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THE LANTERN RECORD.

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SCULPTURESQUE PHOTOGRAPHY—A NEW STYLE OF STATUARY PORTRAITURE.

For many years an imitation of statuary has been made by photography. This has generally consisted in double printing, that is to say, the head of a living sitter is printed upon the bust of a figure cast in plaster, the head of which is stopped out in the negative. Some exceedingly incongruous photographs have been made in this way, although justice compels us to say that in the hands of a real artist some good ones have also been turned out.

An American artist, Mr. C. W. Motes, of Atlanta, Georgia, has produced the finest "statuary" group we have seen. But he has entirely disregarded the meretricious aid of plaster or marble, and has produced his effects solely by lighting. A reduced copy of a large picture 21 by 17, entitled *The Sisters of Bethany*, is given in *Wilson's Photographic Magazine* of last month, and this, as hinted, comes nearer to our beau ideal of a statuary group than any similar work yet presented for public inspection.

The Sisters are clothed in white attire, and suitably posed on a plinth composed of square slabs of granite. We shall say nothing concerning their bare arms, their attire, or their banged hair, because, after all, the Bethany mentioned may not necessarily be that of Palestine, but the name of a town, village, or even a villa residence in Georgia, for in the United States of America Palestine, no less than Great Britain and the Continent, are laid under contribution in supplying names for their rapidly increasing towns and villages; hence a possible explanation of the costumes and personal accessories of these Sisters of Bethany. But, apart from this hypercriticism, the idea is so good and so well carried out, that in the interests of our professional brethren who are longing for something new to give a fillip to business we shall, with the aid of the description of Motes's methods, say a few words more on the subject.

The figure is attired in white and posed against a black background. A black velvet or a green baize background, we learn from Mr. Wilson, is used, a ground of this nature conducing greatly to the effect in general—to the roundness, fulness, and detail of the figure. It is essential that the drapery as well as the figure be artistically posed and hang gracefully. This it is quite possible to do even with our nineteenth century female costumes. But alas for those of the male sex! Unless something of the old time cloak or the Inverness cape be adopted, and these constructed of some white material, the photographer has to face an insuperable, if not unsurmountable, difficulty.

The lighting has to be very soft and diffused so as to avoid deep-cast shadows, and yet there must be a dominant light to prevent flatness. The carrying out of these conditions must be left to the skill and taste of each individual artist. As the maximum of softness and avoidance of heavy shadows are paramount considerations, a generous exposure is necessary.

We have spoken of the background as being black. Where this is not the case in any special picture not expressly produced for "sculpturesque photography," it is not a difficult matter to effect it by a subsequent operation. We have lying beside us a negative as yet undried, by which we have satisfactorily demonstrated this, by obliterating every portion of the background that surrounds the figure. The means adopted were the making up of a strong solution of potassium cyanide in which was dissolved iodine in such proportion that the solution would have remained of a permanent purple colour but for the further addition of a small lump of cyanide, by which it became colourless. This forms an exceedingly powerful solvent of a negative image. To prevent its spreading, a little gum arabic should be dissolved in it so as to impart a body. When, by means of a camel's-hair pencil or fine quill pen, this is passed round the outline of the image, the parts thus acted upon immediately become transparent, all that is then necessary being to wash it off very quickly before the detergent has had time to spread and attack the outlines of the figure. Slightly tepid water dashed on in a spray serves the purpose very well.

While on this topic, we may say that striking effects may often be produced in lantern photographs of portraits by denuding the backgrounds of the negatives of all detail, thus causing in the slide the picture to be seen with a black background.

In conclusion, we are quite at one with the editor of our transatlantic contemporary when he speaks of the inharmonious results obtainable by hoisting the bust of a person "upon a pedestal, which is photographed from a rough pen drawing, and calling it a photo-sculpture. But when we see living figures draped in white, so gracefully and so artistically posed as to represent a work in marble so exactly and faithfully as does this group, we think we have something that is worthy of following." This exactly expresses our sentiments, and we shall be pleased to show the excellent illustration in *Wilson's Magazine* to any who call at our office for that purpose.

DIFFUSED LIGHT.*

The various media employed by photographers for avoiding the effect of direct light have to be considered not only from their aspect as regards diffusive properties, but as to their reflecting and absorptive powers A medium may diffuse light very effectively, but it may also absorb a large amount and reflect more than is convenient if transmitted diffusion is made use of. Thus, one of the speakers at the meeting where Dr. Sumpner's paper was read, Mr. A. P. Trotter, had been interested in the subject for many years with a view of obviating the glare in arc lamps. Another, Mr. Addenbrooke, had been impressed with the importance of the subject when he passed through America three years ago, and noticed the crude manner in which electric lighting was there carried out.

The earliest mode of diffusing the light from the electric arc was by means of globes of ground glass, and, afterwards, of opal glass.. Though Dr. Sumpner's table gives an absorptive power in ground glass three times greater than that of light opal, the effective light is greater from the former, owing to the fact of the more refrangible rays being absorbed to a greater extent by opal.

Suitable diffusion is the key-note of the successful application of artificial light to photographic portraiture. An early exhibited mode, avoiding the difficulty of the glare of the arc lamp for purposes of every-day life, was to hide the light itself and permit its direct and reflected rays to illuminate what was in effect a white ceiling, the light diffused from which was the sole source of illumination in the apartment electrically lighted. For some reason, probably the great loss by absorption, it was not a commercial success. But for photographic portraiture it is the plan best known. The particular plan first utilised in this direction forms the basis then adopted by a multitude of followers. It is, in brief, an arc light (hidden from the spectator) fixed in the focus of a large whitewashed concave reflector—something like a huge movable umbrella whitened in its inner surface—and the lamp fixed about or near the supporting stretchers meet upon the stick. The light from the umbrella, and not the lamp direct, illuminates the sitter. Now, it is quite obvious that, if a suitable diffuser could be placed between the light and the sitter, a far larger proportion would be utilised; but, actually, no such plan has hitherto been successfully devised. The difficulty lies in the utilisation of the rays that fall obliquely on the diffusing surface, few of them are diffused in the direction of the sitter. We consider it would be by no means impossible to devise a system of combined reflectors and diffusers which should waste a minimum amount of the light produced. If there were sufficient demand, there is no reason why a manufacturer should not be able to produce sheets of glass moulded into sets of prismatic indentations, the prisms acting as reflectors set at increasing angles of incidence, as their situation was removed from a normal from the sheet to the light. If such prisms were small enough, they would act as diffusers; if too large, there could be interposed suitable diaphanous media to act as such.

Some such method as this, applicable as it would be to gas, magnesium light, electric arc, or other source of light, would be an immense boon, and would cause artificial illumination to become a "boom," to use an expressive transatlantic phrase. We now bring our remarks and suggestions to a close by appending below the list of media experimented upon by Dr. Sumpner, with their respective reflecting, absorptive, and transmitting power:—

Material.	Percentage Reflecting Power.	Percentage Absorption.	Percentage Transmission.
Blotting paper	82	13·8	9·2
Cartridge paper ...	80	12·2	11·2
Tracing block	35	15·0	54·4
Tracing paper	22	7·0	76·0
Ordinary mirror ...	82		
Ordinary foolscap...	50 to 70		
Tissue paper (one thickness).....	40		
Tissue paper (two thicknesses)...	35		
Yellow wall paper	40		
Blue paper	25		
Dark-brown paper	13		
Yellow painted wall	20		
Black cloth	12		
Black velvet.....	0·4		
Arc Lamp Globes.	Apparent.		
Light opal	15		
Dense opal	39		
Ground glass	42		

It will, of course, be understood that the optical, and not the actinic, effect is referred to in these experimental records.

* Concluded from vol. xxxix., page 819.

Patents in 1892.—The number of new patents applied for during the year just ended was 24,166. This is the largest number that has hitherto been applied for in a year, and exceeds by 1288 the applications for 1891, and by 2863 the year before. Photography, as our weekly lists have shown, has contributed its full quota to swell the numbers.

The New Methylated Spirit in Gelatine Emulsions.—Last week a correspondent sent us two negatives made with boiled emulsions, to one of which rectified spirit was added, and to the other the mineralised spirit. Both negatives were excellent in quality, and fully bore out our correspondent's remark, that the latter spirit appears to be harmless in boiled emulsions. It remains to be ascertained, however, whether its presence in an emulsion prepared with ammonia would be equally innocuous.

Exhibition Rules.—Among the rules for competitors in the forthcoming exhibition of the Fillebrook Athenæum Photographic Society, we note that the competition is open to professionals and amateurs alike, and that there will be no division into classes, with the exception that photographs, which have gained awards in any open competition previous to February 24, 1893, or reproductions of the same, will be placed in a separate class. Fourteen medals "will be placed at the disposal" of the Judges.

The Electric Light in the Studio.—The London Stereoscopic Company have recently adopted the electric light in their Cheapside studio. The power of the light is, we are informed, about fifteen hundred candles, and it is collected and dispersed by a reflector, or, rather, radiator, of the usual pattern. The direct light is cut off from the sitter by means of a small opaque disc placed very close to it; but no transparent screen of large dimensions is employed. The mechanical means for swinging the reflector to any desired position were devised, we were informed, by the Company. Very soft and admirably lighted effects are produced by the light—a fact which should be instrumental in inducing many photographers to adopt the electric light where a supply of power is available from a company' main.

Free Portraits.—The free-portrait scheme, which hasso frequently been exposed in these columns, appears likely to receive another check. The Treasury have now taken up the matter. On Friday last, three men, one of whom is not yet in custody, trading as the Imperial Portrait Company, were charged at the Folkestone Police-court with conspiring to defraud and defrauding. The Inspector of Police stated that the people had also traded under the titles of "The Judge Publishing Company," and "The Star Portrait Company." After certain affidavits had been read, the Bench granted a remand, and liberated the accused on bail. It has long been a surprise to most photographers that the Treasury have not interfered in the matter before.

Photography and the Oscillation of Projectiles.—Before the Physical Society of Berlin, on November 18, Professor Neesen gave an account of experiments made with a view to the photographic recording of the oscillation of projectiles. He employed hollow projectiles, in whose interiora was placed a sensitive plate, illuminated by sunlight through a small opening. During its rotatory flight the ray of light described curves on the plate, from whose position, taken in conjunction with that of the sun, the oscillation of the axis and point of the projectile would be calculated. The results obtained showed that both the axis and point perform oscillatory movements during the flight which are very different from those usually believed to take place. In order to study these more accurately, Professor Neesen is busy with the construction of some arrangement which may admit of the introduction into the projectiles of sensitive plates which shall not participate in the rotatory motion.

Enamelled Carbon Prints.—*Apropos* of the article last week on a simple method of producing enamelled prints we may mention that, if any uncertainty is experienced in judging of the development when plain glass is employed, it may be obviated by very simple means. A plate of transparent glass can, for that purpose, be rendered equivalent to one of opal very easily in the following manner:—Clean one side of the glass perfectly; then soften a piece of double transfer paper in warm water in the usual way, and squeegee on to the glass, and allow it to dry; when dry, immerse in a dilute solution of alum for a few minutes, rinse, and again allow it to dry. Now, if the print be developed on the other side of the glass, there will be no more difficulty in judging of the development than if opal glass were used. The paper backing, being unaffected by the warm water, by reason of its coating being rendered insoluble, will last for scores of developments. Indeed, the only deterioration it is likely to undergo is mechanical injury.

Yellowing of Platinotypes.—During the past year several examples of what have been termed "fading" platinotypes have been brought under our notice. In every case there has been no trace whatever of fading in the true sense of the term, though there has been a decided yellowness in the whites of the picture. Unfortunately, when a photograph undergoes any change whatever, even if it is only in the paper itself, it is put down to fading. This is not the case with engravings. When the papers of these acquire a yellow tint, as most papers do with age, the print is said to have improved, and become more valuable, on account of its "mellowness." Now, the image of a platinotype is practically as permanent as that of an engraving, though the yellowing or the toning of the paper is not looked upon in the same light, yet the effect is very similar and with some is considered an improvement, rather than otherwise. Be that as it may, there should be no change; and, if there is, it is a proof of carelessness in the removal of the iron salts after the image is developed. We are aware that many so-called platinotypes that have been issued during the last two or three years are nothing more than bromide prints, and, it so happens, the yellowness, so frequently seen with the latter, is much more objectionable than it is with the former. With an albumen print it is even worse.

Copyright in America.—A case of considerable interest to English publishers, with regard to American copyright, has recently been decided in the United States Circuit Court for the district of New Jersey. It is the first case that has been decided under the new Copyright Act, by which English publishers are enabled to obtain copyright in the States. Briefly stated, the case was this. The Woodburytype Company published an engraving from Sant's painting, *Little Lord Fauntleroy*. The engraving was duly copyrighted in the United States. Shortly after the first artist's proofs were placed in the American market, the engraving was pirated in the form of a chromo-lithograph. Upon this the Woodbury Company (Eyre & Spottiswoode) commenced an action and obtained a preliminary injunction, and since decrees have been entered. The final decrees now entered recognise the rights of the complainants, and provide for perpetual injunctions restraining the sale of the chromo-lithographs. From this it will seem that English publishers have a remedy against the wholesale piracy of their works from which they have so long suffered, and that the new Act is not altogether so one-sided as at one time it was thought it would prove.

"We Live and Learn!"—The *Pacific Coast Photographer* says: "It is a pleasure to note how often useful machines of service to the fraternity hail from America. We make here finer optical apparatus than can be produced anywhere in the world. Our cameras are acknowledged to be far superior to those of any other country in all respects—compactness, lightness, finish, handiness, and rigidity. Since the McKinley tariff bill placed a higher tax on albumen paper, a surprising increase in the number of factories manufacturing photographic papers is seen on every side, and the consequence is that the photographer, who growled at first from morn till night at what he was wont to term an unjust enactment, is really benefited tenfold. No less than twenty-five different collodion and gelatino-chloride papers have been placed on the American market in the last two years, and it is but a short time ago that we noticed a writer in an English contemporary in which the author bemoaned the fact that the gelatino-chloride papers of England were nowhere near the standard of those of America. It is estimated that over 300,000,000 eggs will be used this year in the manufacture of American albumen paper, while ten years ago the number was hardly worthy of notice!!!"

The Daguerreotype.—While it is an undoubted fact that the Daguerreotype is, and has proved itself to be, the most permanent of all silver pictures, the image is really more delicately constituted and more liable to suffer injury from disturbing causes than any other kind of photograph. This tender condition of the image is often not fully realised by those who have only had to deal with collodion and gelatine negatives, and the prints therefrom, until, perhaps, a valuable portrait has been irretrievably ruined. We have known of scores of such instances. Here is a case in point that has just come under our notice. A Daguerreotype, that was as perfect as it was when taken between forty and fifty years ago, was placed in the hands of a professional photographer to copy. The copy was made, but, instead of the original being returned to its frame, and that made airtight, it was allowed to stand on a shelf for a day or two, where it was exposed to dust and the sulphurous fumes from a coke stove. The result might well be anticipated by those having but a superficial knowledge of the process. The image was almost obliterated with tarnish and, in removing the dust, it was badly scratched. Here was a picture that had endured unchanged for nearly half a century, ruined in a few hours, entirely through ignorance of the conditions. The tarnish it is true, could be removed, but the scratches never. It may be assumed that a Daguerreotype is never required to be copied now unless great value is attached to it by its owner; therefore the greatest care should be taken with it by the photographer. When it is taken from its frame, if there is any dust upon it that cannot be removed by blowing, it may be lightly dusted with a soft and perfectly dry camel's-hair brush, and, as soon as the copy of the picture is made it should be restored to its frame and at once hermetically sealed up as it was originally. The "fading" of a Daguerreotype is simply a tarnishing of the plate, just as silver or plated goods tarnish by exposure to the atmosphere, and is very rapid when sulphurous vapours are present. Although the cleaning or "restoring" of a Daguerreotype is a simple matter, it should not, if the picture is a valuable one, be attempted by a novice.

A NOTE ON HALATION AND DOUBLE FILMS.

It is not my intention to discuss the theory propounded by Mr. Gregor Grant in his communication to the West Kent Amateur Photographic Society published in last week's JOURNAL, beyond remarking that, if it be correct, then it seems impossible to produce a negative with clear shadows on the plates he mentions. With regard, however, to the use of an under-film containing chromate of silver, alluded to by him as having been proposed by Mr. W. K. Burton, I think it is easy to prove that such would be utterly impracticable.

En passant, I think the writer of the article is scarcely correct in his facts when he states that Captain Abney was "the first person to lay down any law" on the subject of halation—to, in fact, point out that it is due, in some cases, to reflection from the back surface of the glass. Captain Abney would, I am sure, be the last to make any such claim, as this, one of several causes of halation, was first pointed out by Mr. Marlowe as far back as 1860 or 1861, and the remedy—backing the plate—was indicated by the late Major Russell in 1864. I myself used annatto in that year, and subsequently burnt sienna and gum, or dextrine, and few dry-plate workers of that period and later, until gelatine came in, ever dreamt of using unbacked plates. As a matter of fact, we have had what is simply a resurrection of "backing" in connexion with gelatine plates of late years, and some people seem to regard it as a new idea.

Turning to chromate of silver, I have not the means at hand of referring to Professor Burton's communication on the subject, and do not remember his suggestion as quoted, though it is very likely it was made *as* a suggestion. I recollect his publishing some experiments on the sensitiveness to light of chromate of silver, which I was unable to repeat. Chromate of silver is extremely soluble in ammonia, and forms double salts with other alkalies. The effect of applying alkaline development to that salt would therefore be to form a soluble silver salt, which would necessarily be reduced by the pyro or other reducing agent unless the liberated chromic acid instantly recombined. At any rate I could never obtain any definite reduction that could be fairly ascribed to the action of light with pure chromate of silver.

But chromate of silver in the presence of a silver haloid is a different matter altogether. Captain Abney was the first person to point out some fifteen years ago the action of the bichromates, in destroying the effect of light, and this action has an important bearing on the suggested application of the under film of silver chromate. Upon the application of a developer the first effect following, or rather accompanying, any reduction, however slight, would be the liberation of bromine or other halogen, which would next combine with the free alkali of the developer, or, more probably, go direct to the chromate of silver to convert it into bromide and liberate chromic acid, which in turn would combine with the alkali of the developer. At the very outset, before reduction had become visible, in all probability a free soluble chromate would be present to arrest all further developing action—to, in fact, destroy the effect of the action of light. How minute a trace of chromic salt suffices to do this will be familiar to those who have employed bichromate for the purpose of curing foggy emulsions. Even after a very considerable amount of washing, such emulsions are often extremely insensitive, although the proportion of chromic salt remaining is so small as to escape any but the most careful tests.

I have never actually tested the chromate under film, nor, indeed, have I tried the effect of a developer upon one containing chromate as well as bromide of silver, but I can describe the effect of an analogous mixture, namely, bromide of silver and chromate of cadmium, that is to say, bromide of silver in the presence of an insoluble chromate.

At the period of Captain Abney's publication of the effect of bichromate in destroying the latent image, in the course of experiments having for their object the clearing of foggy emulsions, it struck me that we should find bichromate a useful "indicator" in accurately adjusting the combining proportions of silver nitrate and soluble bromide. Accordingly, an emulsion was made with excess of silver, allowed to ripen for the usual period, and then a single drop of saturated solution of bichromate added, which, of course, changed it to a red colour. Alcoholic solution of bromide was then added gradually until the red tint was just discharged, after which the emulsion was washed in the usual manner.

In my previous experiments in washing the emulsion in solution of bichromate in order to eliminate fog, I had attributed the absence of sensitiveness to the employment of too strong a solution; but when I found that the emulsion which had had so small a quantity as one drop of aqueous solution in five or six ounces, was absolutely without sensitiveness even in strong daylight, I was puzzled. The result, however, was precisely the same after two or three repetitions.

The cause at length dawned upon me, and actual trial proved the truth of my auspicion. The collodion was bromised with cadmium or rather with the double bromide of cadmium and ammonium, and the same salt had been used to correct the excess of silver thus forming by the decomposition of the small quantity of silver chromate, chromate of cadmium, which remained in combination with the silver bromide. The chromic acid was converted to the soluble state by the developer, or rather a soluble chromate was formed, and this prevented any reduction. After a prolonged washing in very dilute ammonia, the sensitiveness was partially restored, owing to the removal of the insoluble chromate, but never completely.

As the result of that experience, I am very doubtful of the possibility of any useful application of chromate of silver as a photographic agent.

W. B. BOLTON.

ON THINGS IN GENERAL.

A HAPPY NEW Year to all my readers; plenty of business for the "Pros.," few failures for the amateurs! I wonder if the last wish is really a good one? My experience of the photographers who "never have any failures" is, that their work is worthless and their opinions useless. I cannot, however, say the same of some work of letter-writing, which THE BRITISH JOURNAL OF PHOTOGRAPHY has recently had good share of, referring to exhibition matters. Mr. Hector Maclean has hit the exact blot when he writes: "In most assemblies, and particularly restricted ones, there is to be found one man palpably taller than the rest—one whose *obiter dictum* has almost the force of law, and is in itself powerful enough to prevent the formation of any independent judgment." Exactly so! Three or four good men and true in matters photographic, when left by themselves, suffer themselves to be pooh-poohed by one of their number, famous, perhaps, for his work, his medals, or his general ability, or, possibly, his loud voice, and scarcely venture to assert their individuality, or have the courage of their opinions, if traversed by this mental tall one. The practical result is, that the judging is his, with a reserve power of throwing the onus of imperfect judging on his fellow-jurors. It is, virtually, one-man judging, and, as such, has merits of its own. I entirely agree with Mr. Maclean's suggestion, that the judging be done by the "mark system." Only, if so, let it be carried out in its integrity in the manner he indicates. I well remember one occasion, when I formed part of a "jury," all the members starting out with this laudable system in view, but, when notes came to be compared, the result was, practically, that A, B, and C stated which pictures they considered entitled to awards, talked it over if there was no unanimity, and amicably settled matters. A good English system of compromise, no doubt, but not the *mark system*. If well carried out, there would be no room for such injurious insinuations as recently appeared over the signature of "Young Member," who, so far, does not appear to have redeemed his promise to the Editor, that he would reveal his identity by signing a reply letter with his own name.

I have been much interested in the question of magnifiers for retouching, treated by the Editor and Mr. G. R. Baker, the latter, as one commercially conversant with the optical requirements of the public, and possessing further a knowledge of optics, giving advice of the soundest character. Nothing could be more timely or nearer the truth than his remark that "there is no doubt that in many simple or every-day matters of optics a great deal of carelessness is at times shown, and consequently that precious organ of sight, the eye, seriously affected." In his comments about astigmatism, where he states that a great many persons are affected by it, I believe he might have gone further, and said a large majority possess eyes with that peculiarity more or less developed. But few are aware of the defect, or when very marked simply put it down to weak or near sight, and are always experimenting with spectacles of various strength, none of which of the ordinary double convex kind, of

course amend the optical definition to any serious extent. But, turning now to the origin of the matter, the inability of a retoucher to use a pair of spectacles of eight-inch focus, though a four-inch diameter magnifier of the same focus was easy and satisfactory to use, it is singular to find that two such excellent authorities as our esteemed Editor and Mr. Baker have entirely missed the point. The difference between the use of the above magnifier and a pair of spectacles is that in the latter the eyes are placed almost close to the lens. In the magnifier the eyes are always used at a distance of several inches. The action of the lenses and the extent of the apparent amplification is entirely different. Indeed, a perfectly satisfactory result is obtained when (looking at the lens from a prismatic standpoint) an object is viewed through a large magnifier in such a way that both eyes are on one side of the prism. This is readily seen by covering one-half of such lens by a piece of cardboard. Good results will be obtained whether the cardboard be held vertically or horizontally across the lens.

But, speaking of optical matters, one of the richest things I have seen for a long time is an article in the *New York Photographic Times* over the signature of P. C. Duchochois. He is correcting an article, a reprint from the *Scientific American*, which had previously appeared in the *Photographic Times*. The following sentence from the second paragraph in his correction is quoted verbatim:* "Objects at various distant planes appear in relief when seen at a certain angle, theoretical for our vision, one having for its base the distance which separates the centre of the two eyes, about 2¾ inches." The spelling of the word "centre" suggests that the sentence itself may be a quotation: but, however it may be taken, it appears to be meaningless. Then, to explain matters, he takes two woodcuts of stereoscopically different places, one the right way up and the other upside down, and calls them pictures seen by the right and left eyes. He then repeats the two engravings upside down, and calls them the pictures seen by left and right lens. He ends by stating that a stereoscope "consists of the two halves of a bi-convex lens, which consequently give to the rays of light exactly the same direction: they are convergent." This is too delightful—rays the same direction, and convergent. Finally, he ought to know that the idea that the lenses should be prismatic in their section for stereoscopic effect to be produced is long ago exploded. The best form of stereoscope is one in which whole lenses are employed and the view looked at through their axes.

FREE LANCE.

BREADTH.

AMONGST all the terms imported into the vocabulary of the photographer from the artist none is being more frequently used at the present time than the term "breadth."

That photographers should gradually appropriate the expressions of artists is not to be deplored. These terms have most of them been long in use, long before photography was dreamt of: and the fact that they still survive may be taken as proof that they fulfil their functions satisfactorily. These terms, somewhat meaningless in themselves, have come to have a very definite meaning attached to them: and, as the term "breadth" is frequently quoted in an erroneous way, it might be profitable to inquire into the precise meaning of the word. While it might be difficult to frame a hard-and-fast definition of the quality denominated breadth, it is not difficult to explain what it is. It is that quality which makes for simplicity; it may apply to outline or form, to light and shade, or to colour.

In an outline drawing whatever deviations break in upon the general direction of the line render the design more complex, and therefore destroy breadth. Again, in light and shade, whatever deviations break in upon the general tone of a mass destroy its breadth. The power or effect of a mass of colour depends entirely upon its being as far as possible unbroken. I do not enter into the question of how far this quality of breadth or simplicity is to be carried out; manifestly it might be carried too far. I am only concerned with its identity. Now, to what extent can it be said that photographs have breadth?

If we narrow the meaning down to that quality which an artist puts into his work as deliberate design or intention, *apart from Nature*, I am ready to argue that they have none of this quality, notwithstanding the out-of-focus dodge. On the other hand, if you admit breadth of effect in Nature, then, of course, a photograph will have breadth or no, according to what effect was there when the plate was exposed.

But, since the latter statement has never been denied, let the attention be entirely confined to the former conditions, that is, where Nature herself is rather too complex for either artist or photographer to treat with success pictorially—where, indeed, Art can improve on Nature, bringing order out of disorder.

Now, let us clearly understand what has to be done. First, in order that the *outlines* may be more evident and easily followed, deviations from the general direction of the lines must be curtailed. By this means the eye follows with ease the simpler lines; in other words, breadth is introduced.

But photographs from Nature are not merely outline drawings—they have light and shade, and breadth must be introduced here also. There is only one way of doing this, and that is by a process analogous to the former. All deviations from the general tone value of the mass must be curtailed. Just as unity is power in social matters, so unity is power in pictorial matters, and by bringing a host of independent entities into subjection the design is simplified, and power correspondingly increased. Now, since the artist makes his picture *ab initio*, he can, of course, introduce breadth to any extent; but how about the photographer?

It has become a part of the advanced photographer's creed to put down want of breadth in a photograph to an over-abundance of *detail*. Accepting the objectionable and slipshod expression, it is not difficult to show that there is no such thing as detail *per se* in any picture, that is, since everything in a picture is represented by outline, light, and shade. When an individual says there is too much detail, he must only mean that both outline, and light, and shade are too complex for effect. It is now proposed to mend matters, by putting the picture, to some extent, out of focus; and, first, what effect will this have in simplifying outline?

It must be admitted that this will, to an *infinitesimal* degree, curtail deviations from the general direction of the lines; but note that it is at the expense of a hazy outline, which, in place of being more easily followed by the eye, is still more difficult. Contrast this with what one sees in Nature. As objects recede from the eye the outline gets less and less intricate, but the *general* outline remains quite sharp, till at last the distant hills at the horizon, in place of having a "fuzzy" outline, stand out with razor-edged sharpness against the sky, and this, too, so long as there is a trace of them visible.

When the artist would introduce breadth into his picture, he simplifies the outline by sinking deviations from the general direction of the lines, not by making a fuzzy outline. In this he copies Nature, acts on her plan.

I repeat that, in Nature, as the complexity of the outlines gets less and less by distance, so the general contour gets more and more definite; but, bad as an out-of-focus picture is in outline, it is still worse as to its light and shade, for, since by no reasonable amount of racking out or in can the light and shade in any photograph be materially altered, by robbing the shadows of their detail their identity is lost, and they become meaningless patches of black. The same holds true of the lights, of course.

In point of fact, detail, to use the word in its somewhat indefinite but ordinary sense, may be present in a high degree without interfering with the breadth of a picture at all, the only condition being that it be invisible from the distance necessary to command the composition as a whole, in which case I admit its uselessness, of course.

The distance to which one must retire in order to command the composition as a whole ought to determine the amount of so-called detail, for, while more of it may not, if judiciously handled, injure the breadth of the picture, it is at least so much labour lost if it is not visible from the standpoint proper to view the picture. In my opinion there is only one way of introducing breadth into a photograph—choose a subject having the desirable quality in itself.

J. K. TULLOCH, M.B.

* *Photographic Times*, p. 644 (No. 587).

HOW TO MAKE PEN-AND-INK DRAWINGS FOR PROCESS WORK.

IT will be remembered that in a recent number I explained as far as could be done on paper, the process by which phototype illustrations are produced for the Press, and the manner in which copies may be taken from photographs for this purpose. I will now endeavour to make clear in as precise a manner as possible the way in which the illustrations, technically known as "line" drawings, are produced.

In the first place, it has often been said, even by men occupying high positions in the artistic world, that artists are born and not

made. To a certain extent this is correct, as no doubt in this profession as in all others, the genius of the first water, the man who stands head and shoulders above all his contemporaries possesses an inborn talent for his work; but it is possible for any one gifted with an ordinary amount of intelligence and capability for hard work to make a more or less skilful draughtsman. The path to success, however, is by no means an easy one, continual study and labour being essential at every stage. In fact, it is impossible to become absolutely perfect. For the artist of feeling the whole world, animate and inanimate, affords interesting matter for thought and study; and, as one of the chief means of obtaining a hearing in a profession already overcrowded with men struggling to get a foothold is to strike out an original line, it is necessary that the student should possess a keen eye for fresh subjects, and a vivid and retentive memory. Granted these conditions, the ambitious pupil may commence his studies.

As the general reader is probably ignorant of even the first principles of an artist's method of work, it may not be uninteresting to state briefly some of the leading rules by which it is necessary that he should be guided. It is useless to commence drawing anything unless you have a clear and definite perception and grasp of your subject, and thoroughly understand its proportions and have defined its limits. As in photography, so in a greater degree in draughtsmanship, a clear knowledge of the value of lights and shades, and a thorough acquaintance with "perspective" is of first importance, and it is here that a great deal of hard work can be put in. Perhaps the best books for a beginner are Vere Foster's, where the information is prepared and arranged in a most careful and commendable style.

For landscape work, after the preliminary courses have been gone carefully through, the student should endeavour to advance by very easy stages—that is to say, to choose at first a subject which he can clearly grasp, where only one line of perspective is required, and where the background is not confused by a variety of objects.

For instance, we will imagine that the scene chosen is a country lane, with a wall on one side and an open field on the other, with a farmhouse in the far distance, and a few trees within the line of sight, behind the wall. It will be easier to attempt this in winter time, when the branches of the trees are quite bare, as the leaves very often prove extremely difficult to render naturally. The student should be careful to avoid standing in a too central position, and should endeavour to reproduce the shadows only, taking no notice whatever of the lights, as a much finer artistic effect is obtained by adopting that course. It is a mistake to suppose that the outline itself of the subject should be drawn; it is the shadows that should be filled in, and the real outline, as far as possible, merely reflected, or suggested by broken lines. By broken, I mean that the pen should be held very loosely, and should be guided so as to produce a wavy rather than an absolutely straight line, and it should be lifted altogether from the paper at intervals of from a quarter of an inch upwards, according to the size of the sketch. Straight and unbroken lines make a very crude and unnatural impression when the drawing is finished, and, in fact, a true picture could not be drawn if continuous lines were used. Tints are got by varying the thickness of the lines. Thin and open lines must be drawn to depict the lighter shades, and as the shade deepens in intensity the lines should gradually increase in thickness and at the same time be placed closer together. Care should be taken to keep the lines from running into each other, and to make no attempt at crossing until the strokes are dry. If this is not carefully watched, the risk is incurred of losing part of the effect by the confusion and running of the lines, whereas, in crossing, it is necessary that each stroke should be quite separate and distinct.

In order to train the eye to appreciate beauty and flow of line, the beginner would do well to study the lines used by some of the best artists whose drawings are reproduced on wood, especially as regards the angle at which lines running transversely should be drawn, as nothing is so detrimental to a pen-and-ink sketch as to see the lines crossing at wide angles. In the case of rural scenes, and, in fact, in any kind of work, with the exception of architectural subjects, it is desirable to avoid using photographs except as an after-guide for the sake of comparison; but with buildings it would save time and trouble if the student procured a photograph of the subject chosen. He would in this case be enabled to obtain a more strictly correct drawing than if he merely sketched it upon the spot, for in such work the lines are necessarily longer, straighter, and firmer than in figures or landscapes. After carefully copying with pencil every detail as an architect would do, he should proceed with pen and ink to suggest the shadows, as stated previously, rubbing out all lines in the high lights. This gives a very sketchy appearance to the drawing which the novice is apt to believe is easily produced, but it is, in reality, only obtained by taking the greatest care in the first drawing out. The pupil, by studying the works of Joseph Pennell, who is considered the best artist in pen and ink of the present day, will get a better idea of what I intend to convey in the foregoing.

Without the aid of explanatory illustrations, it is exceedingly difficult to describe exactly the means which are used to obtain artistic effect and workmanlike appearance in a sketch; but perhaps these few hints will help to a better understanding of artists' methods when their bearing is taken in conjunction with specimens of work such as I have described.

Of course, much difference of opinion exists as to the degree of merit of different artists, but, in the main, it will be seen that they all work from the same basis and use the same means to obtain what, by virtue of their various methods of execution, gives to the eye an altogether different effect when completed.

Now, with regard to figure drawing, it is worse than useless to attempt to copy photographs unless, perhaps, those taken by the stereoscopic process, which, when focussed in the special lens made for this purpose appear as they would viewed from the figures themselves. In order to be able to sketch true to the life, in addition to his lessons in pen and ink, an artist should carefully study the principles of physiology and anatomy, and endeavour to make a true delineation of every bone and muscle in the human body. The proper course to follow to gain this knowledge is to join what are known as the "Life" classes. Here the construction of the frame is first explained by means of casts of different portions of the limbs and body, and the student is gradually led to the higher studies from the nude. In this connexion also, it may be said that perfection is never reached. The frame is made up of so many delicate and intricate muscles and sinews that to trace, and faithfully copy, every one is the work of a lifetime.

After finishing the English classes, many of the promising men are sent to Paris, where, as every one knows, art is supposed to have reached its topmost pinnacle. Germany and Italy also afford vast fields of knowledge for the artist who desires to become a true cosmopolitan in his profession. Of course in Italy the schools are mostly devoted to the teaching of painting, as in that country one is able to obtain probably the finest scenery in the world. A. J. Gough.

PHOTOGRAPHY AT THE MUNICIPAL TECHNICAL SCHOOLS, MANCHESTER.

At the Municipal Technical Schools, Manchester, the optical lantern is extensively used by the various teachers, and the slide supply is an important branch of the "preparation." Many, if not most, of the slides are necessarily made from drawings, diagrams, &c., in the various text-books, and it is to the reproduction of such illustrations that a special department has been created, which has been found an immense boon in many ways. There are two rooms occupied, one containing the apparatus for making negatives and for finishing the slides, the other as a dark room.

The apparatus used is that invented by Professors Strode and Barr, and it is a marvel of compactness and efficiency, the illumination used being that obtained from two Argand gas burners. The plates used are "the Castle brand," the exposure varying from one minute to two. The whole arrangements are brought down to almost a mechanical operation, as scales are fitted at all points. For instance, we will suppose a diagram nine inches long is to be reduced to lantern-slide size, the book containing it is placed on the top of the box, the diagram being hung opposite the camera, or, if a loose diagram, it is pinned upon a board, which can be hung *in situ* without trouble. The camera stand is next pulled away until a pointer on bottom is at figure 9 on the tramway. The back of camera is also pulled out until a similar pointer is at 9 on the base of camera, a glance at a scale running up the side of it perhaps shows that the bottom line of diagram is eight inches from top, and that the top line of diagram is two inches from the top. These two added together total ten, so a small screw at the side is loosed, and the camera raised or lowered until a pointer on side is at ten. Then, on glancing at the ground-glass screen of camera, we shall find that the image is the right size, is in centre of plate, and is in good focus. Remove the focussing screen, insert the dark slide, and with 105 seconds exposure we shall obtain a correctly-timed negative.

In entering the dark room strangers always step in very gingerly, and ask if the floor is safe, because the room has been the shaft of a lift; this room is lighted from the top, being covered in with two thicknesses of orange fabric for lighting in the evening, or, in dull weather, a small incandescent lamp in an orange bag hangs conveniently over the bench, and the current can be switched on without any trouble. A special hydroquinone developer is used, and is

generally allowed to act whilst two more exposures are being made by which time, as a rule, the negatives are fully developed, ready for washing and fixing. After fixing, they are thoroughly washed in an automatic apparatus, then put on rack till dry; when dry, the negatives are examined, and those needing the operation are intensified, bleaching with mercury, followed by ammonia, or by hypo, if only a little extra density is required. The slides are made upon Mawson's lantern plates, the exposure being made to the light of a gas-jet at a distance of nine inches, the developer being hydroquinone. When ordinary photographs are to be copied, about three times the exposure is necessary, the developer used being pyro soda for the negatives, and hydroquinone for the slides. Slight over-exposure in the slides is corrected by immersion of the slide in a mixture of hypo and ferricyanide of potassium.

The department is worked entirely by Miss Williams, and, although only of very recent establishment, the slides produced are of a high class, and the quantity sufficient for this unique school. The present schools (three separate buildings) are shortly to be superseded by a magnificent pile of buildings, in which photography will be allotted a good position.

The classes on photography and photo-mechanical processes are quite new, but up to the present are well attended, and the pupils show some excellent work. The lectures are practical as well as technical, and treat of modern methods instead of, as is usually the case, obsolete or nearly useless ones. W. T. Wilkinson.

A SUGGESTION FOR REGULATING AWARDS AT COMPETITIVE PHOTOGRAPHIC EXHIBITIONS.

Most will agree that the task of awarding medals and adjudicating upon the respective values of pictures sent to photographic exhibitions has hitherto been of a somewhat thankless and unsatisfactory nature. Why this is so is hard to define with any certainty, for those to whom the task is entrusted are invariably selected for their known discrimination and knowledge in matters of the kind. No matter who the Judges may be, there is always more or less grumbling at the results, and not always from the non-recipients of the awards.

I will now suggest what, perhaps, may be when more elaborated an improvement in the system of judging usually adopted. My idea is that there should be a kind of *standardised opinion*, to be settled by committee as to details, but constructed on the following lines. To make myself clear, I will sketch how the judging is frequently managed. The gentlemen appointed for this office examine the photographs one by one, or ought to, and put down on a strip of paper a certain number of marks, as representing the value of the picture under their examination. The higher the number, the more favourable the opinion; from one to ten is usually adopted. At the end of the examination the numbers given by each Judge are added together, and the photograph receiving the greatest number of marks is considered the prize picture. It will be seen that this system is defective, because each of the four or five censors may estimate the value of the picture from quite a different standpoint that can have little or no connexion with the other. One may appraise a picture for its artistic qualities, and another for its manipulative excellencies, and others from standpoints in their own minds utterly distinct from the rest, with the result that good qualities of different kinds actually *neutralise* each other; and the whole ends in an unsatisfactory muddle, the Judges themselves being more or less surprised at the result, although it would seem no better plan could be adopted than the absolutely unbiassed opinion of capable men so obtained.

My proposition is that, in the first place, *definite* qualities shall be adjudicated upon, and these classed under four heads:—

1. Artistic excellence—grouping, lighting, posing, and form.
2. Manipulative excellence—brilliancy, delicacy, and freedom from defects of all kinds.
3. Colour and texture.
4. Mounting and framing.

Printed lists should be provided as indicated in diagram. The first column containing the number of the pictures, and the following ones headed as above, with a division for remarks.

	1	2	3	4	Remarks.
1					
2					
3					

Suppose each Judge is supplied with one of these printed lists. He will examine No. 1 picture, and place so many marks, according to his judgment, under the different headings from I to 5; the higher the number, the higher his estimate. While, for example, let us say of No. 1 that 5 will express his estimate of the first division, 2 of the second, 2 of the third, and 5 of the fourth. Now, proceeding to No. 2, his figures might be 1 for the first division, 5 for the second, 5 for the third, and 5 for the fourth. The aggregate total of marks would be 14 for No. 1, and 16 for No. 2, giving preponderance to the less important qualities; but, as in the first division No. 1 is of more importance than in No. 2, the excellence of the picture is estimated to be better in No. 1 than in No. 2, on account of division I being the most important in picture-making. But it will be said that this is judging the picture from a solely artistic standpoint, and making the other divisions of no account. So it would if this was the end of it; but to remedy this *the standard must be formed* to fix how much more *proportional value* shall be given to No. 1 division over No. 2, and No. 2 over Nos. 3 and 4. I would propose the proportion to be 9 for the 1st, 3 for the 2nd, and 1 for the others. It would then be very easily estimated which picture was best *according to this standard*, and by adopting the same at all photographic exhibitions I think a fairer estimate would be given to the work than by the present system. The aggregated lists might be prepared and exhibited in the show-room, and would indicate to all the points and qualities that influence the Judges in making their awards. The column for remarks might contain the collective opinion of the censors on the work in its entirety, or refer to any particular or unusual quality in it.

There are some who think in giving a decision *no reason* should be publicly announced; but I think in this case the indication of the grounds of the nward would be both an advantage and satisfaction to all concerned. This is, however, but a crude notion of a plan I fancy would work satisfactorily if carefully elaborated, the dominant idea being the *foundation of a standard* that would be the means of *fairly* estimating the *different* qualities of a photograph, each of which may be equally good in its way when estimated from different points of view, but not one that would permit a fair estimate of the work when taken *en gros*. Edward Dunmore.

COMMERCIAL MOUNTANTS.

[American Journal of Photography.]

The word mountant has long been adopted as a convenient expression to denote the mixture made use of to confine paper prints in their proper position on the cardboard. It is thus one of our technical terms in photography, but persons sometimes go wrong in the use of even these simple expressions, and we remember once seeing this term mountant translated into a German photographic contemporary by language meaning a man who goes up mountains!

The chemical relation between mountants and the fading of mounted prints is a matter which still commands the attention of practical photographers, and it is to be regretted that no specific directions how to make silver prints permanent can be given. It is impossible for us to say, Make your prints on this or that paper, silvered thus, toned thus, and fixed and mounted thus, and then they will never fade. All that we can do is to take the ripened experience of many years and say, Avoid certain things in making your prints, for it is known that they cause fading in a comparatively short time.

Commercial mountants may be divided into three classes, the gelatinous, the starchy, and the mixture of the two together. Now, nothing is more convenient than to have a bottle of mountant always in readiness, so that prints may be mounted at short notice; but is this proceeding a safe one as regards the permanency of the print? While we believe that an affirmative answer might be given in the case of platinum and, perhaps, bromide prints, we certainly condemn the using of any other mountant than a fresh-made one for prints made on silvered paper; moreover, we assert this most strongly against gelatine mountants of all kinds, but particularly those to which glycerine has been added.

Some of the less conscientious persons in the photographic calling do not scruple to mount silver prints with the commonest kind of glue. We merely allude to this matter in order to express our strongest disapprobation. Almost everybody knows that the difference between refined gelatine and common glue is one of degree rather than of kind; but even the finest commercial gelatine is not now deemed safe. Gelatine is a substance possessing a strong affinity for water, and this is greatly increased by the addition of glycerine. The glycerine is very desirable, almost indispensable indeed, in a pure gelatine mountant, because it renders the mixture less horny, and more workable. Now, it is open to doubt whether prints mounted with such a compound ever really dry. We have known prints so mounted, and kept in a perfectly dry place, to leave their mounts at the slightest touch, while others framed and hung on a wall began to fade almost immediately.

These remarks will be understood as applying to the ordinary silver print on either albumenised or plain paper. As we said a moment ago, platinum or bromide prints could fairly be expected to last better, because neither of them contain that delicate albumeno-silver compound upon which the beauty and the instability of the silver print both depend. It is also well known in photography that all developed images are more permanent and lasting than those which are "printed out." On this ground alone, better results in permanency are to be expected from bromide and platinum.

There is a class of commercial mountants partly or wholly starchy in character. All the forms of parlour pastes rank in this category. It seems strange that, while plain boiled starch fresh made is the best and safest mountant, flour paste should have always been in bad odour amongst photographers. Yet practice and experience—the safest guides to follow—prove this to have plenty of foundation. Pastes made of ordinary wheat flour are very prone to mould; and, while this tendency can be counteracted in great measure by certain additions, they themselves have an injurious effect upon either the silver compounds in the print or upon the whiteness of the paper. Dextrine also belongs to this class, being a derivative of starch. Gum arabic is out of the question, being at once too much inclined to turn sour, and very expensive if good qualities are selected. Indiarubber was at one time quite in vogue, and if it played the same trick as gelatine with glycerine, in letting the print scale off after a time, it was at least harmless as regarded any injurious effect upon the stability of the print.

Silver prints of large dimensions are sometimes sized with a gelatine sizing and varnished. The practice cannot be called a safe one, however. Recent experiences point strongly to the danger of using gelatine in any form with a silver print. This applies also, we regret to say, to the cementing of prints to glass. It is probable that Canada balsam could be made to serve for this purpose. If gelatine must be used, however, we advise the best quality only, carefully tested for acidity, and used if possible without glycerine. If the prints peel off the glass, the glycerine will have to be added. Cemented prints ought always to be hermetically sealed in their frames, or at least as nearly so as possible, and hung in a place perfectly free from dampness.

On talking these matters over with one of our oldest and best photographers, he went so far as to condemn commercial mountants altogether, calling them "a lazy man's resort." While this may be an extreme view to take of the matter, so far as amateurs are concerned, we are, nevertheless, sure that it is the correct and safe one for the professional photographer. Starch paste, the best and safest mountant, is made in a few moments with little or no trouble and expense. It should be made fresh every day, and never kept over; and the brushes and vessels well washed the last thing at night, to be dry and ready by morning.

ELLERSLIE WALLACE.

PHOTOGRAPHING LOFTY INTERIOR WORK.

HAVING read an article in a recent issue of this JOURNAL on "Photographing Stained-glass Windows," it occurred to me that a plan I have found useful for, not only windows, but for any other lofty-situated subject (as capitals of pillars, carvings, and such like), might be useful if more generally known. All that is required in addition to the usual apparatus is a supply of string and a pair of tall steps. The steps are almost always to be found in churches and cathedrals, or the verger will supply them. The idea is to raise the camera, roughly focussed, centrally as convenient with the object to be photographed, and expose by means of a cord attached to the lens cap and focussing cloth by the operator standing on the ground. In the first place, set up the camera, and ascertain the distance required to get the proper-sized image. This can be done on the floor of the building with very little trouble. This being ascertained, set up the steps in the right position, and secure the camera on the top of them by cords, or by boring a hole through the top step, which is better, and using the camera screw as though it was being attached to the tripod—an extra-long screw may be kept for this special purpose.

This done, the *exact* position and focus can be settled by standing on the steps, and focussing in the usual manner. The focussing cloth is then adjusted over the camera, with a *lot of loose folds* in front, to the edge of which a long cord has been fastened, so that a slight pull from below will draw it over the lens. The same cord is also attached to the top of the cap of the lens. The dark slide being inserted, the shutter is opened, and the cap of the lens eased almost off, just leaving it sufficiently on for safety. Descend the steps, and when all vibration has ceased, a slight pull will remove the cap, and make the exposure; another pull will draw the focussing cloth over the lens when the exposure is completed. Mount the steps, cap the lens, close the shutter, remove the dark slide, and the operation is completed, without any shake and without any danger; and you have the advantage of a lofty scaffold platform without any trouble.

EDWARD DUNMORE.

WINTER PHOTOGRAPHY.

IN cold weather photography does not work with the smoothness and certainty it does in warm. The light is deficient in actinism, and unless the solutions are warm the negative is wanting in detail and in density. In fact, the absence of warmth is more often responsible for poor results than is the feeble light.

Pyrogallic acid in solution will, in cold weather, discolour far quicker than when warmer, and this in spite of an increase of a preservative, such as nitric acid, sulphite of soda, &c. Therefore, when good work is required, care must be taken that the temperature of the solutions is not allowed to fall below 60° F. The dishes used for development must also be warmed prior to use, as it will obviously be useless to pour warm developer into a cold dish, and then expect that the solution will warm the dish and retain sufficient heat to perform its functions properly.

When a negative is developed in a warm solution, not only is it better, but it is also cleaner and freer from stain than it would be if developed in a cold solution. Present-day dry plates will bear a solution as warm as 80° without danger, but 65° will be as high as is necessary for the developer to be before pouring over the plate. A cold developer, as well as giving poor negatives and causing stains, also causes frilling and blisters. The blisters sometimes dry out without leaving marks, but frilling caused by cold solutions is far more difficult to deal with than is frilling caused by hot weather or by the use of a developer containing an abnormal quantity of fixed alkali.

Cold weather also has a deleterious effect upon printing methods. The light, being weak, does not penetrate the denser portions of the negative, consequently the lighter half-tones are deficient in detail. To some extent this may be remedied by extra depth of printing, but not altogether, because it is generally necessary to print somewhat deeper in dull weather in order to get a bright print.

For winter printing weaker negatives will always give better results than very dense ones, but in this connexion it is necessary to observe that the full gradation is present. A negative, whether strong or thin, must be so, from the highest light to deepest shadow. An under-exposed negative is bad for either summer or winter. In washing paper previous to toning, water, with a temperature of at least 60° Fahr., should be used. After toning, the temperature is of little importance, but the toning solution should never be below 70°—that is, where good, brilliant tones are required. These remarks apply as much to gelatino-chloride papers (printing-out paper) as to albumenised paper; but, if the temperature of the solutions be too high, the gelatine papers are apt to frill and the image float off the paper. They will withstand a temperature of 70° without danger, but not higher.

A point of great importance in connexion with gelatine-coated papers is this, they must be washed in warm water (60° to 65°) before toning; it is quite useless to wash in cold water (below 40°), then tone in a solution about 70°; the tones are poor, and the half-tones suffer.

Gelatino-chloride prints, intended for enamelling, will be found to strip off the glass better if soaked in a solution of aluminium chloride for ten minutes, and washed afterwards; in fact, all gelatino-chloride prints are better for this treatment, as the chloride has such a hardening effect upon the gelatine as to make it more brilliant, and make it practically insoluble.

W. T. WILKINSON.

COLOURLESS ALKALINE PYROGALLOL.

As illustrating a lecture on oxygen or air, says Mr. Alexander Johnstone in the *Chemical News*, a strong solution of pyrogallic acid in KHO or NaHO is often exposed to the gas or the atmosphere to show its great power of absorbing free oxygen, and its instant change of colour when exposed to it. This experiment "tells better" if a clear, *colourless* solution of alkaline pyrogallol be shown to the class before exposure to oxygen. This can be done very easily and quickly. Into a rather deep test-glass, such as is ordinarily used in lecture experiments, place some solid pyrogallic acid, and then a little water, just enough to barely dissolve it. Next put a small handful of sodium carbonate into a flask, and cover with HCl to drive the CO_2 off. Pour the CO_2 gas into the glass above the pyrogallol, and then add the KHO to the latter. The class will see that the alkaline solution below the CO_2 remains colourless. To show the change caused by the presence of O, pass the latter from a tube into the lower stratum of the CO_2 covering, or incline the glass so as to throw out the CO_2 and admit the air. The change will be instantaneous.

MEASUREMENTS OF CLOUD HEIGHTS AND VELOCITIES.

THE *Annals of Harvard College Observatory* contain a discussion by H. H. Clayton of the cloud observations made at Mr. A. L. Rotch's observatory at Blue Hill, Massachusetts. The details given may be of interest to those who make cloud photography a study. One of the most noticeable facts brought out by the measurements of cloud heights and velocities, which have been conducted with great care, is the difference in height between the same clouds in summer and winter, the clouds, with few exceptions, being lowest in winter. The bases of the cumulo-nimbus clouds, however, are generally lower in summer, while, at the same time, their tops are higher than in winter. The heights of the different clouds were found to maintain an almost constant ratio to each other. The mean velocities recorded showed that the entire atmosphere moves twice as fast in winter as in summer. The mean velocity of the highest clouds in winter was about 100 miles an hour; the extreme velocity amounted to 230 miles an hour, from which it appears that the upper currents are much more rapid over America than over Europe, which possibly explains the greater velocity of the storms in America. As regards the direction of cloud movement, the tables show that from the highest clouds to the earth's surface the prevailing wind is west; about 4000 metres more than ninety per cent. of the observations show the clouds from some point between south-west and north-west inclusive. In the cirrus and the cumulus regions, and near the earth's surface, the prevailing direction is from a little north of west, but in the intermediate levels, from a little south of west, the excess of the southerly component in these regions being possibly due to the influence of cyclones.

AMONG THE BEES WITH THE CAMERA.

[Greenwich Photographic Society.]

EARLY this summer I first made my acquaintance with the bees with the camera, though I had done a lot of photo-micrography of the anatomy of the bee, and the pictures I shall show are the results of my various excursions to Orpington and Bromley, in company with Mr. Broughton Carr, editor of the *British Bee Journal*, to whom I am much indebted for the arrangements of the hives and various appliances that I have photographed.

A prosperous colony of bees at the beginning of the swarming season consist of a fertile queen, a few hundred drones, and from 30,000 to 50,000 workers; the mother bee, or queen, as she is usually called, is a perfectly developed female, and deposits all the eggs from which the other bees are produced. These eggs are of two kinds; the one develops into drones, and the other, under ordinary treatment, produces worker-bees, which are undeveloped females; but the same eggs, under different treatment and care, produce perfect females, or queens.

The queen usually lives from three to four years, and is distinguished from the other bees by her form, size, and colour, being longer, darker, and of more slender structure, with comparatively shorter wings than either the drone or worker, as but one queen (except in rare circumstances) is allowed in a hive at one time, young queens are only reared when a colony is deprived of a queen, is about to swarm, or if she becomes aged, or her fertility ceases. In from three to five days after birth she leaves the hive for fertilisation by the drone or male bee, which, when once accomplished, suffices for life, as ordinarily she never afterwards leaves the hive, except when accompanying a first swarm. If her death occurs, or she from any cause becomes unproductive when there are drones in the apiary, and young brood or eggs in the hive, the workers construct larger cells, called queen-cells, supplying the larva with abundance of rich food, and the eggs which would otherwise produce worker-bees are developed into queens. If the queen does not deposit eggs in any of them, the bees will supply them with eggs, which they remove from worker-cells. If they are not able from any reason to become fertilised, she will only lay drone eggs. The queen has a curved sting, which she uses when contending with a rival; she is capable of laying as many as from 2000 to 3000 eggs a day, and is in her prime the second season, after which her laying powers decrease.

The drones are more bulky than the queens, and are larger than the workers. They have no stings, lead an idle life, and, with the exception of assisting to keep up the temperature of the hive, do no work for the support of the hive, but feed upon the produce of the workers. At the end of summer, when their services are no longer required, food is withheld from them, and they are turned out to perish.

The workers, which are the most diminutive in size, are too well known to need description. The slide shows the queen, drone, and worker; it is a photograph of the insects set out so that the relative distinctions of form may be compared. Upon this bee devolves all the work of collecting and defending the stores, building comb, feeding drones, and feeding and protecting the queen and brood. They rule and regulate the whole economy of the hive, and perform all its offices, except those which have direct reference to the reproduction of the species. During the summer months the workers do not live more than six to eight weeks, owing to the hard work they have to perform, but worker-bees hatched in the autumn usually live through the winter, and commence the work of the hive in the spring. An egg deposited by a queen in a cell prepared by the workers hatches into a small grub in three days; it is cherished and fed until the ninth day, when it becomes a nymph, and is sealed in its cell to emerge a perfect bee.

Having taken up too much time in describing the three bees, I will pass on more quickly with the photo-micrographs of some of the parts of the bee. It will not be necessary to go into the detail of class, order, or family to which they belong, except to say they are of the order *Hymenoptera*, genus *Apis*, species *Mellifica*, this being indigenous to Great Britain.

There are no less than eight distinct hairs on the bee. I am sorry that I have not a slide to show you. The most important part of the bee is its head, which differs very much in form in the three bees.

The tongue consists of no less than five parts. The centre is the tongue proper; the two parts on either side form the cover, or sheath; the two above form another cover, into which the whole is drawn when not in use. At the end of the tongue is what is called the spoon, circular and concave, with a row of pale clavate hairs along the edge, and short, hooked hairs on the inside. At the narrowest part of the tongue, just above the spoon, there is a fringe of guard-hairs.

The eyes consist of a pair of large compound eyes and three simple eyes. In the slide of the compound eye we shall find the outer layer divided into a number of hexagonal facets, which are convex, and form the cornea. Between most of these facets are seen long, straight hairs, which act as protection to the eye similar to eye-lashes, and they are also sensory.

The second and third segment of the thorax support the wings. The lower wing, along the upper edge, has a row of hooklets, twenty-three in number, which, when the wings are extended, catch in the fold of the upper wing, and this gives to the consolidated combination of the two a greater surface and force in beating the air to accelerate its progress and carry its body.

The third legs of workers serve as gatherers and carriers of pollen. The upper joints are covered with long feathery hairs, the tibia or second parts, constructed for the conveyance of pollen and propolis, being framed externally like a little basket. It is smooth and hollowed, and the lateral edges are fringed with recurved hairs, which retain anything that may be placed in it. Along the lower extremity it has a row of stiff bristles, called the comb. The first leg, as shown, you will notice near the upper end, and on the inner side there is a deep curved incision, called the sinus, terminating in currycomb. Its function is to keep the antennæ clean and free from pollen. When the insect wishes to clean one of its anteunæ it lays it within the comb, and the velum of the spine upon it; the combined action of the comb and the velum removes anything that is upon it. The operation may be frequently observed, and it would be noticed that the antennæ on the right side are cleaned by the device on the left leg, and the antennæ on the left by that of the right leg.

A few words here on the breathing apparatus will not be out of place. If you look at the diagram, you will see that the air enters through the spiracles at the side of the abdomen into the tracheal tubes or air sacs; by means of these tracheæ air is carried to every part of the body.

Each spiracle consists of two, opening one behind the other, the inner one being closed by a valve, and the outer one is provided with short hairs along the edge of the opening to prevent dust and other impurities from entering.

This slide (of the sting of the bee) shows the whole of this complex apparatus with the poison bag, consisting of the barbed lancets and the divided sheath and the palpi, which are covered with sensitive hairs, so that the bee can find a soft place to insert the sting.

This slide shows the barb more highly magnified. The lancets have a fine cutting edge, and are provided along their outer edges with ten deep retorse barbs, down which the poison flows. If the bee is not disturbed, after it has inserted its sting, it can by giving it a twisting motion withdraw it, but it generally leaves its sting behind, tearing away the whole apparatus and part of its abdomen.

This shows the skin of the abdomen with its hairs and wax plates. The salivary gland would take too long to describe now. I will show the most interesting of my pictures—the outdoor work with the camera among the bees. This is a photograph of an old cottage apiary, and shows you how not to keep bees if you want to keep them clean and healthy. We had a great deal of difficulty in getting this photograph, as there is so very much superstition among bee-keepers. They were afraid

something terrible would happen; either the bees would all take flight, or the queen die, and they would get no honey; but I believe, beyond a good row, nothing has happened.

This shows a modern apiary, all of the newest, up-to-date hives, and is the property of Mr. Broughton Carr, through whose kindness and help all the slides to be shown have been done. It stands with a southern aspect, with a high bank to shelter it from the north wind, and under some small trees of apple and plum.

Here we have the bee-keeper tiering a hive. When the honey begins to flow, and the brood is well in hand, the bee-keeper puts on a tier of comb or sections for the bees to fill with honey. In these frames are put twenty-one sections, and when they are nearly completed, twenty-one more are put on, and the ones nearly full are lifted up and put on the top of the others, and it is possible to get as many as seventy sections filled with honey from one hive.

To examine a hive it is necessary to quiet the bees, and the best means of doing so is to use a smoker. The hive cover is taken off, and the quilt just turned back at the corner when a little smoke is puffed in.

This is bee dress with veil, which at times is very useful, as in hiving a swarm, changing the hives, and many other occasions. Having quieted the bees the cover can be removed, and a frame taken out to see how the brood is getting on, and that there is no foul brood or parasites about. Now, to look at the other side of this frame, one has to be very careful, or else the comb will drop out. It must not be turned over, but must be kept in a perpendicular position.

Catching the queen. This frame of comb had been taken out of the hive to see how the work was going on, and on looking over it we found the queen. There was a great uproar in the hive during the absence of her majesty, and, when the frame was replaced, it was curious to note the change of tone and hum of satisfaction that took place. Had she been absent a little longer, most likely all the bees would have been off.

Taking a swarm under great difficulties. This swarm was very unsettled, half the bees were on one tree and the other half on another tree some ten yards apart. The day was intensely hot, a clear sky and burning sun, so that the bees would not make up their minds where to settle, and kept flying backwards and forwards from tree to tree; at last they began to cluster on the top of an apple-tree; so you will see the difficulty one had to get this photograph. When they were ready, my friend got up into the tree and shook them off into the skep, lowered it half-way down into the tree, and soon all the bees had gone in.

Now comes the process of hiving this swarm. A hive has been go ready, filled with foundation frames; a large white cloth spread on a platform made up in front of the hive, on which the bees are to be shaken out. This skep was nearly full, and probably contained about 30,000 bees. With one jerk the bee-keeper shook all out. I never saw such a mass of moving insects. The photograph was taken the moment they were down, for in less than five minutes all had entered the hive, so anxious are they to get comfortably housed; and we were anxious to see the queen enter, but in the mass we were not successful.

The bees may be driven out of the skep, and the combs transferred into a movable-comb hive, or a skep may be made to swarm artificially. To drive bees, this should be done on a fine, warm day, when many of the bees are away. The skep has been removed to a quiet spot, and placed on an old tub. Before you remove the hive you blow a little smoke into it; the bees at once gorge themselves with honey, and after a few minutes you puff in a little more smoke, and remove the hive, invert an empty skep over the top, bringing the edges together at the point towards which the combs run, then prop up the front with two iron rods bent at right angles at either end; you then commence patting the hive with your hands, hard enough to shake the combs; after a few raps, the bees will begin to swarm out and go up into the empty skep. In about ten minutes all the bees may be driven out; then they may be transferred to other hives, or whatever you may wish to do with them.

It was curious to see how the bee can be subdued and handled without being stung. After the bees had been driven into the skep, a table was brought out, covered with a white cloth, and the bees shaken out on it, when Mr. Carr took them up and threw them over his hands without one of them stinging him. It will be seen that to make bees harmless it is simply necessary to frighten them into gorging themselves with honey, when they may be handled with impunity. The hive having been brought back and placed on the table, with the bottom just propped up, how quickly they made their way across to the hive, when a few crawled up the rods, and soon formed two beautiful columns of bees, which soon again became a mass. Closing up all the front in this way, the whole of the bees soon got back into the hive.

A large quantity of surplus honey is collected in sections. These are made of one long strip of wood, so cut that it will fold over into a square frame, about 4×4. In the middle is fixed what is known as a wax foundation, so that the bees, instead of making wax, find it here already for them. They have only to work it, that is, to pull out the wax from either side, and build up its cells; and, as it takes from thirteen to twenty pounds of honey to produce one pound of wax, it will be seen that the bee-keeper that uses comb foundation must have a great advantage over one who does not. These sections are sold at about 1s. each, and as many as twenty-one sections are placed in the hive, one sees how very profitable bee-keeping may be made; and in a good season three lots of these sections may be made. The large frames are filled in the same way. Only pure wax should be used.

It would take too long to go into the detail of all the work of the bee-keeper; but, any one wishing either to study the natural history of the bee or the practical work of the bee-keeper, I would refer them to Mr. T. W. Cowan's two books, *The Honey Bee: its Natural History*, and *The British Bee-keepers' Guide-book*.

This paper is, perhaps, rather disjointed, but it was roughly put together, and illustrated by some forty-five lantern slides, many of which are not described here.

T. E. Freshwater, F.R.M.S.

THE USE OF PHOTOGRAPHY IN PHYSICAL RESEARCH.

This is the title of a very interesting and instructive lecture delivered before the Physical Department of the Brooklyn Institute of Arts and Sciences, December 13, by Professor Edward L. Nichols, of Cornell University.

The lecturer began by stating that photography is now used in almost every branch of physical research; that it is often used advantageously as a substitute for drawing when making observations. Professor Nichols projected upon the screen a number of views, illustrating the exploration of the magnetic field, showing the lines of force, and of various phenomena which have heretofore been illustrated by drawings made by the hand of the observer. In some cases the hand-made drawings compare favourably with the photographs, while in others they appeared to be incorrect. The lecturer spoke of the value of photography in making long-continued observations; also in making observations of phenomena developed instantaneously, as in the case of lightning flashes, electrical discharges, sound vibrations, &c. He also showed upon the screen a plate illustrating diffraction fringes formed by a small triangular aperture in a piece of tinfoil, the figure being very intricate, and altogether different from what might have been expected.

An interesting illustration was that of photographs of the manometric flame, the flame for this purpose being produced by a concentric burner, the illuminating gas being supplied to the central orifice while the oxygen flowed through the annular orifice. The photographic flames produced in this way were very bright, clear, and sharply defined, and, although drawings heretofore made compared favourably with the photographic record, they were not, of course, as accurate as the photographs.

Interesting views of the electric arc were shown, with which the hand-made drawings heretofore used compared very favourably. The photographs, however, revealed some phenomena which had not been observed by the eye. Among these were the brilliant particles thrown off from the arc, also the superior actinic quality of the light given by the incandescent copper covering of the carbons. A photograph of an arc on an alternating circuit showed a succession of light flashes, proving the intermittent character of the arc when produced by an alternating current. Other peculiar features were shown, among them an illustration of the arc oscillating from one side of the carbon to the other. This the lecturer supposes to be due to the attraction and repulsion of the earth's magnetism. He stated that the singing of the arc was clearly due to rapid intermissions, and that the pitch of the sound proceeding from the arc was what would be expected from the rate of the reversals of the current.

An attempt has been made to produce a photographic record of the alternating current by means of a telephone having attached to its diaphragm a mirror, the incident beam being projected on the mirror, the reflected beam being received on a moving sensitive plate. The result showed that the fundamental vibration of the telephone diaphragm interfered with the production of a correct record. For this method was substituted one in which a stream of mercury carried the alternating current, the apparatus being so arranged as to allow the stream to pass between the poles of a magnet. The mercury was oscillated by the attraction and repulsion of the magnet, the movement corresponding exactly with the reversals of the current. The mercury stream was photographed through a slit located at the point of greatest amplitude of vibration, and the curve produced was the sinuous curve expected from an alternating current produced by a machine working normally.

One of the most interesting illustrations of the evening was that of sun spots taken by means of the spectroscope. This method of investigation appears to have shown conclusively that the fecula around the dark portion of the sun spot correspond with the flames projected from the sun.

THE PARA-AMIDOPHENOL AND AMIDOL DEVELOPERS.

[Section of Photography of the Academy of Sciences, Chicago.]

These developers, although of recent date, are now articles of commerce. The former was, I believe, first introduced by Dr. Andresen, which, for brevity, we will refer to as "phenol;" the "amidel," by J. Hauff. Each of these developers is considered by many whose opinions are entitled to great weight to excel all other developers.

I have used the "phenol" for bromide-paper transparencies, and even half-tone negatives for photo-engraving, with good results. I used generally substantially the following formula:—

Sulphite of soda crystals, C.P.	2 ounces	4 drachms.
Distilled water.....	12 ,,	4 ,,
Phenol		2 ,,

One grain of bromide of potassium may be used to each ounce of developer.

Dissolve the sulphite in the water while boiling, and, when dissolved, put the phenol in before it cools. I have used this developer thus compounded five months after it has been made without any apparent depreciation of strength or utility.

For use, take one ounce of this stock solution, and add from four to six ounces of water with about one grain of bromide to each ounce of developer.

I found upon using this identical formula, except that the developer was mixed with cold water, that it was an utter failure, hence the importance of using boiling water. In cold weather, unless this developer is kept at a high temperature, a copious amount of crystals will be formed on the bottom of the bottle. These crystals will consist mainly of the para-amidophenol.

This I consider an excellent all-round developer. It may be used for any dry plates that have come under my notice, isochromatic, orthochromatic, or otherwise, for making positives or negatives by contact, and for making negatives in the camera, for general portrait work, or behind a line screen for half-tone photo-engraving. It makes a negative almost, *if not quite*, equal to the old wet plate. It allows great latitude in development, and should be very fully developed to allow for the density which it will lose in the fixing bath. It makes a fine-grained negative, but not as fine as the amidol. It does not require the same skill and care to work it as the amidol, and may be used for many purposes for which that developer is useless. From eight to ten plates may be developed with a solution of this developer.

I first used the formula sent out with the amidol as follows:—

Amidol	80 grains.
Sulphite of soda crystals, C. P.....	800 ,,
Distilled water.....	8 ounces.

Then took one ounce of this stock solution, and added from four to five ounces of water, with a plentiful supply of bromide of potassium. With proper exposure the image does not appear with undue haste, but after making its appearance it proceeds to complete development with great rapidity, but will not be injured by remaining in the developing solution for a short time. I found by adding seven ounces or more of water to the ounce of stock solution that the negative or positive developed in it would be covered with a surface fog or veil so as to make it entirely useless.

The above formula I will designate as No. 1. It was made four weeks ago, and the developer is but slightly discoloured, and works as well as it did the day it was mixed. On yesterday morning I made a developer which I will call No. 2, precisely like No. 1, except that it contained forty grains of amidol instead of eighty. By examining the bottle, which I have here, it will be seen that the solution is clear, which is undoubtedly owing to the great amount of sulphite of soda it contains. At the same time I made developer No. 3, precisely like No. 1, except that it contains 400 grains of sulphite of soda instead of 800, and, after mixing the developer, it was boiled all together, the sulphite having been first dissolved in boiling water. The wine colour of the developer may be in part attributed to the small amount of sulphite of soda, and in part to the boiling of the solution after the amidol had been added. I would not recommend the boiling of the solution after the amidol has been added. It tends to discolour the negative or positive as well as the solution, which will be seen upon an examination of the bottle which I have here.

I then made developer No. 4, precisely the same as No. 1, except that it contains 400 grains of sulphite of soda instead of 800, and the amidol was added after the solution containing the sulphite had become cold. It will be observed that the solution is slightly discoloured, which is probably owing to the small amount of sulphite it contains.

In all of these four developing solutions, the sulphite of soda was dissolved in boiling water, as it should be in all cases, and the amidol should be put in when cold.

The solution No. 1, according to the formula which accompanies the amidol, as will be seen by six positives which I have here, works well when used with plenty of bromide of potassium.

The formula No. 2, reducing the amidol from eighty to forty grains, is, for some purposes, an improvement upon the original formula No. 1.

The formula No. 3, reducing the sulphite of soda from 800 to 400 grains, and boiling the developer when mixed, cannot be recommended. The same may be said of formula No. 4.

In two cases, after exposure, I gave the plates a bath for three minutes in a ten per cent. solution of bromide of potassium, and then developed them while wet. It will be seen, by an examination of these two positives, that the bromide bath improved their density. It did not materially prolong the development.

Amidol is the cleanest working of all the developers, and gives the finest-grained positives of any, and, in my opinion, cannot be excelled for making positives; but I have serious doubts whether it will ever come into general use for negatives in the studio of the practical photographer. The plate developed with amidol loses no density in fixing. The colour is black and white like a wet plate; but, while the black is fine in colour, it is not always opaque enough to make a good printer. Under certain circumstances, this is the worst of all developers to fog a plate.

Amidol loses its active working strength when it has developed three or four plates, and should then be thrown away.

I used in making these experiments, Carbutt's "A" Sen. No. 10, and Cramer's transparency plates, Sen. No. 12. My experiments with Carbutt's orthochromatic and Cramer's isochromatic plates with amidol were not successful.

I regard a very free use of bromide as indispensable to the successful working of the amidol developer. It not only keeps it within due bounds, but prevents surface fog, and adds to the clearness, brilliancy, and beauty of the negatives or positives.

J. B. Bradwell.

PHOTOGRAPHY OF THE LIGHT WAVES OF THE SMALLEST WAVE-LENGTHS.

At the meeting of the Mathematical and Natural Science Section of the Imperial Academy of Sciences of Vienna on November 10, Professor V. von Lange presented the following communication from Herr Victor Schumann, of Leipzic:—

"The photographic energy of the ultra-violet rays on collodion and gelatine plates decreases strikingly at the wave-length 200 $\mu\mu$, and falls off to a similar extent towards the more refrangible side. The cause of this decline in energy lies in the fact which I have established spectrographically; (1) in the impermeability to light of the collodion and gelatine, in which the sensitive ingredient of the coating of the plate, *i.e.*, the silver haloid, is embedded, and (2) in the impermeability of the air which the rays have to traverse on their way to the plate. If we remove these two absorbents, the silver haloid shows itself many times more sensitive for the rays beyond 200 $\mu\mu$ than it was in presence of the collodion and gelatine, and the photographic efficacy extends far beyond the previous limit of the ultra-violet light (wave-length 185·2 $\mu\mu$). The production of a film of pure silver haloid on the plate offers great difficulties. A method for this purpose was hitherto not known. After numerous experiments I found a process by which I have now for two years prepared all the plates which I have required for observing the rays beyond the wave-length 185·2 $\mu\mu$. The air could only be removed from the rays by exhausting the spectrograph. In this manner I have hitherto been able to follow about twenty different spectra far beyond 185·2 $\mu\mu$. All of them develop here an unexpected wealth of rays, but none to so high a degree as the hydrogen light of the Geissler tube. I estimate the number of the hydrogen lines, which I have isolated at 600, and the shortest of their wave-lengths at 100 $\mu\mu$. I have not as yet effected the measurements, for which, however, I have already made preparations." For illustration the speaker exhibited a tableau composed of Herr V. Schumann's original plates, showing the portion of the ultra-violet hydrogen spectrum first photographed by the latter.

A KODAK GATHERING AND PRESENTATION.

Bloomsbury Hall was, on Thursday last week, filled to overflowing by the *employés* of the Eastman Company both in London and Harrow, from which latter place a special train had been chartered to convey to London the numerous people there employed in the Company's factories. Their Paris and Nice branches were also represented, the former by the Manager and Manageress, and the latter by choice bouquets of flowers sent in profusion for the adornment of the room and the ladies who were present, for, in addition to the Chairman and some of the Directors of the Company, there were a few invited guests and friends.

The occasion was ostensibly a musical and dramatic entertainment, but it was in reality an occasion for the *employés* to signify their appreciation of Mr. W. H. Walker's management and kindly feeling towards them by presenting him and Mrs. Walker with a tangible recognition of their esteem.

It has for some time been known that this gentleman's health was giving way under the strain which he has undergone since 1885 in the establishing of the large business which now crowns his labours, and it was found that a long furlough from the active duties of the general

managership was absolutely necessary to recruit his health. His retirement from this post at the close of the year was seized upon as a fitting time to present him with a testimonial.

It is creditable to the Company that the musical and dramatic programme was ably supplied by its own officials, in which the Harrow Kodak Glee Club came well to the front.

At the termination of the first selection of music, Mr. Archibald Rider, the Secretary of the Company, said he had been asked by his colleagues to act as their mouthpiece to-night in connexion with that part of their proceedings to which they had now arrived, and to which they had all been looking forward with the greatest possible interest for some considerable time; and it afforded him the more pleasure to do so in that it gave him the opportunity of publicly testifying his own personal and warmest thanks for the many kindnesses he had experienced at the hands of Mr. and Mrs. Walker.

They were met here to-night to do the greatest honour they could to Mr. and Mrs. Walker, and to present to them a token of their love, respect, and admiration for their many endearing qualities. As soon as he learned that Mr. Walker had definitely decided to retire from the active management of this Company, it occurred to him that the occasion was the one opportunity they had for some time been looking out for of expressing in a tangible form that regard and esteem held by all for their chief and Mrs. Walker. The idea, when broached to his fellow-workers, was received with the greatest acclamation and enthusiasm. Everybody wished to go one better than his neighbour; but it would be invidious for him to mention individuals where all have worked with such a will to make a success of this movement.

Paris, represented by Mr. De Bedts and Mlle. Leonardon, Nice, Harrow, represented by about 120, and Oxford-street turned out to a man, were unanimous in their regret at the loss of such a chief, and in their love for and admiration of his great abilities and attractiveness of character.

They all knew that the result of Mr. Walker's experiments and investigations in the art, in conjunction with Mr. Eastman, had been the greatest revolution in photography that has occurred for many years; and he felt sure that, when the future history of photography came to be written, Mr. Walker would of necessity occupy a very high position in the ranks of those to whom photographers are mostly indebted for their fascinating and lovely art. His and Mr. Eastman's invention of films and methods of using them alone has made photography a recreation, a pleasure, a delight, and last, and most important of all, for without it we could not enjoy the others, a health-giver to thousands.

They were all well aware that our leading physicians now prescribe a Kodak to their patients, especially to those suffering from idleness, and the cure has been pronounced most efficacious. Therefore they would agree with him that, without any lack of modesty, Mr. Walker might, with far more justice than many who lay claim to it, pose as a philanthropist. But there are other reasons, which for the present more directly concern us, why he should claim our greatest possible love and esteem. He did not think it would be here out of place to briefly detail Mr. Walker's connexion with the business in this country. As most of us are aware, Mr. Walker came here early in the year 1885—like all good Americans, for a few months only, which from force of circumstances invariably turn into years—with the intention of making known to the photographic public of Europe the result of his and Mr. Eastman's discoveries. This he did through the medium of the Inventions Exhibition, then being held in London. The Photographic Committee of this Exhibition were so struck by the bold departure and possibilities of these inventions that, although they had already made up their minds in regard to the award for the greatest invention of the year in connexion with photography, they unanimously accorded the medal to the Company represented by Mr. Walker.

Now, that was a very striking and encouraging success—so encouraging that Mr. W. immediately opened an office at 13, Soho-square. It was then the speaker's great good fortune to join him before even the fittings were complete, and he could picture him now as he then first saw him. He was sitting in a chair very much tilted back, with a cigar in his mouth, his feet on the table, superintending the fitting up of the office and endeavouring to instil into the workmen some of his own great energy.

He soon made a host of friends, and of necessity—being so successful—a few enemies; but they have, with hardly an exception, come to value his great abilities and fine character, and are now numbered among his warmest friends.

The business grew rapidly and continuously, and with it the staff and offices. From one office and a dark room we blossomed to two rooms and a dark room. Then were annexed two attics for storing purposes, but at that point the capabilities as an office of 13, Soho-square were exhausted. Although the business had developed so rapidly, and was so highly successful—so successful that most men would have rested on their laurels—Mr. Walker, with characteristic foresight, saw that, if the business was to be that great success he always intended it to be, a larger and retail establishment must be opened. So, with great energy and determination, and in the face of almost insuperable obstacles, he finally obtained the premises at 115, Oxford-street we now occupy. This was at the end of the year 1887.

"The wisdom of this policy was immediately, and in a startling manner, shown by the tremendous increase in the business. In 1889 we developed from a branch to a tree, and took firm root in our own soil as the Eastman Photographic Materials Company, Limited. From this point we are all familiar with the steady growth of the Company and its interests.

Again and again have we outgrown our clothes and required new ones. 1. The factory at Harrow was built and started, entailing such an enormous amount of work on Mr. Walker as would have appalled most men. 2. Then he inaugurated a branch at Paris. 3. From that one at Nice. And lastly, we at 115 have overflowed into 117, Oxford-street. All this has been the work of one man.

"Ladies and gentlemen" (continued Mr. Rider). "there are now employed by this Company over two hundred persons, all of whom are indebted to Mr. Walker's intellect, energy, and business capacity for their present positions, in most cases for their very livelihood.

"But, as if that were not sufficient to command our grateful love, he binds us to him with the strongest chains by the kindness and consideration he has always shown to us all. Nobody, however humble his position, has received anything but the greatest possible courtesy and consideration. It matters not our position, we are all listened to with unfailing courtesy and patience, and he has always been most just in his treatment of us.

"These are but very few of the many reasons we have for thanking him. Time will not permit me to mention everything he has done for us, but I am certain that, whatever I have left unsaid, Mr. Walker will understand that he has our warmest affection, and that, wherever he goes when he leaves us, he will carry with him our best and heartfelt wishes for a long and pleasant life. I am sure that I am but echoing the sentiments of all when I say that I feel the greatest pain at Mr. Walker's retirement; but, in view of the incalculable benefits he has conferred on all of us, it would be most ungracious to begrudge him the rest he needs and has so well earned. There is, you will be rejoiced to hear, a bright speck in our present somewhat clouded horizon, inasmuch as Mr. Walker still remains on their Board of Directors; and, knowing what I do of him, I feel sure that he will not cease from all active connexion with the Company, and, doubtless, we shall still often see him among us. I wish—and I know you are all with me—that I could say more, but perhaps Mr. Walker himself may think this a fitting occasion to raise our hopes.

"I fear that Mr. Walker's qualities have caused me to neglect somewhat the claims Mrs. Walker has on us. Those who have enjoyed, as I have had the great pleasure, Mrs. Walker's friendship know how much she has at heart the welfare of everybody in the Company's service. She has done for a number of us considerably more than we know of, and I know personally of several instances where her influence on—and, failing that, scolding of—Mr. Walker has given more than one of us another chance. Why, if it were not for her sending Mr. Walker to us in extra good humour some mornings, where would some of us be now? The quality of mercy has been strained very considerably with some of us, and might have been broken quite but for Mrs. Walker's kindly intercession." Turning to Mr. and Mrs. Walker, he said, "It is my pleasing duty, on behalf of the *employés* of the Eastman Company, to present to you this small token of our great respect, regard, and admiration. In your retirement you carry with you our deep regret at the parting, and our heartfelt desire that you and Mrs. Walker will be spared many years in which to enjoy your well-deserved rest and new life."

Amid great applause the curtain was raised, and displayed to view a large and massive silver salver with a suitable inscription engraved on it, together with a silver-mounted album, containing groups embracing every individual in the Company's employment both in this country and on the Continent.

Mr. Walker, in acknowledging, on behalf of himself and Mrs. Walker, the handsome testimonial, expressed his extreme gratification at the spirit by which it had been prompted. He had always had the greatest faith in the idea which he, assisted by Mr. George Eastman, had endeavoured to carry into practical effect, and he could not but feel proud at the result of their labours as evidenced by the large numbers of those employed by the Company then before him. In future, although they would not see so much of him as they had done, he would always be among them in spirit, and would cherish the remembrance of the geniality of his intercourse with them and especially of that happy meeting. He concluded by formally introducing Mr. Dickman, his successor in the managerial chair. The meeting broke up at eleven o'clock.

Our Editorial Table.

SINCE describing the Hemery's Medallion Group System of portraiture in our number of last week, we have been placed in a position to illustrate what we then said with two blocks, which show the nature of the invention better than could be given by a verbal description. In one the number of figures is four, in another, eight, but there is really

no limit to either the number capable of being printed on a card or their arrangement on it. As we have previously said, Messrs.

Marion & Co. are the agents for this useful novelty, which affords the means of presenting the whole of the members of a family on one card.

"Name-it."

This useful invention of Mr. A. Gray, 44, Snow-hill, E.C., affords a means for printing the names and subjects on the negatives in a really neat style. Previous to its introduction, the lettering of negatives was a laborious proceeding, and few of those who attempted it achieved anything like success, but since "Name-it" came on the

stage, the operation has become one of extreme simplicity. It consists of a small box, having compartments for types of letters alphabetically arranged, there being enough of each to serve in the composition of a longer title than is ever likely to be required in the naming of a negative. There are also figures, spaces, an inking roller, and the other things which go to the making up of a complete printing outfit, as shown in the cut. "Name-it" has been subjected to considerable improvement since it was first introduced, resulting in the ability to print a clear, sharp title on the negative. For the purpose for which "Name-it" has been introduced we can strongly recommend it.

The *Year-book of Photography*, edited by T. C. Hepworth, F.C.S. (London: Alexander & Shepheard), comes to us this year printed in large type—in this respect like the American annuals. In the "Guides to Practice," Captain Abney leads off with a seasonable article on "Winter Photography." Mr. Bothamley follows with "Lantern Teachings," and he, in turn, is followed by others of good reputation. The Editor's article on "Gas Cylinders in Transit" will prove useful to those who have to carry large cylinders with them for lecturing purposes. There are two full-page collotype illustrations, by Waterlow & Sons, and a pen-and-ink reproduction of a photograph, together with much that is useful reading matter in the shape of hints by the Editor.

The British Journal Photographic Almanac, 1893.

Edited by J. Traill Taylor. London: Henry Greenwood & Co., 2, York-street, Covent Garden.

The editorial article this year treats of "Some Modern Methods of Book Illustration." Captain Abney writes on "Shutter Diagrams;" Mr. R. H. Bow on "Achromatism and the Secondary Spectrum;" Mr. Pringle on "Shutters;" Mr. George Davison on "Mounting;" Mr. Bothamley on the "Focal Length of Lenses;" Mr. G. W. Webster on "Single Lenses;" and there are nearly 160 other articles by the ablest writers in the world of photography. Naturally we are precluded from indulging in any critical review of the literary contents of the volume; but it is at least due to the various gentlemen who are responsible for the illustrations that we should here refer to those admirable embellishments. By consent Messrs. Morgan & Kidd's machine collotype picture of Miss Vanbrugh as *Anne Boleyn* is remarkably good and effective. The charming and artistic pictures of Mr. Wellington, Mr. Hastings, and Mr. Woodward lose nothing in the highly effective manner in which the Meisenbach Company has reproduced them, while Messrs. Waterlow, with their half-tone process picture, exhibit a capital specimen of thia now popular class of work. The half-tone picture by Mr. Sutton's process exhibits the latter in a degree of excellence which augura well for its commercial success. It may, in conclusion, be noted that the Almanac is the largest so far issued, both in regard to its literary contents and commercial announcements.

Photogravures.

By Herr Paulussen, Vienna.

The common belief that photogravure on the Continent is practised to a higher degree of perfection than in this country receives considerable support from an inspection of Mr. Paulussen's small reproductions of some of Mr. Tagliafèrro's pictures, with which the latter gentleman has favoured us. Most attendants at the principal exhibitions are acquainted with the quiet humour and truly artistic feeling which Mr. Tagliafèrro has so long displayed in the prosecution of photography. In the photogravure reproductions before us, it may be fairly said that the excellence of the originals has been admirably conserved. For technical delicacy and beauty of detail, Herr Paulussen's work, as those who saw the small exhibition of photogravures at the Great Britain Society a few months ago will allow, is difficult to excel.

Printing-out Opals and Lantern Slides.

We have received from the Paget Prize Plate Company samples of their printing-out opals and lantern slides. In the brief intervals of sunshine with which the Clerk of the Weather has recently favoured us we have ascertained that they print out with about the same rapidity as ordinary sensitised paper. They are toned and finished in the same manner, and yield most pleasant warm tones. The Company are also supplying a special frame for the purpose of printing-out, of which we hope to report on a future occasion.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 9	Camera Club	Charing Cross-road, W.C.
,, 9	Darlington	Trevelyan Hotel, Darlington.
,, 9	Dundee Amateur	Asso. Stodio, Nethergate, Dundee.
,, 9	Lantern Society	20, Hanover-square.
,, 9	Norfolk and Norwich	Bell Hotel, Norwich.
,, 9	North Middlesex	Jubilee Hall, Hornsey-road, N.
,, 9	Putney	Boys' Gymnasium, Charlwood-road.
,, 9	Richmond	Greyhound Hotel.
,, 10	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 10	Derby (Annual)	Smith's Restaurant, Victoria-st.
,, 10	Great Britain	59, Great Russell-st, Bloomsbury.
,, 10	Hackney	206, Mare-street, Hackney.
,, 10	Manchester Amateur	Lecture Hall, Athenæum.
,, 10	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 10	Paisley	9, Gauze-street, Paisley.
,, 10	Stockton	Mason's Court, High-street.
,, 11	Ipswich	Art Gallery, Ipswich.
,, 11	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
,, 11	Munster	School of Art, Nelson-place, Cork.
,, 11	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 11	Southport	The Studio, 15, Cambridge-arcade.
,, 11	Stockport	Mechanics' Institute, Stockport.
,, 12	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
,, 12	Camera Club	Charing Cross-road, W.C.
,, 12	Cheltenham	
,, 12	Glossop Dale	
,, 12	Hull	71, Prospect-street, Hull.
,, 12	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 12	North Kent (Annual)	Gravesend.
,, 12	Oldham	The Lyceum, Union-street, Oldham.
,, 13	Bristol and West of England	Roome, 28, Berkeley-sq., Bristol.
,, 13	Cardiff	
,, 13	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 13	Halifax Camera Club	
,, 13	Holborn	
,, 13	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 13	Maidstone	"The Palace," Maidstone.
,, 13	West London	Chiswick School of Art, Chiswick.
,, 14	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 29, 1892,—Mr. P. Everitt in the chair.

THE AFFILIATION SCHEME.

A letter from the Assistant-Secretary of the Photographic Society of Great Britain was read, intimating that it was contemplated to have two lectures on photogravure in February, to be given in London, by Mr. H. Dennison, of Leeds.

PRINTING-OUT OPALS.

Mr. T. E. FRESHWATER asked how to ascertain how a printing-out opal or lantern slide was sufficiently printed?

Mr. W. E. DEBENHAM suggested looking through the picture, and judging the relation which the intensity of the deposit bore to the intensity of the negative.

The CHAIRMAN remarked that Mr. Cowan, Mr. Ashman, and Mr. Prestwich had invented special frames for the purpose. An actinometer could also be used.

Mr. J. S. TEAPE remarked that there was always some uncertainty as to the amount of the deposit that would fix out.

PORTRAITURE BY ELECTRIC LIGHT.

Mr. A. HADDON exhibited a negative (being the portrait of a lady) which he had that afternoon taken with the electric light. The light was not more than 1000 candle power. In order to use as much as possible of the arc, it was placed in about the focus of a concave reflector of about two feet in diameter. In front of the light was placed a screen, covered with thin tissue paper, a large sheet of tissue paper being placed on the shadow side. He used a rapid rectilinear lens, working at *f*-11, and gave an exposure of ten seconds. The screen was placed at about a foot from the light, and six from the sitter.

The lighting of the negative was thought excellent.

CURVILINEAR DISTORTION WITH SINGLE LENSES.

The following question from the box was read: "What determines the curvilinear distortion of a single lens, and how may it be modified?"

Mr. DEBENHAM stated that it was determined by the position of the diaphragm, and might be modified by altering it, while it might be entirely got rid of by making the lens itself the diaphragm. The diaphragm causes certain parts of the lens to select certain parts of the picture. Mr. Debenham illustrated his remarks by diagrams on the blackboard.

IMPURE OXYGEN.

Mr. HADDON alluded to a recently published letter of Mr. T. C. Hepworth, in which it was stated that commercial oxygen was sometimes contaminated to the extent of forty-five per cent. of nitrogen, and said that, as there were many lanternists among the members of the Association, it might be useful to them to know how to be able to test a sample of oxygen for purity. He promised to demonstrate the test at a future meeting. Mr. Grundy (of the Royal Naval College) had recently found that a sample of oxygen contained forty-five per cent. of nitrogen, while another of a special make only contained about eight per cent. In no case had the percentage been so low as five per cent. Other samples had contained up to fifteen per cent. of inert gas.

REMOVING THE DEVELOPED IMAGE.

A question having been asked as to the best method of removing the developed image of an unfixed plate, Mr. THOMAS BEDDINO suggested either chlorising the image and dissolving it off with ammonia, or immersing the plate in a solution of tannin, to harden the film, and then dissolving out the image with nitric acid, 1 : 5.

The meeting then adjourned.

Croydon Camera Club.—A discussion on *The Best Printing Process* to take up was opened by the PRESIDENT at the meeting on January 2 in favour of bromide paper. In the course of his remarks, he emphasised that the lack of recognition which the said process has hitherto received is mainly due to the small proportion of men in the front rank who work it, and also that a very small proportion of those who take it up acquire the requisite experience and skill in order to turn out prints of the highest attainable quality. In the resulting discussion various processes were advocated by Messrs. Oakley, Packham, Letts, Sampson. Carden, White, Hirst, and Neeves, most of whom showed large collections of prints in illustration of their contentions. Mr. A. R. Dresser also sent a number of bromides developed with amidol, to show that the process in question can be made to yield very satisfactory results. At the termination of an animated debate a vote was taken, with the result that platinotype and gelatino-chloride tied for first place, and bromide was second.

West Kent Amateur Photographic Society.—December 29, 1892.—The PRESIDENT (Mr. Andrew Pringle) gave a demonstration of the *Theory and Practice of Making Gelatino-bromide Emulsion.* Having described the process in general terms, and explained the lines on which the operations are performed, he proceeded to make an emulsion, first with soluble bromide and silver nitrate, and then with ammonio-nitrate, explaining the advantages and disadvantages, in his opinion, of each process. A description was next given of various methods. Finally, a plate was coated, the speaker stating that, in his opinion, very few commercial plates were coated thickly enough, but that, in these days of keen competition among manufacturers, economy must be observed somewhere.

Dorset Amateur Photographic Association.—The annual meeting was held at Dorchester, on Monday, January 2. The outgoing officers were re-elected, viz., *President:* Rev. W. Miles Barnes.—*Committee:* Rev. E. J. Pope, Messrs. D'Aeth and Skene.—*Hon. Secretary and Treasurer:* Rev. T. Perkins. The Treasurer reported a good balance in his hands. The quarterly prizes given for the best prints contributed to the albums circulated during the past year were awarded to Rev. T. Perkins, Mr. Skene, Miss Skirrow, and Mrs. Perkins. A special prize for a single print, given by Mr. Skene, fell to Mr. D'Aeth, and the prize for the best set of six lantern slides shown at the meeting was awarded to Mrs. Perkins.

RECENTLY ELECTED OFFICERS OF SOCIETIES

(*Received too late for the* ALMANAC).

ACCRINGTON AND DISTRICT CAMERA CLUB.—Established 1892. Meetings, first Monday in each month. *President:* Dr. Clayton.—*Vice-Presidents:* Joseph Barnes, — Cheney, Dr. Geddig, Rev. J. R. Rendell, — Stanley.—*Hon. Treasurer:* John Hanson. *Hon. Secretary:* Isaac Hanson, Rothwell Heights, near Accrington.

AUCKLAND PHOTOGRAPHIC CLUB.—Established 1889. Meetings, second and fourth Thursday in each month. Annual Meeting, second Thursday in October. Rooms, Australian Mutual Provident Society's buildings. *President:* Dr. J. Logan Campbell.—*Vice-Presidents:* Josiah Martin, J. R. Hanna.—*Committee:* A. J. Hunter, W. C. Fraser, W. G. Churchward, G. M. Maingay.—*Treasurer:* R. Mason, Gas Company's Office.—*Secretary:* G. R. Boulton, Bank, New South Wales.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.—*President:* W. H. Hunt, D. Mus., London.—*Vice-President:* C. B. Reader.—*Council:* G. Latimer, G. E. Thompson, H. B. Millar, W. T. Briggs, G. A. Carruthers, W. A. Brown, C. Male, Thomas Mansell, J. H. Walch.—*Librarian:* J. A. Forrest.—*Lanternist:* F. N. Eaton.—*Auditors:* A. Bradbury, H. S. Nicklin.—*Treasurer:* A. F. Edwards.—*Hon. Secretary:* F. Hope-Jones, Prenton, Birkenhead.

BRIGHTON NATURAL HISTORY SOCIETY (PHOTOGRAPHIC SECTION).—Established 1892. *Chairman:* D. E. Caush, L.D.S.—*Committee:* A. H. C. Corder, J. Hunter Graham, G. Foxall, W. Mitchell, J. P. S. Slingsby-Roberts.—*Hon. Secretary:* Walter Harrison.

BRISTOL CAMERA SOCIETY.—Meetings, second and fourth Thursday in each month at 10, St. Augustine's-parade. *President:* C. Bryant.—*Council:* J. H. Brock, W. T. Crank, H. J. B. Davies, M. E. Dunscombe, G. A. Evans, E. Jakeways.—*Hon. Treasurer:* G. L. Wood.—*Hon. Secretaries:* M. W. Dunscombe, H. G. Tasker.

CALIFORNIA CAMERA CLUB. — Regular Monthly Meetings, first Tuesday after first day of month. Club Talks every Wednesday night. Illustrated Lectures at Metropolitan Temple monthly. Address of Club Rooms, 819, Market-street, San Francisco, California. *President:* H. B. Hosmer.—*First Vice-President:* H. C. Tibbitts.—*Second Vice-President:* F. E. Smith.—*Librarian:* H. C. Owens.—*Treasurer:* George W. Reed.—*Secretary:* James W. Duffy.—*Corresponding Secretary:* Charles Albert Adams.

DEVON AND CORNWALL CAMERA CLUB.—Established 1889. Meetings, on alternate Mondays at eight p.m. Place of meeting, The Athenæum, Plymouth. Annual Meeting in September. *President:* Lieut.-Colonel R. Barrington Baker.—*Vice-Presidents:* R. Burnard, W. Gage Tweedy.—*Council:* D. Aldridge, A. A. Carnell, J. S. Hawker, Miss E. Keen, E. H. Micklewood, D. Roy, Colonel Stewart, R.E., Captain Waye, R.N.—*Treasurer:* C. Russel Rendle.—*Secretary:* R. Hansford Worth, C.E., 42, George-street, Plymouth.

LLANDUDNO CAMERA CLUB AND LANTERN SOCIETY.—*President:* The Right Hon. Lord Mostyn.—*Vice-Presidents:* Rev. John Morgan, B.A. (Rector of Llandudno) and Mr. W. A. Whiston.—*Committee:* W. D. Henderson, Hughes-Jones, W. Owen, Waterson.—*Hon. Secretaries and Hon. Treasurers:* A. Campbell Paradwys, A. H. Hughes, Rochester House, Llandudno.

PHOTOGRAPHIC SOCIETY OF INDIA.—Resuscitated in 1885 from the Photographic Society of Bengal. *President:* The Hon. Sir Comer Petheram, Q.C.—*Vice-Presidents:* J. G. Apcar and J. S. Gladstone.—*Committee:* Colonel Rogers, R.E., P. Donaldson, N. Giannacopulo, B. A. Samuells, B.A., C.S., J. H. Lane, W. H. Jobbins, A. Tocher. T. H. Wilson, E. M. Showers.—*Treasurer:* George Ewing.—*Secretary:* T. A. Pope, Photographic Society of India, Asiatic Society's Buildings, Park-street, Calcutta.

QUEENSLAND AMATEUR PHOTOGRAPHIC SOCIETY.—Founded 1888. Meetings held on first Friday in each month at the Builders' and Contractors' Exchange, Courier-buildings, Queen-street, Brisbane. *President:* Dr. J. Thomson.—*Vice-Presidents:* J. W. Sutton, D. T. Lyons, F. R. Hall.—*Committee:* Dr. J. Wheeler, T. W. Bertinshaw, G. R. Robson.—*Librarian:* E. H. Alder.—*Treasurer:* J. J. Campbell.—*Secretary:* A. R. L. Wright, Telegraph-chambers, Queen-street, Brisbane.

RICHMOND (VA.) CAMERA CLUB.—Established 1890. *President:* E. F. C. Davis.—*Vice-President:* R. A. Lancaster, jnn.—*Executive:* E. F. C. Davis, R. A. Lancaster, jun., Dr. Phil Tayler, R. B. Blankenship, C. D. Hobliston.—*Secretary and Treasurer:* C. D. Hobliston, 628 and 630, E Main-street, Richmond, Virginia.

TASMANIAN PHOTOGRAPHIC, SCIENCE AND ART ASSOCIATION, HOBART.—Established 1887. Meetings second Friday in each month, at Royal Society's Museum. *Patron:* His Excellency Sir Robert G. C. Hamilton. — *Vice-Patrons:* His Honour Sir Lambert Dobson, Hon. Dr. Agnew.—*President:* William Lovett.—*Committee:* Curzon Allport, Russell Young, A. Morton, A. L. Butler, H. Downing, R. Shepperd, E. Robinson, E. Scott, D. Allport, W. K. Morris, R. McGuffie, E. R. Ash, and H. J. Buckland.—*Treasurer:* F. J. Paterson.—*Secretary:* Nat. Oldham, Claremont, Hobart.

TORONTO CAMERA CLUB.—Club Rooms and Studio, Second Floor, corner of Yonge and Gerrard-streets. *President:* E. Havelock Walsh.—*First Vice-President:* A. W. Croil.—*Second Vice-President:* W. H. Moss.—*Committee:* Hugh Neilson, N. A. Powell, M.D., Professor W. H. Ellis, M.D., J. G. Ramsey, George H. Gooderham, G. Townsend.—*Treasurer:* R. G. Muntz.—*Secretary:* Ernest M. Lake.

VICTORIA CAMERA CLUB.—Established 1887. Meetings first Monday in each month. *President:* Hon. F. S. Dobson, LL.D.—*Vice-President:* A. M. Henderson.—*Committee:* James Pettigrew, A. Harper, H. B. Clutten, and J. J. Rouse.—*Secretary and Treasurer:* Alfred H. Farmer, 54, Elizabeth-street, Melbourne.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

INDIA-TINTING PHOTOGRAPHS.

To the EDITOR.

SIR,—All photographic *artists* should be grateful to you for the prominence you have given this subject, and also to the source from whence it emanated, for undoubtedly it is by similar means true artistic effect will be secured, effects which are otherwise beyond the reach of ordinary photographic resources.

To this judicious over-tinting the painter-artist is greatly indebted for many of his startling results in harmony and atmospheric effect; it is by similar means he tones down his work in a marvellous manner, rendering that which had been previously harsh and without character agreeably beautiful, and thereby enhancing the effect in creating an individuality all his own.

The painter names this process *glazing*, and, if it is admissible for painters' work, it surely is equally and legitimately available to the *sun artist*, if produced solely by photographic or chemical means, unaided by brush work, for, unless colour retouching upon the print be admittedly correct, it would be equally unfair to allow what is technically known in the dyeing trade as *cutting out* or *discharging*, as it would be only retouching reversed—*i.e.*, removing instead of adding to the shadows in order to increase the value of the gradations by unorthodox means, and not by the ordinary photographic procedure.

But are not similar effects to this proposed *India tinting* produced by the ordinary processes of photographing, where the positive delineation of the picture predominates over the negative ground colour of the paper; and was this not pronouncedly evident in several of the more successful pictures of the year, especially in the landscapes where extensive cloud effects existed? And may we not presume that the eye of the observer frequently supplies sympathetically the actual *India tint* demanded, where no discordant wide areas of inharmonious ground colour exists to produce a discord? This effect is perhaps more evident in pictures of a warm tone, as, for instance, in warm bromides, sepia, and in semi-sepia platinotypes.

These *India tintings* must of necessity be of the most delicate character to be effective, and unfortunately this great delicacy warns us that if permanency be our aim, great precautions are necessary, for, if the presumed increased effects are arrived at by this tinting, it would be very distressing that their enhanced beauty prove to be only a temporary excellence.

Knowing how readily all delicate tints are degraded or bleached out—in other words, how readily they fade away—additional precautions should be adopted in preparing the prints for such tinting, and in selecting the tinting agent.

The aniline colours are notably of a most unstable character, by no means suitable for the purpose, and coffee staining, although it may be of a somewhat more reliable nature, it must be remembered varies in every sample, the colouring matter as a dying agent being largely, and in many instances almost entirely, composed of semi-charred saccharine or similar matter. The tea staining may be more reliable, but why not employ some colouring matter of a thoroughly permanent and constant character, tannic acid, catechu, indigo, &c.? There are several of the old-fashioned, and now much disused, dyers' drugs which, in combination with suitable mordants, are not only beautifully delicate, employed as tints, but are of acknowledged stability.

One other precaution will in every instance have to be kept continuously in mind. Hypo and all the sulphur salts must be thoroughly eliminated to secure permanency, for they are powerful bleaching agents.—I am, yours, &c.,

J. P.

January 4, 1893.

ALUMINIUM MOUNTS.

To the EDITOR.

SIR,—On the appearance of this year's PHOTOGRAPHIC ALMANAC, I referred to its pages in hope of finding some mitigation in the charges made by our best opticians for aluminium lens mounts, but in vain. Can any of your readers solve this problem? If X has a high reputation for optical work, should he charge for metal mounts in the same proportion?

As an illustration of the diversity of charges made for aluminium mounts, I send you the following table. The makers names are substituted by letters:—

Rapid Symmetrical Series.	A.	B.	C.	D.	E.	F.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Focus 6 inches	1 6 0	0 15 0	0 17 6	—	0 10 0	0 14 0
,, 7¼ ,, ...	1 7 0	1 0 0	1 5 0	0 11 3	—	—
,, 9 ,, ...	1 9 0	1 5 0	1 5 0	—	0 10 0	0 18 0
,, 10½ ,, ...	1 14 0	1 10 0	2 0 0	0 14 5	—	1 0 0
,, 12 ,, ...	1 14 0	—	—	0 16 10	0 12 0	1 4 0
,, 14 ,, ...	2 0 0	1 15 0	1 15 0	1 4 0	0 15 0	1 4 0
,, 16 ,, ...	3 10 0	2 5 0	2 5 0	—	—	—
,, 18 ,, ...	5 0 0	—	—	1 12 0	1 0 0	1 4 0
,, 20 ,, ...	6 0 0	3 10 0	3 10 0	—	—	1 7 0
,, 24 ,, ...	8 0 0	5 0 0	6 10 0	—	1 5 0	2 0 0
,, 30 ,, ...	10 0 0	10 0 0	8 0 0	—	—	—

Granted that our best opticians are entitled to the full value of their reputation, as represented by the higher prices they can command for lenses mounted in brass, it none the less seems exacting, that they should charge for aluminium by the standard of their optical work. Why should a monopoly price be placed upon a 24-inch lens mount, represented by the difference between 8*l.* and 1*l.* 5*s.* or 2*l.*? But if we examine further, the charge of 8*l.* for the aluminium mount of a 24-inch lens appears still more extraordinary. This lens is three inches in diameter, but if we take a Zeiss lens of Series III., diameter three-and-three-quarter inches, focus twenty-three inches, the charge for aluminium mount, Iris diaphragm included, is 4*l.* Deduct 2*l.* 15*s.* for Iris diaphragm, as charged by the same optician for a lens of three-and-three-quarter inches diameter, we then arrive at 1*l.* 5*s.* for the aluminium mount, the same as charged by the cheapest optician.

If the cheaper opticians have the truth of their advertisements at heart, concerning the quality of their lenses, I would advise them to attach full Kew certificates at an extra charge. No doubt they would then find a large demand for aluminium mounted instruments, especially in the large sizes.—I am, yours, &c.,

PHILIP EVERITT.

January 2, 1893.

"TWO MR. BROWNS."

To the EDITOR.

SIR,— May I ask your kind insertion of the following disclaimer?

In the index published with last week's issue you couple an article on "Photographer's English" with one on "Platinum Toning as applied to Gelatino-chloride Papers," and credit the two to one author. The latter article is from my pen, but I should not like any of my friends to believe me responsible for the former; hence this note.

Photographer's English concerns me not; I am only solicitous as to the purity of my own.—I am, yours, &c.,

JAMES BROWN.

31, *Market-street, Newcastle-on-Tyne, January* 2, 1893.

[We extend our apologies to our friend for having, in the index, confused him with the "other Mr. Brown." Dare we plead, in extenuation of the slip, that there is a seducing similarity in the names?—ED.]

MOUNTING GELATINO CHLORIDE PRINTS.

To the EDITOR.

SIR,—Having several times noticed inquiries respecting the difficulties many workers find in mounting gelatino-chloride paper so as to retain the perfect enamel surface produced by squeegeeing on to glass, I am glad to be able to give a few hints which will enable any one to mount this paper with ease and certainty. The difficulty I found was to obtain a mountant that had strong adhesive qualities with but little moisture, and quick drying. Having found such a one, to use it I hold the print (just as stripped off the glass and *unbacked*) face down in the hand, then brush a thin layer of the mountant along each edge. Next brush over the centre of the mount with a solution of three quarters mountant and one quarter water (use as little of the mixture as possible), place the print in position on the mount, and rub all over with a silk handkerchief. Do not use any other pressure. I have mounted some hundreds this way both large and small, and never have one spoilt. The gloss remains quite uninjured.—I am, yours, &c.,

ARTHUR C. COCKBURN.

22, *Sheatley-road, Brondesbury, N.W., January* 3, 1893.

THE LATE MR. W. R. HARRISON.—The announcement of the death of a quondam French correspondent of this journal is received with regret. For some time anterior to 1866 Mr. Harrison was our regular French correspondent. He was a gentleman of ripe experience and a colleague of Bingham and other men of note in those early days. He died on December 28, aged seventy years.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange Slingshy's flash stand, with six Marion's lamps, equal to new, for head-rest or studio furniture.—Address, ARTHUR WHETTON, Market-place, Deddington.

Will exchange my whole-plate, 8½×6½, Stereoscopic Company's portrait lens, quite new, for a whole-plate rectilinear lens, by any good maker.—Address, P. TARRANT, Westcott-hill, Dorking.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "HENRY GREENWOOD & CO.," 2, *York-street, Covent Garden, London.*

JAS. CREIGHTON.—Received.

LENS.—We think that the lens you suggest will serve the purpose very well.

THOS. BLOE.—A fifteen-grain solution of protosulphate of iron, to which is added one drachm.

B. D. HIGGINS.—Remove the bad varnish with methylated spirits of wine, and revarnish with a better varnish.

H. FLATHER.—Received; thanks. We had already had a similar communication from another correspondent.

"STAR" READER.—Mr. Charles Beresford and all his works have frequently been denounced in our columns. See sub-leaders.

WM. HARROP.—There is no advantage in the use of a yellow screen with non-orthochromatised plates. It simply prolongs the exposure.

SCEPTIC.—We agree with you that it is doubtful whether, in practice, the most rapid plates of to-day are more rapid than those of ten years ago.

C. DUNCAN.—No special medium is required for working up bromide enlargements in water colours; if the paper is rough, crayons may be used.

A. LEWIS.—The great depth of the shadows is a common failing with bromide prints when they are much under-exposed and the development is forced.

ELECTRIC.—With a light of from 1000 to 2000 candle-power, and under the circumstances you mention, an exposure of eight seconds, approximately, would be required.

PLATEN.—Details of a collotype process, which we are aware was worked with great success in America, are given in the editorial article of the current ALMANAC.

N. FARRELL.—1. We are not aware that collodio-chloride paper is manufactured in this country. 2. Dr. Van Monckhoven is said to have been the originator of the process.

STANLEY G. DICKER.—Squire's lenses had a high reputation in their day. They were considered as acting rapidly. If the lens is in good condition you are safe in purchasing at the price mentioned.

G. BENSON.—In putting your lenses together after cleaning them, the relative positions of the lenses forming the back combination have not been noted. Reverse the crown glass and all will go on well as before.

R. BEDWELL.—If on the addition of more liver of sulphur to the old hyposulphite of soda no further turbidity is produced, it may be safely concluded that all the silver has been precipitated, and any further addition will do harm rather than otherwise.

A. M. Z.—You will find the camera referred to described in an article on page 39 of the volume of this JOURNAL for 1891, which will probably answer your question more fully than we could devote space to here. The principle of the camera is as old as it is excellent.

L. MELDON says: "A correspondent last week sent a description of a dip-bath for development. His letter appeared in the paper, but not the description. I should be glad to get the description therein mentioned."—We shall probably be giving a full description of the bath in our next.

A. Z. J. says: "I have seen some pictures on opal of sea-pieces of a peculiar greenish-blue tone, very suitable indeed for such subjects. I am sure they are not bromides, unless some developer has been used, the formula for which has not been published. Can you give me any information on the point?"—We have no doubt whatever that the pictures in question were produced by the carbon process. Although we have not seen those referred to, we have seen others of similar subjects which answer to the description, and they were printed in carbon.

A. W. F. writes: "Last March I entered into an agreement as printer and mounter for one year's services. As I learnt that all the photographers in this place were going to close on the day following Bank Holiday, I asked my employer if he was going to do the same. He said No, and that I must be at work that day as usual, and, if I was not, I was to consider myself discharged. As all the other photographers in the town were closed, can he legally discharge me for not going to work, which I did not?"—Yes, certainly he can. The Tuesday was not a legal holiday, although many houses closed to enable their *employés* to have an extra day's relaxation.

L. C. M.—Luminous paint is an outcome of a discovery made over forty years ago by Becquerel that the sulphides of strontium and barium became phosphorescent after exposure to strong light. We are not able to inform you the method by which the paint is manufactured. Sulphide of calcium is the phosphorescent agent.

F. E. G. says: "To-day, when developing in the dark room, I unintentionally placed a number of negatives in a dish of water which had had a small quantity of strong sulphuric acid left in, and when I let in the daylight I found the water quite milky, and each negative coated with a bluish-white opalescence, part of which I was able to wash away (from the surface only). Several of the negatives, however, are utterly spoiled, unless they can be cleared, as they are irregularly clouded, owing to the negatives which had been resting on top of them. I shall be much obliged if you can assist me out of the difficulty."—The negatives, we presume, were placed in the sulphuric acid solution immediately after being taken from the hypo. In that case sulphur was doubtless precipitated, the "clouding" being silver sulphide, which we fear is irremovable from the negatives.

LEYTONSTONE CAMERA CLUB.—January 25, Members' Lantern Evening.

THE West London Photographic Society's annual *conversazione* and exhibition of members' work takes place on January 10 and 11 (next week).

CROYDON CAMERA CLUB.—January 16, *Spanish Slides* and lecturette by Mr. Cembrano. 30, *Slide-Making by Reduction*, by Mr. B. Gay Wilkinson.

PHOTOGRAPHIC CLUB.—January 11, Members' Open Night; demonstration with the amidol developer. 18, *Glass and Fabrics for Dark Room Illumination.*

PROFESSOR ARTHUR H. ELLIOTT has resigned the joint-editorship of *Anthony's Bulletin* on account of defective eyesight, being succeeded by Mr. F. P. Smith, who for the past year has been his assistant.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—Meeting, January 10, 1893. Lecture and demonstration on *Platinotype Printing*, by S. G. B. Wollaston, at Art Gallery, Newcastle, at half-past seven.

NORTH LONDON PHOTOGRAPHIC SOCIETY.—Instead of Wellington Hall, the meetings of this Society will in future be held in the Constitutional Club, Canonbury Tower. The joint Secretaries are Mr. W. T. Coventon and Mr. Alex. Mackie.

MESSRS. FUERST BROTHERS inform us that they have appointed Mr. L. E. Morgan (formerly with the Fry Manufacturing Company) for the purpose of giving practical demonstrations of the use of the amidol developer. They would be glad to receive applications from any photographic societies or clubs that may be desirous of arranging for Mr. Morgan's attendance at their meetings in order to demonstrate development with amidol.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—January 12, *Testing Oxygen Gas*, by Messrs. F. B. Grundy and A. Haddon; also *The "Kolm" Magnesium Lamp*, demonstrated by Mr. J. G. Hudson. 19, Monthly Lantern Night. 26, *Photographing Paintings by Artificial Light*, by Mr. W. E. Debenham. February 2, Special Lantern Evening, *Norway and its People*, by Mr. S. J. Beckett. 9, Opening Lecture of the Technical Series announced recently. 16, Monthly Lantern Night. 23, Annual Musical and Lantern Entertainment in St. George's Hall, the Champion Hotel, commencing at half-past seven.

FORTHCOMING EXHIBITIONS.

1893.	
February 1	*Cleveland Camera Club. Hon. Secretary, J. J. Hallam, 11, Amber-street, Saltburn-by-the-Sea.
,, 7, 8	Rotherham Photographic Society. Hon. Secretary, H. C. Hemingway, Rotherham.
,, 14	Durham City Camera Club. Hon. Secretary, R. Haux-well, The Avenue, Durham.
,, 16–18	*Woolwich Polytechnic Photographic Society. Hon. Secretary, W. Dawes, 145, Chesnut-road, Plumstead, S.E.
,, 18	Holborn Camera Club. Hon. Secretary, F. J. Cobb, 100 High Holborn, E.C.
March 1, 2	*Fillebrook Athenæum Photographic Society. Hon. Secretary, Joseph W. Spurgeon, 1 Drayton Villas, Leytonstone, Essex.
April 17–29	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.

* Signifies that there are open classes.

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1706. Vol. XL.—JANUARY 13, 1893.

REVERSED NEGATIVES IN PRACTICE.

The subject of reversed negatives has frequently been treated of in times past, but it appears, from queries we have to reply to, that additional interest is now being taken by photographic experimentalists in the various mechanical processes—particularly since the issue of the Almanac—in some of which reversed negatives, that is as regards right and left, are imperative. We shall not here go into the details of all the numerous methods by which reversed negatives can be made, but shall confine ourselves to explaining, for the guidance of novices in the work, the strong and weak points of those most generally practised. In the first place, it must be borne in mind that one of the most important points with negatives for photo-mechanical work is extreme sharpness in all parts of the plate. Therefore it will be manifest that this quality is secured in the highest degree by utilising an original negative instead of having to reproduce it, whatever be the means by which this is accomplished.

There are several ways of producing reversed negatives direct. The one most generally followed by professional workers is that of taking the negative with the aid of a prism, or mirror of plane glass silvered on its surface, placed at an angle, either in front of or behind the lens, for it matters not which position it occupies. In some respects the prism is the more convenient in use, but for large sizes it becomes a costly piece of apparatus. Hence the mirror is usually adopted for all sizes, at least in England. The prism is, however, often used on the Continent. Whichever instrument be employed, this system of working direct is at once the simplest and the best method of obtaining reversed negatives, as it involves no more trouble than making them in the ordinary manner, while their quality is in no way inferior.

Reversed negatives may also be taken direct by placing the plate the reverse way in the slide, and exposing through the glass, allowing, of course, for its thickness in the focussing. But it will be obvious to every one that any dirt or scratches on the glass, or imperfections in it in the form of air bubbles, &c., will be reproduced in the negatives, and these defects are not always discoverable with dry plates. Nevertheless, this system is universally followed by some houses who work the "zinco," and what may be termed other rough processes. There, however, the process used is generally the wet-collodion, and this gives the opportunity of careful examination of the glass before it is coated. Where this system is adopted, the ground glass of the focussing screen is usually fitted with its smooth side towards the lens. The carriers of the dark slide are also supplied with small springs at the corners to press the plate, from the back, against the wire corners which are fixed in register with the ground surface of the focussing screen.

Celluloid films, it has often been stated, can be printed from either side without loss of sharpness. This is practically the case with those of the thinnest kind, when used for some purposes. But practical workers tell us that, even with the thinnest, there is a perceptible loss of sharpness in the grain, when they are used in some mechanical processes, even when the greatest care is used with the light in printing.

Here is another method of producing reversed negatives that is, perhaps, more extensively followed abroad than it is here, particularly by collotype workers, namely, removing the negative from the glass upon which it is taken in film form, and printing from it with the side that was next the glass in contact with the prepared plate. If the negative is made by the wet-collodion process, the glass is French-chalked prior to collodionising. Then, when the negative is finished, a thin sheet of softened gelatine is squeegeed upon it, or the negative is placed on a levelling stand, and a solution of gelatine poured on. When dry, in either case the negative can readily be stripped off for use. Dry plates, specially prepared for stripping, are now articles of commerce, and the negative, after it is taken, may be treated in the same way as collodion negatives, as regards stripping. If ordinary dry plates—that is, those not prepared for stripping—be used, the film can also be removed by treating it with very dilute hydrofluoric acid, after the manner of Plener. Obtaining a reversed negative by stripping it from the glass of course involves more trouble than taking it reversed in the first instance. But the stripped film often possesses advantages over the one on its rigid support, inasmuch as perfect contact can always be ensured in printing, a condition not possible if the glass negative be uneven. If, however, the stripped film be backed with a piece of plate glass, absolute contact in all parts is at once secured.

We have hitherto been dealing with negatives taken reversed or with a view to their reversal afterwards. But in general practice a large number have to be utilised that were not, and, more often than otherwise, they must not be tampered with as in stripping, hence there is nothing to do but to reproduce them. It follows, as a matter of course, that, if the reproduction be made direct from the negative, the greatest possible degree of sharpness should be secured. There are several methods by which this can be done. There is, for example, the method of Colonel Waterhouse, with the thio-carbamides, the reversed action of light method, and the method of Mr. Bolas, by treating a dry plate with bichromate of potash before exposure, and some others. As a matter of fact, however

although they are all capable of yielding excellent results, they are but little used, if at all, by commercial workers.

The plan usually pursued by professionals is to work by way of a transparency, either by contact printing, or more generally, with the camera. The latter way becomes imperative when, as is often the case, a size different from the original is required. The transparency is sometimes made on a dry plate, and sometimes in carbon. The latter possesses some advantages over the former, inasmuch as, if the negative be on uneven glass, perfect contact will still be secured through the flexible nature of the tissue, hence a sharper result. For the new negative, either wet collodion or dry plates can, of course, be employed.

Here is another method by which a reversed negative from a transparency can be obtained by contact printing alone. A carbon transparency is made in the ordinary way, and from this a negative is printed on a dry plate. It might be surmised in this case that, as the carbon image is more or less in relief a sharp negative would not be secured. But this, in practice, is not really the case if the usual transparency tissue be employed, as with it the relief is so trifling, that it may be disregarded if tolerably parallel light be used in printing the negative.

The extra trouble involved in having to reproduce negatives is often compensated for, inasmuch as then one has the opportunity of securing in the reproduction a negative having the characteristics required for the work in hand, and which the original frequently does not possess. We have not alluded to nearly all the different ways by which reversed negatives are obtainable, but we have indicated those most in every-day practice.

CHANGING BOXES *VERSUS* DARK SLIDES.

II.

The first idea of the "grooveless" changing box, alluded to in our last issue but one, was due, we believe, to Mr. P. Mawdsley —at present on a visit to this country from America—at least, it was, we believe, in his hands that we several years ago saw the earliest attempt to utilise this principle. The details of Mr. Mawdsley's method, so far as we remember, were as follow :—

The box itself in general construction was upon the same lines as Hare's automatic changing box and slide, but without grooves, and was made of such dimensions as to carry the required number of plates in contact with one another, thus saving a considerable amount of space. We have said the plates were in contact with one another, but this is hardly correct, as they only came in contact at the edges. Obviously, it would be scarcely desirable that even the toughest and hardest of gelatine films should slide in contact with the back of another plate in changing, and, in order to avoid this, Mr. Mawdsley attached to the opposite edges of the *back* of each plate, by means of glue, a narrow strip of thin cardboard to form a bearing surface, upon which the next plate could slide without injury to its surface. So mounted, half or two-thirds as many more plates would pack into the same space as when the ordinary grooved box was used.

In working the changing box the dark slide is attached in the ordinary way, and the box held in such a position that the first plate is at the top of the pile, and, sufficient "play" being allowed for the purpose, it then easily passes into the dark slide. After exposure the dark slide is again attached to the box, and the sliding lid moved to the side occupied by the *last* plate, which is now brought into the uppermost position, when the exposed plate can be returned to the box behind the unexposed ones, and so on until the whole have been exposed.

On actual trial, we find that twenty plates of ordinary thickness, packed hap-hazard from a pile, will go comfortably into the space of a grooved changing box intended to hold a dozen, allowing space also for the necessary number of cardboard strips, so that possessors of existing changing boxes who may wish to increase their carrying space for glass may easily do so to that extent by clearing out the grooves; but, if films are to be employed instead of glass, in the same space from fifty to a hundred may be included, according to the thickness and character of the holder or carrier. Thus in the simple form of carrier we shall describe later, if used as a double one, a hundred films will easily go into the ordinary one-dozen grooved box; that is to say, fifty carriers may be used, each holding either one or two films, as may be decided.

In order to utilise the double carriers, however, some extra provision must be made, either in the form of a double dark slide—the ordinary one being single—or, perhaps, better still, by providing the means of reversing the position of the slide in attaching it to the box. Such an arrangement was described, at page 568 of our volume for 1889, by Mr. W. B. Bolton. It consists of an attachment in the form of a pair of false jaws fitting on to the box in place of the slide, and into which the slide itself can be inserted in the reverse position, so that, after the whole of one side of the film-carriers have been exposed in the ordinary way, the extra jaws can be placed in position and the opposite sides exposed in the same manner.

In 1881, provisional protection was granted to Mr. C. Sands for a changing box and slide in which the principle of the grooveless box was utilised, though the details of construction varied from those detailed above. The lid of the box was fixed, and was provided with two separate openings for the exit and ingress of the plates. The opening and closing of these slots was automatic, being performed in the act of attaching the dark slide by two pins fitting into corresponding holes; the slide itself, if we remember rightly, was opened and closed by means of a sliding strip of metal. The plates were placed in "carriers"—which, of course, rendered the changing box bulkier in every way than an ordinary one—and it was adaptable to either single or double carriers.

As to the respective merits of double slides, and the method of reversing the single slide, it may be pointed out that the former has the advantage of only one changing operation for each pair of plates, though, at the same time, some little trouble is involved in construction, in order to secure correct register of both plates in the camera, and at the same time to permit the carrier to slide freely in and out of the holder. Another point in favour of the double slides is that the exposures run consecutively from one end of the box to the other, while, by the reversal method, they run from one end to the other and back again, so that the first and last exposures in the box will be in the same carrier. This is apt to cause some little difficulty in identifying any particular exposure, if it be desired to develop before the rest; but, after all, the same, or a greater, difficulty exists in the case of the continuous films of a roll-holder, and it may be minimised by a careful numbering of the carriers in their proper order.

Results of Solar Photography.—Mr. George E. Hale writes in *Astronomy and Astro-Physics*: "In view of the fact that the study of prominences, facula, and sunspot spectra by photographic means has now been taken up by several investigators, it seems desirable to bring together the results of the work in this direction which has been in progress at the Kenwood Observatory since April last, 1891." In furtherance of this view he has entered into an interesting series of descriptions in each department, which, though concerned with matters photographic, are not capable of useful abbreviation, and we therefore refer our readers to the original paper in No. 109 of the journal quoted, or as abstracted into the *Chemical News*, p. 4, No. 1728.

A Word of Warning as to Corrosive Sublimate.—Though a photographer, perhaps, does not expose his hands so much as a surgeon does to the effects of solutions of corrosive sublimate, the fact that this chemical is much employed by some operators renders it advisable to put photographers on their guard by stating the experience of Professor Albert. At a meeting of the Vienna Medical Society he gave an account of the ill effects he had experienced, he having used the solution daily in his work as a surgeon. He found that he suffered from dyspeptic troubles, and lately that some of his teeth were falling out, effects which he traced to the absorption of mercury through the skin. It is evident, therefore, that photographers have another chemical to add to the list of those which are injurious to the system, if the hands are immersed without protection in solutions of such substances.

Photographing the Motion of Vessels.—In *La Nature* last week will be found two singular-looking engravings, which, though of photo-astronomical interest, it would be impossible to understand without the accompanying letterpress. The illustrations are, in point of fact, views of an eclipse of the moon taken on board a vessel with exposures of two minutes' duration. The rolling and pitching of the ship has caused the image to describe a series of gyrations and convolutions on the plate, which are faithfully brought out on the negative. M. Gaston Tissandier suggests of them that, as a method of registering the movements of a vessel when sailing has often been sought, these pictures furnish a solution of the problem, a negative of the moon or sun being employed instead of, as hitherto' one of the horizon.

The North London Photographic Society.—This well-known Society, which represents in its history and connexions the earlier days of photography, and which has numbered among its members many of the men whose names are household words among photographers, is about to move its quarters from Wellington Hall, Islington (where it has had temporary accommodation since the pulling down of its old rooms at Myddelton Hall) to Canonbury Tower, Canonbury-square, arrangements having been made with the Canonbury Constitutional Club, who occupy the premises, for the use of the necessary rooms. The first meeting in the new home will be on Tuesday the 17th inst., when it is expected that there will be a goodly gathering of members to "warm the house," and greet the new Hon. Secretary, Mr. W. T. Coventon, of 50 Highbury-park, N., the late Hon. Sec., Mr. W. Bishop, having regretfully resigned his post under pressure of other engagements, though still retaining his interest in the Society.

Differences in Value between Eye and Photographic Star Maps.—At the last meeting of the Royal Astronomical Society considerable interest was aroused in a discussion on the new star in Auriga, which now appeared to be becoming brighter to the eye, though, in the photographs, it was less bright. The explanation offered by Mr. Taylor is as follows, and, as it embraces points of great importance, deserves to be well studied:—As the brightness of the new star diminished, and, presumably, its temperature fell, its spectrum would change very considerably. The line at wave length 5005 had become by far the brightest in the spectrum—indeed, was the only line recorded by several observers. A similar change of spectrum had been noticed in all temporary stars which had been spectroscopically examined. This line, which appeared to be the characteristic nebular line, was in a region of the spectrum to which ordinary photographic plates were only slightly sensitive, while it was near the region of maximum visual brilliancy of the spectrum for ordinary eyes. The line was therefore taken into account in visual estimations of magnitude, and practically ignored in photographic estimations, and it was a remarkable fact that the presence or absence of this line should have made a difference of three magnitudes in estimations of the Nova.

New Mode of Enlarging the Telescopic Image for Photographing.—Mr. Davidson, reported at the above meeting that he had taken some enlargments of Jupiter, which showed that a newly proposed method would be very useful. It consisted in applying, after the fashion of the tele-photographic lens, a suitably corrected concave lens, placed at a distance behind the object-glass. Mr. Maunder had experimented with such an apparatus, in view of the coming eclipse in Brazil and the West Coast of Africa, and had obtained direct images of the moon one and a half inches in diameter.

Covering Metal with Glass.—A successful mode of covering metallic surfaces with a durable coating of glass is a problem which, if successfully solved, would be of vast usefulness in photographic work generally. In case of any of our readers wishing to experiment in this direction, we give details of a method which has been suggested for this purpose:—Take 125 parts, by weight, of ordinary flint-glass fragments, twenty-nine of carbonate of soda, and twelve of boric acid, and melt. Pour the fused mass out upon some cold surface, as of stone or metal, and pulverise. When cool, make a mixture of this powder with silicate of soda—water-glass—solution of 60° Baumé. With this coat the metal to be glazed, and heat in a muffle, or other furnace, until it has fused. This coating is said to adhere very firmly to steel or iron. We see no reason why if, on a comparatively small scale even, a method of surfacing iron with glass, either by the above or other means is possible, it should not be adopted, and thus be of the greatest value for such purposes as the ordinary steel plate of rolling presses is now put to. We are aware that plate-glass beds are supplied to some machines, but it is evident that they are not applicable where heat is applied. A rolling press, supplied with a plate with a glass surface, which would not scratch or become rusted like steel, nor break with a certain amount of heat, would be invaluable.

A SEASONABLE PRINTING PROCESS FOR AMATEURS.

It is probably owing to the reluctance on the part of the grea majority of amateurs to venture on to new ground that one of the best and oldest of our printing methods is almost entirely neglected by them, in spite of its various advantages, including indubitable permanence. I allude to the carbon or autotype process, which after silver printing on plain and albumenised paper, takes rank amongst the oldest of our modern printing processes.

The principle of the process is so utterly different from most other methods, and the manipulations so far removed in their character from those with which the amateur is familiar, that he may perhaps be excused for imagining difficulties which a simple trial would soon dispel; for, after the first mastery of the details of the exposure and development, the carbon process is one of the, if not the, easiest and most certain in its results of the large number that are now at the disposal of photographers. In fairly practised hands the beauty and uniformity of the results produced by this form of printing, combined with the ease in working and the small percentage of spoilt prints, is really remarkable, and cannot, we venture to think, be surpassed by any other.

But at the present season of the year carbon printing offers special advantages over most other methods that cannot fail to recommend it if it be once tried. Its superior rapidity in printing will be especially appreciated during the short dark days of winter, while the less liability of the tissue to injury from damp while in the printing frame gives it the preference over many of the newer processes. From the nature of the sensitive material there is, of course, an end to all difficulty in securing satisfactory and uniform tones, but perhaps the

greatest advantage of all is its wonderful adaptibility to negatives of greatly varying density and quality. It is scarcely too much to say that by suitable modification in the treatment of the tissue, both in sensitising and development, prints of excellent quality may be obtained from negatives which it would be hopeless to attempt to print by any other method. It is, in fact, the process *par excellence* which does *not* require a special type of negative, being as well adapted to dense slow printers as to thin, delicate, and even flat ones.

In connexion with this quality, it may be further remarked that for getting the best possible result from many of the only half-exposed hand-camera negatives that form so large a proportion of modern work, there is no process that can in any way approach carbon, for, by suitably reducing the strength of the sensitising bath, vigorous and well-modelled prints may be obtained from the most ghost-like negatives. Again, in the case of small negatives taken chiefly with a view to enlargement, it is well known that the best results are obtained from these delicate negatives full of detail; but if direct prints be attempted from such negatives in silver or platinotype, the chances are much against satisfactory results, as these processes require a more robust type of image. But such negatives are just the ones that will give the very finest quality of result in "carbon," and therefore the process can with still greater confidence be recommended to the notice of the large army of users of hand cameras of one sort or another.

A possible objection to the process may be found by some in the necessity for sensitising the tissue when required for use, as, although it may be obtained commercially in the sensitised condition, it requires to be used up within a comparatively short period. This objection, however, may be put on one side, for the worker who will not incur the slight amount of trouble involved in sensitising is not one that is likely to venture far enough out of the beaten track to try the process at all. But it is, after all, a very easy matter, when a day's printing is to be undertaken, to sensitise, over night, as much tissue as is likely to be used, and it will be ready for use in the morning. Moreover—and especially at this season of the year—the sensitised tissue may be comfortably kept for ten days or a fortnight, if protected from damp, in one of the ordinary tin cases. The full extent of its deterioration—if such it can be called—when properly kept, will be that it will take longer to develop, and will probably require hotter water; though, as a partial set-off to this, many operators claim that a better quality of results, as regards fineness and gradation, is obtained with tissue that has been sensitised for some days.

I do not suppose many of your readers will venture to the extent of making their own tissue, nor is there any necessity to do so, unless it be for the sake of producing special colours not found amongst the commercial samples. These are offered in such a variety of tones of the usual photographic kinds that for ordinary work there is no necessity to go to the trouble of preparing for oneself. But if by chance it should become necessary, there is not the slightest difficulty in the process, far less, indeed, than in the preparation of an emulsion, while the quality of the product need be in no way inferior to the commercial article. It is true that in the manufacture of the latter elaborate machinery is employed, as well as a large staff of more or less skilled assistants; but these are only required by reason of the magnitude of the operations and the necessity for having everything done in the most expeditious and economical manner possible.

(*To be concluded.*) W. B. Bolton.

CONTINENTAL NOTES AND NEWS.

Silver Lactate Plates.—Before the Antwerp Section of the Association Belge de Photographie, the President, Mons. Joseph Maes, recently gave a demonstration of the development of some transparencies on plates prepared with lactate of silver. The whites of the images were said to have been very pure, and the blacks very intense. The plates are rapid enough for reduction in the camera.

"The Question Box."—Before another Section of the same Society one of the members, Mons. Ed. Sacré, brought forward (as he had already done several times) a proposition for the institution of a "question box," so that members might have the opportunity of submitting questions without disclosing their identity. The report does not state whether M. Sacré's proposition was carried, so that we may suppose that that gentleman will bring the subject before the Section again. Among the few English Societies who have a "question box" we are not sure that, as a means of enabling an inexperienced member to obtain information upon a matter which he is reluctant, for fear of ridicule or criticism, to introduce in the usual way, it is of any practical use, it being as a rule more honoured by neglect than by use.

Sodium Sulphate in the Developer.—Herr Pippel, in a German contemporary, recommends the use of sodium sulphate (Glauber's salt) instead of the sulphite in the developer, it yielding clean negatives of a rich black colour. For a properly exposed plate he recommends immersion for a few seconds in a bath of—

Pyro	1 gramme.
Saturated solution of soda sulphate	20 to 40 c.c.
Water	100 c.c.

to which, being returned to the developing measure, is added 2 to 10 c.c. of a saturated solution of sodium carbonate, development then being resumed with the mixed solution. For over-exposure, bromide; more detail, an increase of carbonate; and for under-exposure, more of the latter, plus 20 to 30 c.c. of the sulphate solution, are recommended.

A Black Stain for Wood.—The photographer who makes his own apparatus may desire to know a good and cheap black stain. According to *Science en Famille*, the following fulfils those requirements:—

Extract of logwood	15 grammes.
Chromate of potash	2 „
Water	1 litre.

The extract of logwood is dissolved in boiling water, and the chromate then added. The colour of the liquid is a deep violet, which changes to a pure black in contact with the wood.

Vibration of Photographic Apparatus, &c.—To judge of the steadiness of photographic (or photo-micrographic) apparatus, &c., a contemporary recommends that a glass vessel, charged with mercury, be placed on the top of the camera or other convenient position. The least possible movement of the apparatus is shown by the numerous and varied little waves which appear on the surface of the mercury bath. These minute undulations are immediately perceptible to the eye, which sees, as it were, the images obtained by reflection on the brilliant surface of the mercury.

Writing on Glass.—For "matt" inscriptions on glass it is suggested to dissolve in 500 grammes of water 36 grammes of fluoride of sodium and 7 grammes of potassium sulphate, and in another 500 grammes of water 14 grammes of zinc chloride, 65 grammes of hydrochloric acid being added. For use, equal parts of the solution are mixed, and the inscription made on the glass with a pen or brush. In about half an hour the lettering so traced will present the customary "matt" appearance.

Varnishing Zinc Trays.—When zinc trays, &c., are used for washing plates or prints, says "Ki-Non" in *L'Amateur Photographe*, the deposited hypo reacts on the metal, which, if coming into contact with prints, stains them. This, he says, may be avoided by varnishing the vessel with bitumen of Judea (5 parts dissolved in 100 parts of benzol). The varnished vessel is placed in sunlight in order that the bitumen may be rendered insoluble. He advises two applications of the varnish, and to repeat the operation as occasion may require.

Impurities in Reducing Agents.—As the result of an examination of the developing properties of gaïacol, as alleged by Colonel Waterhouse, Messrs. A. & L. Lumière state that that sub-

stance in the purified form does not develop exposures on the silver haloids, the developing action being due to the impurities with which it is contaminated. Treating of the developing powers of certain substances at a very high degree of dilution, they mention the interesting fact that an alkaline solution of para-amidophenol at the strength of 1 : 10,000 is sufficient for the purpose.

WINTER TROUBLES.

It may seem something like "locking the stable door after the horse is stolen," to raise a note of warning after an accident has happened, but as we can scarcely hope that the present thaw closes our winter, the same trouble may occur to others that has fallen within my own experience. This, though perfectly explicable, is to me, after many winters' acquaintance with chemical and photographic apparatus, entirely novel in its form, and, as a very simple precaution will prevent its recurrence in other cases, I make no excuse for narrating the circumstances.

Just previous to, or in the early part of the late severe frost, a large and valuable porcelain dish, after being used for washing a batch of prints, was roughly wiped out and reared on edge against the wall in one of my work rooms. The dish, I may say, was, up to this time—so far as I was aware—perfect, the enamel not even being cracked, as is so often the case with such dishes, even after comparatively little use. Judge my astonishment, therefore, when, on going into the room one day, I noticed a crack extending from one of the lower corners, as it stood against the wall, to nearly the centre. A rough examination led to the conclusion that the crack was a new one, probably the result of a recent knock, though I could not remember having administered one, and nobody else had had access to the dish.

The crack at this stage did not appear to be a very serious one, not sufficiently so to cause the dish to leak or to unfit it for the purposes of washing to which it was usually applied; but in order to guard against further damage, it was placed more carefully in its proper rack, one of a series of shelves on which it rested in the horizontal position. Here it remained for probably a week until I required it for use again, when, on taking it out, I was disgusted to find that not only had the crack extended nearly right across the dish, but it had become at its starting-point at the edge nearly an eighth of an inch wide.

An examination showed that the crack was filled up along its entire length with ice, and this gave a clue to the cause; and a subsequent closer and more careful scrutiny proved my original supposition to have been correct. A very slight crack, possibly not visible at the time, in the lower corner as the dish stood against the wall had absorbed a certain amount of moisture, which in freezing forced the edges of the crack wider apart, and probably opened it up a little in length, and into the newly opened portion fresh moisture found its way by capillary attraction, to be frozen in turn and still further extend the damage, until the wedge of ice, as I have said, had opened the crack at its widest to nearly an eighth of an inch.

In this condition the dish was perfectly firm, the two portions being held together by the intervening strip of ice; but, on pouring a little warm water into it, the expansion of the material caused the fracture to extend, with a faint report, to the opposite side of the dish, and, the cohesion of the intervening ice being simultaneously destroyed, the two portions fell apart. It required but a brief scrutiny to show that a crack scarcely two inches long had existed in the upright *side* of the dish, and through only a portion of its thickness; this much was evident from the slight discolouration of that portion. The rest of the fracture caused by the ice was perfectly white and fresh.

Curiously enough, though this was the first occurrence of the kind that ever came under my notice, within a day or two a precisely similar accident happened in the domestic department; a large jug, having been hung up damp, was fractured in the same manner, and fell in pieces when warm water was poured into it.

The lesson taught is a very simple one, namely, never, but especially in frosty weather, put porcelain, or similar vessels, away damp. The danger is greater in the case of dishes, jugs, or other utensils used for pure, or, at any rate, ordinary water, than those containing solutions of chemicals, as the latter will, to a certain extent, prevent, or arrest, the freezing of the liquid. Still, the careful man, who always washes his dishes or measures before putting them away, would be wise in carrying his care a step further, and making it a point to systematically dry them before considering his task performed. Neglect of this simple precaution has cost me a useful and valuable dish.

It will surprise many amateurs who have not tried it, how small an amount of heat will keep the frost out of a dark room. A plan I have adopted with satisfaction for several years past, consists in keeping burning, in my sink, when not in use, an ordinary benzoline lamp, over which is placed, on a retort tripod, a tin can, containing about three pints of water, which absorbs and radiates the heat that would otherwise be diffused and wasted. The shelves on which my bottles are stored are in close proximity to the sink, and these get the benefit of the genial warmth, though the far-off corners of the room may be below freezing point. With this simple arrangement, not even "saturated" solutions of oxalate of potash, or sulphate of iron, need give any trouble in the coldest weather. The cost is less than a penny *per diem*.

OLD COLLODION.

SOME CONTRIBUTORIES TO ARTISTIC RESULTS.

[Hackney Photographic Society.]

My intention in engaging your attention to-night, with some of the minor matters which may or may not contribute to the artistic result of our work, was not to deliver a discourse of a learned kind, but rather to select one or two matters, and, having expressed some views thereon, to have left the thing to general subsequent discussion. Those who are sufficiently serious in their endeavours for improvement probably have as much solid food as they can digest provided by the weekly journals, so that I sometimes think our lectures and essay readings at society meetings are not always the best possible appointments for the good of individual members. Thus, for instance, as a contributary to general good effect, I might have selected frames and mounts. I should have raked together specimens of mouldings and cardboards from the four quarters of the earth, and come ladened like a picture framer's agent. I should then have suggested the respective merits of black and gold, white and gold, English gold, and the gold which, though it glitters, is made in Germany, dark woods and light woods, black or brown. Then there would, of course, be plushes and silks, and wondrous fabrics to be considered; there is the clear white glass and the greenish glass, with all sorts of specks and bubbles in it, and a hundred other aspects from which one may usefully consider and discuss the framing and mounting of our pictures. It is an important matter; a good picture is worth well mounting, and, in order to decide on the mount most suitable, no ordinary care, judgment, and taste are needed.

Exhibition Frames.

As it is, however, I have none of these specimens here, nor perhaps is it necessary to have such. Most of us have seen a few exhibitions, and in that case have had opportunity of seeing every kind of frame which human ingenuity could invent, and we must in many cases have been convinced that with some competitors the frame was the thing exhibited, with some apology for a picture thrust in the opening just to fill it up. I have thought sometimes that in the frames you may find an index to the exhibitor's character and condition. There's the man of magnificent ideas, but lacking the means of carrying them out, glorious in florid gilt, crimson flock inches wide, and he who has money and loves to spend it, who frames his things regardless not only of expense, but of the fitness of things. The man of original ideas is soon recognised, and often his originality gets the better of his judgment, and the unconventionality becomes affectation, and he who copies or imitates is apt to imitate blindly, and misapply the models which he has set up.

And now, if one should say, What amongst the many ways of framing and mounting is the best which will secure for me the commendation of those who judge? I should say that your good taste in framing will be best displayed when your frame itself is not noticed. No paradox is this, but solid truth, and hence one advantage of having every picture in the room framed with uniformity no *one* attracts more than another, and so we shall escape that most irritating remark, as open-mouthed wonderment says, "What a beautiful frame?" I well remember visiting Mr. F. Hollyer's exhibition of photographs at the Dudley Gallery privately, with some half-dozen *confrères*, and immediately on entering the room each one of our number exclaimed, or his looks expressed it, "What capital framing!" Then we laughed that we too should have done what so many have been ridiculed for doing—admiring the frames before thinking of the pictures. But do not mistake me, the case was very different; it was not actually the frames that awakened remark, but the excellent judgment shown by the artist in using such material, and of such colour that, although we could if we thought about it tell what manner of frames were there, yet throughout a walk round the gallery one was never conscious of frames at all. The pictures might as well have been let into the walls of the building, and been part and parcel thereof. To my mind that is ideal picture-framing.

The Right Frame and Mount to Use.

Can you remember, for instance, some picture, some photograph, which pleased you a good deal, but, if asked, you cannot remember anything of the mounting or frame? Well, then, be sure that was just the right frame and mount for that particular picture. How are you to imitate it if you can't remember what it was like? My good sir, no one suggests—or, at least, I do not—that you should imitate that or anything; what suited that picture may not suit yours; your only way is to select such a surrounding for your picture that it shall be wholly forgotten and kept in subjection when looking at the picture. Someone challenges me by referring to the ponderous mass of gilt which usually surrounds the best of paintings. Well, the way to avoid attracting attention is sometimes to do the time-honoured ordinary and usual thing, and so it has become customary to put oil paintings in heavy gold frames. Perhaps the safest thing is to follow so widely adopted a custom. Still, we may notice already in some of the newer picture galleries the conventional gold frame does not rule supreme, quite a number of blackwood mouldings being introduced; moreover, the artist's fine contempt for the frame-makers' craft is seen inasmuch as somewhat shabby and far from new frames are employed, but with just that amount of good taste which, without effort or intention, saves the artist from error in the opposite extreme. I have hinted that the conventional and ordinary may, when we are in doubt, be the safest course to adopt. I give this as a point for discussion; and further that, all things considered—and I must emphasise this qualification very strongly—all things considered, and allowing for some exceptions, the safest and best mounting for our photographs, as taste and feeling goes at present, is the plain wood, oak or dark colour, and the cream-toned mount on a white board, as has become very widely used.

But I fancy already some one is beginning to resent my expending so much time in talking about so dry a subject as frames and framing.

Cutting Down Prints—The Knife and Scissors.

Well, then, if I had had proper time to prepare my subject for you this evening, I should have brought here to-night a printed photograph cut down to all manner of sizes, and I would have discoursed on the scissors and knife as a powerful contributary to final artistic result. As it is, I have brought no examples; I content myself with submitting to the suggestion that, as a rule, we are all too much afraid of using the knife. We are too inclined to be influenced by the standard commercial sizes; if 12+10 is the size of our plate, we must fill every inch of it; this at least seems to be the prevailing idea. Even those who are thoroughly acquainted with the often-used argumenta in favour of liberty of size and shape, still, as it were, reluctantly fall into the groove, and strive more than for anything else to make the subject fill the entire plate.

There is nothing new in all this; our teachers have been pointing out the advantages of cutting down our prints so as to improve the composition for years past, still we may notice the same old faults committed on all hands, for want of a little strength of mind in putting in the knife and cutting away some pretty little bit, some favourite corner, because, although good enough itself, it does not help the picture as a whole—and it does require no small strength of mind, as I myself know full well. Am I not conscious of being a grievous sinner myself in this direction? It is hard to deliberately cut away and destroy some, it may be, particularly interesting object, something especially well rendered, because it does not help the picture as a whole; but its good qualities, technically considered, must be no reason for saving it. By this I do not, of course, mean that the chief and central object in a composition is to be cut away, though it sometimes may happen that the object we had intended as an important item in the scene does not quite come up to our expectations, and we can secure a satisfactory picture by reducing the size of the print very considerably. To give you an example, I not very long ago spent a day with the camera on the marshes below Old Winchelsea. Some of you may know the spot, and will remember how delightfully the abrupt hill on which Winchelsea is built rises from a vast green level. Here black-faced Kentish sheep browse by thousands, and I conceived the idea of getting a group of sheep on the left of the foreground and including the hills in middle distance. And so I did, yet, when printed and finished, the thing was far below my expectations, and I could not for a long time decide what was amiss. I was so intent upon my picture of sheep that it never occurred to me that the sheep and the hills had no connexion until, with a boldness of which I am not often capable, I cut the thing in halves! Now, I found I had, by two strokes of my knife, constructed a picture in the half which still contained the hills, but; alas! the group of sheep, which I had waited hours for, which I had wearied my attendant in driving and coaxing into position, were abandoned—the object of all my care and patience is cast into the waste-paper basket.

When producing the first print from a negative, I usually lay it out flat, and take four strips of brown paper and lay them so as to temporarily frame my print; then I shift them in a variety of ways, each time including within their boundaries a different part of the print. By this means I ascertain what part of that landscape is best retained and what best discarded, often with the most heart-breaking results. How often has a 15×12 view, made with great care, been reduced to as small as 6×4? And when I have recalled the real hard work and fatigue which attended the carrying of large camera and heavy apparatus, it seems a good deal to have gone through for the sake of a little print.

Size and Artistic Effect.

Closely akin to this is the notion that size has a good deal to do with artistic effect—an erroneous idea that a large picture is artistically superior to a small. Possibly some scenes are more suitably produced on a moderately large scale; but, as a general rule, I do not hesitate to say that a quarter-plate *may* be as completely (nay, often is) a work of art as your 24×18. Now, Mr. Chairman and gentlemen, if I had prepared for this evening, as I ought to have done, a should have submitted to you occular proof of this by exhibiting I print 3×4 by the side of one 30×40; as it is, I must put it to you that *size*, that is measurement by inches, contributes nothing of artistic effect.

The completely successful picture is the one which, whilst giving a pleasant impression, does not make its size *felt*. A little picture may be of such a character that the spectator is not made conscious of its restricted size; the selection of subject, and the treatment of it, may convey a sense of breadth and largeness, which, to my mind, is a most important characteristic.

Why Adopt a Rectangular Form of Picture?

Why do we usually adopt for nearly all subjects a rectangular form for our pictures? The eye does not form a rectangular figure when looking at nature, but a vignetted ellipse. It was probably convenience in the first place which decided the matter, and then custom grew upon this, so that now we use a rectangular form because, being conventional, it attracts least attention, and the spectator is *unconscious of* the boundaries. The arrangement or composition of every picture should be such that its boundaries should not be felt to be restricting, and there should be such interest within the confining lines that the eye feels no desire to wander, and the mind no wish to inquire of what else the world was composed, or what came next in the landscape panorama. I might suggest such arrangements of lines, such combinations or such dispositions of central objects, and so forth, which I have myself found to assist in this direction, but beyond this neither I nor any one else can tell you how to make your small picture overcome its impression of littleness. It is a thing to be found of experience and observation, and to be attained as others have attained it—on the steep ladder of many failures.

A Definition of Artistic Effect.

I should not have to look very far back to find the time when it would have been necessary for me to preface such remarks as I had intended making, and have already been stumbling over, with a definition of what I meant by artistic effects; but I am seriously glad to believe that in some sense we have got beyond that necessity, and that, in a general manner at least, most of my patient audience have some idea as to what an artistic picture should be, namely, not an imitation of nature, or a copy of nature, but rather an interpretation, that is, *a general and broad representation of the impression made upon the artist's mind by the scene, and containing an expression of the sentiment or idea which it awakened.*

Before exhausting the list of factors which might be considered in the light of contributories to artistic effect, we should have to discuss: Figures supplementary to a landscape scene, also cattle and the like; and we might note how and when they contributed or detracted from the well-being of the picture; also clouds and the employment of a second negative; colour, whether of the image produced or of the paper used, which may make or mar our work; position of light and the amount of it, also the relative tone of various parts; and we should hardly escape discussing the question of focus and amount of detail permissible, and you know if we started that topic to-morrow's sunrise would find us still at it, and this room bearing close resemblance to a battlefield or the sequel of an Irish wake.

"An Evil Reputation."

Has any gentleman here, I wonder, ever had an evil reputation foisted upon him which he does not deserve? Has any one who, being a man of very temperate habits, found suddenly that his neigh-

bours have quietly agreed amongst themselves that he is much addicted to whisky drinking, and that when he goes out of an evening, professedly to a meeting of the Hackney Photographic Society, his best friends spread the report that the Hackney Photographic Society only means a wild bacchanalian revel, or a disguise for entering on a housebreaking expedition? If so, he will be able to sympathise with *me*, for somehow my photographic friends have decided amongst themselves that I believe in nothing but photographs put confusedly out of focus, printed on exceedingly rough papers and in a reddish-brown colour fallaciously called sepia.

A. Horsley Hinton.

AN APPARATUS FOR THE DEVELOPMENT OF PHOTOGRAPHIC PLATES WITHOUT THE USE OF A DARK ROOM.

[Journal of the Society of Chemical Industry.]

The apparatus which I bring before you to-night was in use for two months before I learned that a "portable developing box," similar to it in many respects, had been described by Dr. T. W. Harvey in the *International Annual of Anthony's Bulletin* for 1888. But as the apparatus about to be described differs from it in principle, and is based on the photo-chemical investigations of Messrs. Hurter & Driffield, I have thought that this communication might be of interest to the Society.

In the paper which we had the pleasure of listening to last session (this Journal, IX., 455–469), Messrs. Hurter & Driffield have shown that of all the conditions involved in the production of a "perfect negative," those relating to the exposure are by far the most important, and if the exposure factors are so adjusted as to give the "correct exposure," the development is of secondary importance, as the density gradations of the negative are entirely due to the action of the light.

It therefore occurred to me that, with a correctly exposed plate, development might be carried on quite mechanically, as the required density can be regulated by the length of time of development.

On trying the experiment of allowing plates which had been exposed by the aid of Hurter & Driffield's actinograph to remain in the ferrous oxalate developer for different lengths of time, it was found that, with the same quality of plate, satisfactory negatives could be obtained in ten minutes with a strong solution, and in fifteen minutes when the solution was diluted with an equal volume of water. When the time required to obtain a suitable printing density had been ascertained for a particular plate, it was found that there was nothing gained by watching the progress of the development, and consequently the dark room might be dispensed with if means could be found to keep the plate in the dark during development, and in its transference from the dark slide to the developing vessel.

In order to attain this object I have devised the apparatus which I have named a dark developing bath.

It consists of a metallic case, A (fig. 1), only slightly larger than the plate for which it is intended, which can be closed light-tight by means of the lid B. It is furnished with two tubes, one, C, entering at the bottom of the bath, which can be connected by a piece of india-rubber tubing, E, to the funnel D; the other is near the top, just above the level of the plate P. The former serves to introduce the developer into the bath, and the latter, F, allows the air to escape and also acts as an overflow.

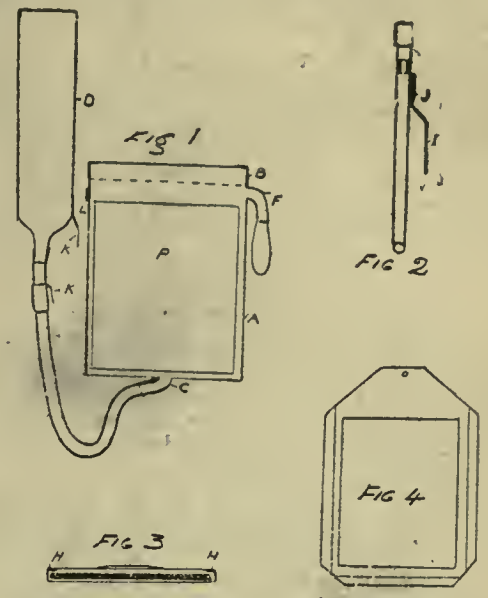
The funnel, D, and the indiarubber tube, E, are supported by means of the hooks K K, which fit into the eye L. The tubes are so bent that no light can enter the bath. An end view of the bath is shown in fig. 2, in which a movable hook, I, fitting into the socket, J, serves to fix the bath to any convenient support.

A section, Fig. 3, shows the plate P, the film side of which is kept from contact with the side of the bath by means of the metallic strips H.

When the bath is intended for the development of films or paper prints, it is furnished with a carrier (fig. 4) into which the film or paper is inserted before being put into the bath, and when required for the development of several plates at one time, it is constructed with grooves as in an ordinary plate box.

The bath is used as follows:—The dark slide containing the exposed plate and the bath are placed in a changing bag, into which it is only necessary to insert the hands. The plate is then transferred from the slide to the bath, care being taken to keep the film side towards the back of the bath.

After being closed, the bath is withdrawn from the bag into daylight, and fixed vertically to any convenient support by means of the hook. A vessel is placed under the overflow tube, and the inlet tube is attached to the funnel, which after being filled with the developing solution, is raised and lowered several times, to alternately fill and empty the bath, and so ensure the removal of air-bells from the surface of the plate. After standing sufficient time to complete the development, the solution is run off from the bath. The plate is



washed by running water through the bath (either by means of the funnel or by attaching the india rubber tube direct to a water tap), after which it is taken out, in daylight, and "fixed" in a covered tray.

If it be desired to "fix" entirely in the dark, the operation may be conducted in the same bath or in a similar one to which the plate has been transferred in the changing bag.

The final washing of plate may be done either in the bath or in the usual way.

The best developer for use with the dark bath is ferrous oxalate, on account of its property of not producing "fog," even when a plate has been left in it for an hour (Hurter & Driffield, loc. cit. p. 459). It should be made just before use from the following solutions prepared according to Thomas's formulæ:—

No. 1.

Potassium oxalate	300 grammes.
Potassium bromide	2·2 „
Water to make	1000 cc.

No. 2.

Ferrous sulphate	400 grammes.
Sulphuric acid	3 cc.
Water to make	1000 „

To *four* parts of No. 1 *add one* part No. 2, and water to make *eight* parts.

When the developer is used at once with Thomas's "Extra Rapid" plates, from twelve to fifteen minutes in the bath at about 15° C. is sufficient to give a satisfactory negative, if the exposure has been correct.

The time required to obtain a suitable density is found by placing the exposed plate in the bath and adding the amount of developer required to fill the bath, in four equal portions at intervals of five minutes. Four densities are thus obtained by developing for five, ten, fifteen, and twenty minutes respectively, from which observations the time that gives the desired density is selected.

A very small bath to contain *four plates* (a quarter plate cut into four) is useful for the development of test plates exposed in the camera on a landscape in order to ascertain the speed of the plate, as recommended by Mr. V. C. Driffield (*Photographic Soc. Reporter*, April 1889).

A developing bath constructed as above, besides enabling plates to be developed *without a dark room*, has some other advantages over the ordinary developing tray. The bath being used vertically presents a very small surface of liquid to the air, thereby preventing the rapid oxidation of the developer. As the solution is introduced at the bottom, under pressure, it flows up evenly over the plate, carrying the air before it and so prevents air-bells. The plate is com-

pletely immersed in the solution during development. The bath being quite light-tight, there is no risk of "fog" from access of light to the plate, and it is therefore especially suitable for the development of isochromatic and other very sensitive plates. The tubes attached enable the solution to be readily run off and replaced by one of altered composition, and also allow of a continuous flow of developer through it.

As this apparatus has been designed for the development of correctly exposed plates, any plates developed in it which are either over or under-exposed will be more or less defective. If, however, the exposure has been nearly correct, a passable negative will be obtained, but if it has been *widely different* from the correct one, as no provision is made for remedying the defect, the negative will be a failure, but if such a result should lead to more attention being paid to the exposure it will not be altogether to be regretted.

ALEXANDER WATT.

"BREADTH."

MR. TULLOCH'S letter has started a subject which will bear much reflection, and I wonder if nineteen out of every twenty photographers ever think about this artistic quality in the production of their prints, or how many understand what it means, and yet it is the *one chief objection* which painter artists raise against photography, that photographs are so deficient in "breadth."

Thousands of amateurs have taken up, and will take up, photography as a pastime who have never had any training in drawing or painting in oil or water colours, and therefore have had no chance of becoming acquainted with terms used in art and their meanings, and it naturally follows that they cannot apply these principles to their work in the form of study of composition, light and shade, and breadth of treatment, and it is mainly here that others who have enjoyed such opportunities, and have been draughtsmen or painters *before they took up photography*, step into the front ranks, and show superiority in their photographic work, and the best thing those who desire to excel can do is to take a term of training in any of the numerous schools of art now existent in every town of any size, and so qualify themselves *to see* in nature *with educated eyes* things they now look at with a pleasing, but at the same time artistically uneducated, effect.

If I were asked to define in as few words as possible the meaning of "breadth" in a picture or photograph, I should be disposed to say that it is the *absence of spottiness*, or the reverse of the effect of spottiness, and that abundance or minuteness of detail in the picture or print has nothing whatever to do with it either one way or another, provided that detail (though microscopically sharp) *is kept in subordination to the general tone of the parts of the picture or print where it exists.*

"Breadth" is a quality of great convenience to the painter; it enables him *to ignore* the wealth of detail which would cost him infinite time and labour to produce with brush or pencil, and which, if produced, would distract the interest of the spectator and attract attention, to the detriment of the principal "motive" of the picture. Therefore he subordinates detail, or, if painted in, he "glazes" it over and tones it down with some transparent pigment which, whilst it prevents undue attraction to the eye, permits it still to be found by any one who *seeks for it*.

Breadth is so essentially an *artistically created* quality that it is not frequently seen in nature, except under special conditions of light and shade. This is sufficiently evidenced by photography itself, from the fact that so few photographs possess it. If any one desires to study the effect of "breadth" in natural landscape, they must be on the watch for it soon after sunrise on summer mornings, or in the late afternoon and evening, when the sun is at a comparatively low altitude, and how few photographers ever attempt to get their negatives taken at such times. Wait till the sun reaches an altitude of sixty-five or seventy degrees, and it becomes very difficult to find "broad" effects of lighting, because every object becomes so generally illuminated that "spottiness" in the lighting is universal, and it is only by selection of larger masses of shadowed subject that "breadth" can be obtained.

Again, after a shower of rain, when every atom of foliage sparkles in the light with wet reflecting surfaces, the quality of breadth is absolutely impossible to secure, and such a subject may be taken to express a quality the very opposite of "breadth." The moral is, Don't take any negatives under such disadvantageous circumstances, however beautiful the view may appear to your senses; the result in the photograph must be general spottiness, distraction to the sight, and vexation to the perception of artistic friends.

How, then, is "breadth" to be secured in our photographs? In two ways—partly photographic and partly artistic. First, by careful study of the time of day, early or late, when the subject is broadly lit, and taking negatives at such times. Second, by imitating the work of the artist and toning down in the finished print such obtrusive spotty lights as tend to destroy the breadth of the picture, and which have been found impossible to avoid in the natural view.

The followers of the fuzzy definition school had the attainment of this quality of breadth very strongly in view in adopting the "out-of-sharp-focus" principle, but it appears to me that it is a mistake to suppose that it can be attained by that means. The broken effect of spotty lights amongst broad shadows is just as apparent, though not so strongly accentuated, when they are thrown out of focus, and the distracting effect is the same, and, therefore, nothing is gained by diffusion of focus; but if these disturbing lights, which *will* come where they are not wanted, can be toned down so as not to be obtrusive, the effect of breadth can be secured *without the sacrifice of good definition*, which has such a charm in photographs when well managed, and which artists enjoy as much as any one else when kept down in proper subordination to the general tone and lighting of the picture.

Another method of securing breadth to a large extent is by giving *full exposures*. We all know that the consequence of under-exposure is great contrast of light and shade, and the more the negative is forced to bring up latent detail in shadows the more accentuated becomes the contrast and the spottiness. The reverse is the case with over-exposure, as the proper balance of contrasts is overdone, and general flatness is the result, which constitutes an exaggerated and spurious kind of breadth. Those who delight in so-called "brilliant" and "sparkling" negatives, and aim at sufficiently short exposures to secure them, often err by obtaining negatives deficient in the quality of breadth by reason of this very "sparkle" and "brilliance," and it is just the *critical point in correct exposure* to obtain the true effect of breadth without either spottiness on one side or flatness on the other, and it is only to be got by *sufficiently full* exposure and restraint in development. This will secure it photographically, but, allowing for accidents in timing the exposure, or *impossibilities in obtaining perfect natural lighting*, it is as legitimate to adopt the artist's method, and to tone down objectionable lights in the print, as it is for him to "glaze" or "scumble" his effects on his canvas, and, as a final resort, is often the only way to obtain the desired effect of breadth.

"LUX."

THE PINHOLE SOCIETY'S OUTING.

IT was resolved that the members of the Pinhole Society should have an outing. Fine weather brightened the heart of the amateur, and he in return spent many evenings in brightening his beautiful set. Then came the difficulty, what part of England should be favoured by the Pinholes on this particular day? Sixty members each selected, and hard indeed was the task to get the remaining fifty-nine to go in unison. All expressed their objections, and the chairman found it a very lively meeting. Some had taste for water pieces, others wanted landscapes, a few preferred figures, while one had a strong taste for trees, and a good house of refreshment near. Finally came a mutual settlement, every member promising to be at the appointed spot, and to bring a friend if possible. When the morning arrived, the full muster numbered four. The remainder of the society had, in the meanwhile, decided if the others *would not*, they *would* go to the spot of their own choice. So they went.

The four turning up together were bent upon the real thing—a jolly day first, and pictures second. Away steamed this little party, all loaded with oddities connected with, but never separated from, the art of their heart.

When a party of camera men meet on a rail car, all charged with hopes and strong tobacco, what talk! The usual lady and gentlemen passengers sit by and wonder, and again wonder, at the strange language they hear flow so fluently from the lips of these camera men. The gentle sex are said to talk, but are not in the running with a merry party of photographers. Processes and developers containing the whole letters of the alphabet are rattled off with the greatest speed. A good photographic gossip is far more gratifying than an outsider can imagine. It comes to all who ride this hobby horse. And so the four men of the camera sped on. Each knew the best developer and worst make of plate, and all four disagreed thoroughly and candidly over each. One's success proved another's failure, and so trouble came and trouble went. More talk, more smoking! Grand old meerchaum! strong old briar! all burning and roaring at full blast. The male and female passengers slowly but surely become saturated with long words and tobacco smoke. They wonder, as the train dashes on, where and what are the stations. To see is impossible, and with clatter of train and language of a country porter without and confusion of tongues within, they begin to feel uneasy. They shrink from asking a question of the camera men, as to do so would break their run of words, for they now think photography a sacred science,

and photographers strangely wonderful men, while much regretting they had allowed themselves to remain so long in the same compartment.

At last came a pause, the four men knock their pipes on the edges of their shoe-leather, put them away to the pocket nearest the heart, and, with camera-case on the tripod slung over the shoulder, each makes a long down step, and all four, with packs and bags, are safely landed at their destination. The two passengers also get out, and push by with a rapid farewell glance. After a short halt, on they go, until the leader gives the word, "Halt! present arms, and blaze away!" Then, in quick time, comes the sight of tools in their multiplicity. Here you have demonstrative proof how some carry the fullest detail in all the likely and unlikely requirements of his art. One has a range of lenses from decimal focal length nothing, to that eight times the boundary length of his plate, with which he says he can "bring down" an object as near as his eyelash, or as far off as the moon. Everything he carries opens one into another, with the ingenuity worthy a Chinaman. He even wears a wonderful suit—all secret drawers and pockets. Touch a button, when out comes a dark slide. Pull a string, when out hops a pretty little magnifying glass. From a fob comes the neatest finder possible; also quite a portable photographic store. If you are in doubt as to the light he, in a jiffy, hands you the very latest actinometer, supplemented with a thick volume of closely printed instructions. The standard tables of exposures, position, and light are also there to the least degree, with such information—"failures" cannot be thought of, least of all explained. Another of the four has a rough-looking lot indeed; he feels some reluctance to open up beside his elaborately equipped comrades, so, under the shadow of a big tree, he raises gently and quickly his cheap set to its stand, which is, in itself, a noble piece of English oak, heavy enough to resist the quarter or 15 × 12 camera, which retains a power, like Sandow, for more weight. The best-looking thing he carries is the black velvet focussing cloth, and soon it acts the part of pall to his seedy camera box. How, all day, he so cleverly and, in a way, seemingly unintentionally arranges this cloth to always remain without exposing his lot, is worthy one's admiration. His slides are stronger than highly polished mahogany; they require no brass bindings, being in themselves sheet iron. His exposures are made by his own judgment—without reference. He takes everything cool and easy, and seemed thoroughly confident of the results. And so both the men, with their chums, worked away the day, all getting home well pleased, and feeling better for the outing, and ready for a good, enjoyable night's rest, as payment for a day's toil. On the following fortnight, once more the "Pinholes" met; all mustered in fair numbers, anxious to see the results. The four chums sat together. The owner of the exquisite lot seems to have downcast features. They compared results—without doubt he owns the worst work. How to account for it he does not know. Possibly, in the excitement, he mistook *f*-8 for *f*-32, and fogged all by over-exposure. His ideas had become confused by too many items of detail in his bound book. He got a bit mixed, while the man with the cast-iron slides had little incumbrance, and turned out the most successful pictures. It was therefore further resolved, before the close of the meeting, that the said four should once again take another outing, and carry as few articles of apparatus as possible, and, *for certain*, leave behind the bound volume of tables. TOM COAN.

DERBY PHOTOGRAPHIC SOCIETY'S EXHIBITION.

THIS Exhibition was held on January 4. A local critic writes:—"The pictures hung numbered 367, and included some of the finest amateur works which have ever been brought together in this or any other town. The specimens included a set of grand platinotypes by Mr. A. H. Bennett, which won the silver medal presented by Mr. W. Bemrose, J.P., as well as the series by Mr. F. E. Bemrose, which gained the bronze medal given by Dr. Rooney. Mr. J. Riches' collection gained the certificate given by the Society and were also capital pictures well deserving the award. We might mention that the merits of the exhibits were decided some time ago, the judge being Capt. Abney, the President of the Society. Mr. Councillor W. W. Winter exhibited a number of large photographs, which were very much admired, especially *Galatia* and *Maggie*. Mr. R. Keene had on view some excellent architectural studies, whilst leaving the professional pictures and coming to the amateur views Mr. E. C. Green's large collection were very deserving of notice. They were principally land and sea-scapes and were highly finished works of an enchanting art. Mr. J. Scotton's locomotives (silver print process) were highly meritorious, as all this gentleman's works are, whilst Mr. T. Scotton's views of interiors of Midland Railway buildings, were admirable. Mr. J. Flint's *On the Trent*, as well as his photograph of the fountain in Derby Arboretum, were striking pictures, taken with care, and Mr. J. Eastwood's frame of eight included a magnificent portrayal of the interior of Lichfield Cathedral. Mr. F. G. Thurgood had some capital views hung, all well-known local scenes, and Mr. T. Scotton's picture, *A Heavy Load*, was another work which could not be passed without notice. The same gentleman had *A view near Barnt Green*, which demanded attention. Next came some really excellent fruit by Mr. S. C. Riley, with some high-class amateur work, by Mr. A. B. Hamilton, in the platinotype 'A' process. One of these, which had been enlarged by Mr. Keene, is a portrait of Lieut-General Sir John Stokes, K.C.B. The same exhibitor has an amusing series of small works entitled *Where are you going to, my pretty Maid?* Another fine picture is *Honfleur*. Views of Derbyshire are shown by Mr. C. H. Rourdin, and are very interesting indeed, both scenery, style, and effect being all that could be desired. The pictures which won the medals are specimens which speak for themselves, but Mr. Bennett's are undoubtedly the best. Mr. Riches' comes very near the winners, and his efforts well deserve the reward they obtained. All the other works are quite up to the average, and we must not omit to mention those of Mr. G. Walker and Mr. J. Fleet. On Wednesday evening the medals were awarded by his Worship the Mayor (Mr. Councillor W. H. Marsden), in the presence of a large number of ladies and gentlemen, including Messrs. R. Keene, T. Scotton (Hon. Sec. to the Society), J. Scotton, A. B. Hamilton, W. Wilkinson," &c.

WEST LONDON PHOTOGRAPHIC SOCIETY'S EXHIBITION.

IT is a pleasure to visit such an Exhibition as that of the West London Society, which was held at the School of Art, Bedford Park, Chiswick, on Tuesday and Wednesday last, as, from former experience, one may with tolerable certainty rely upon seeing a collection of high-class photographs ably hung, and with the other details of an exhibition gratifyingly well managed. No small share of the undoubted success of this year's Exhibition may easily be traced to the efforts of the President (Mr. John A. Hodges), who, besides being a cultivated photographer, is also a working President (and therefore commendable to other Photographic Society Presidents for imitation), taking an active part in the work of the Exhibition, and also contributing several of his own pictures thereto.

About 180 frames of photographs were hung, the high average of merit displayed making it a trifle difficult for the critic to select individual works for praise, while happily there was little if any room for adverse comments, unless, maybe, the now inevitable opportunity at photographic exhibitions for airing a preference for one of the two methods of focal treatment in vogue be taken advantage of.

A capital exhibit was that of Mr. James J. Adam, his winter effects being so realistic as almost to cast one into a chill. For one of them, *A Frozen Swamp*, he was awarded the President's silver medal. A bronze medal went to Mr. L. C. Bennett for *In the Pool*, a study of craft below bridge, and the same gentleman showed studies of *The Conch Digger*, and *The Cress Gatherer* (a man gathering cress in an ordinary piece of landscape, very cleverly treated to make quite an artistic picture). In *Rejoining their Ship* a boat laden with two or three figures is seen making for a distant vessel, but, to complete, or rather to tell, the intended story, Mr. Bennett might have made an attempt to show us the faces of the sailors, and could well have afforded to have been a trifle less fuzzy. Mr. W. A. Brown showed an excellent rendering of *The Brook*, a water-cum-tree bit which the late Lord Tennyson might conceivably have had in his mind when writing the poem. An untouched, out-of-door *Portrait of a Lady*, by Miss Brigg, showed soft lighting, and ease of pose, and in *On the Basingstoke Canal* Mr. W. L. Colls was represented by a tender and harmonious view. Mr. S. T. Chang merits our congratulations for his continued improvement, his Holland House interiors, *Cottage near Witley* and *Church near Godalming*, showing care in the treatment.

The President (Mr. Hodges) received a bronze medal for *Drear December*, a large study of a bit of desolate landscape with trees, which, to our thinking, would have been more effective had a cold instead of a slight sepia tone been employed. Anyhow, the same gentleman's Welsh series, *Shallow Waters*, *In Conway Vale*, and the other pictures of his which we have noticed before, are, to our thinking, as good as anything he has ever shown, and much superior in handling and effect to the picture here medalled.

Mr. George Lamley, a painstaking artist, showed several, including *A Sluggish River* (a charming study previously noticed), and received a bronze medal for a study of trees and loneliness—*Solitude*. Mr. W. S. Rogers' small picture of craft, *Coaling—Tyneside*, and his roadside view, *The King's Highway*, were full of delicate detail, and deserve high praise, as did Mr. H. R. Rainger's small study of *Richmond Bridge*. Mr. Rogers' delicacy of treatment pleased us very much. He received a bronze medal for *The Year is Dead*, a bleak view of leafless trees. By the way, a distinct vein of pensive melancholy ran through the Exhibition, in which there were any number of frost studies, twilights, deserted mills, departing days, winters, *et hoc*.

Mr. A. W. Scanlan, with *The Return of the Herring Fleet*, a large, breezy study of sea and craft, having a pleasant, warm tone, and an admirable view, *Haymaking*, Messrs. H. and L. Selby, and Mr. T. Tripplin (vigorously rendered, if rather heavy-shadowed, Norwegian views), all showed good work. Mr. C. R. Whiting's bustling, boldly-handled views of *Seddon Harbour*, *Plymouth*, were very fine in technique, but possibly would have looked better in a less bilious tone. Mr. Charles Winter deservedly gained a medal for a capital outdoor untouched por-

trait of *My Mother*, and showed several winter views of great merit. We liked a little view of *Spring* by Mr. George Way, a sharp, crisp study, as spring effects should be. Two interior views of Hampstead Parish Church, by Mr. A. A. Boucher, were, perhaps, the best interior work shown, and one of them gained a medal.

As we have already said, we have nothing but praise for the Exhibition as a whole, which may in some degree account for the fact that we have been able to find so few faults with individual pictures. A happy feature of the display was the inclusion among the exhibits of a collection of photographs medalled at previous exhibitions of the Society. The Judges were Messrs. A. Horsley Hinton and J. C. Dollman, R.I., from whose report we cannot help making the following extract, which may be of interest at the present juncture:—"The Judges wish it to be distinctly understood that they do not consider the entries in the Outing Class are any of them deserving the distinction of a medal, but, as they are asked to award a silver medal, they consider *Near Weybridge*, by Mr. L. Selby, the best of the class. They would like to add that they only award this medal feeling themselves bound by the printed conditions, which leave them no option but to award a medal to work which they consider deserving or otherwise."

Our Editorial Table.

Handbook of Regulations and General Information regarding the Chicago Exhibition.

This handbook contains an important mass of well-arranged information relating to the World's Fair, and certainly ought to be in the hands of every one who feels at all interested in it. Among the drawings are a bird's-eye view of the Exhibition, and a view of the principal buildings devoted to special departments. The tables showing the M'Kinley Tariff rates are significant, as showing the heavy duties to which articles imported into the United States are subject. This handbook is issued from the offices of the Royal Commission, Society of Arts, John-street, Adelphi, London, and all communications must be addressed to the Secretary.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 23,315.—"Improvements in or relating to Packs or Series of Sheets with Notched Edges, more particularly applicable to Packs of the Flexible Sensitised Films in Photographic Usage." Complete specification. J. T. Clark.—*Dated December* 19, 1892.

No. 23,378.—"Improvements in or connected with Doublet Lenses for Photographic Purposes." C. P. Goerz and E. von Hoegh.—*Dated December* 19, 1892.

No. 23,434.—"Improved Photographic Dark Slides." S. H. Brittain and E. J. Brittain.—*Dated December* 20, 1892.

No. 23,487.—"Improvements in or relating to Photographic Cameras." Communicated by A. C. Kemper. Complete specification. A. J. Boult.—*Dated December* 20, 1892.

No. 23,530.—"An Improved Frame for Miniature Photographs, Views, or other Analogous Articles to be used as an Article of Jewellery." J. Stevenson.—*Dated December* 21, 1892.

No. 23,577.—"The Manufacture and Production of a New Material for use in Obtaining Oxygen from Atmospheric Air." H. Weymersch.—*Dated December* 21, 1822.

No. 23,592.—"An Improved Portable Photographic Developing Sink." B. Humphreys.—*Dated December* 21, 1892.

No. 23,681.—"An Improved Stand or Rack for Displaying Cards, Photographs, and other Articles." H. C. Hall.—*Dated December* 23, 1892.

No. 23,716.—"Means or Apparatus whereby Photographers can Retouch their Negatives or Prints with the aid of Artificial Light." E. T. Powell.—*Dated December* 23, 1892.

No. 23,756.—"Improvements in Optical Lanterns." S. W. Allen.—*Dated December* 23, 1892.

No. 23,772.—"An Apparatus or Means of Illuminating Objects for Photographic Purposes." H. Senier.—*Dated December* 24, 1892.

No. 23,797.—"Improvements in or Relating to Mirrors, Screens, Reflectors, and the like, also Applicable to Photographic Cameras." J. Challinor and F. Fidler.—*Dated December* 24, 1892.

No. 23,837.—"An Improved Connexion or Coupling for use in conjunction with Cylinders, Flasks, and Vessels containing Gases, and Fluids under High Pressure." The Manchester Oxygen (Brin's Patent) Company, Ltd., and W. M. Jackson.—*Dated December* 26, 1892.

No. 23,855.—"An Improved Method of Attaching the Legs of Camera Stands to the Tops." W. G. Tweedy.—*Dated December* 27, 1892.

No. 23,926.—"Improvements in Panoramic Cameras." R. W. Stewart.—*Dated December* 28, 1892.

No. 23,942.—"Magnesium Arc Light for Photography." G. W. Morgan.—*Dated December* 28, 1892.

No. 23,944.—"Improvements in Photographic Cameras." A. C. Smith and A. A. Smith.—*Dated December* 28, 1892.

No. 23,987.—"An Adjustable Clip or Grip for Holding Photographs. A Vignetting Chair and a Stand or Support for a Screen or Background Frame used in and for Photographic Purposes." H. L. Morel.—*Dated December* 29, 1892.

No. 24,106.—"Improvements in Photographic Apparatus." S. D. Williams.—*Dated December* 31, 1892.

No. 6.—"Improvements in Lanterns and Other Means for Illuminating Photographic Dark Rooms. G. V. Fosbery.—*Dated January* 2, 1893.

No. 202.—"Improvements in Portable or Hand Photographic Apparatus or Cameras." Communicated by J. B. Brunel and A. Reynier. W. P. Thompson.—*Dated January* 4, 1893.

No. 312.—"Improvements in or Relating to Photographic Cameras." H B. Sharp and H. C. Hitchmough.—*Dated January* 6, 1893.

SPECIFICATIONS PUBLISHED.

1892.

No. 1635.—"Magic Lantern Slide Carrier." Conybeare.
No. 2852.—"Photographic Cameras." Hughes.
No. 2879.—"Photographic Cameras." Cricks & Taylor.
No. 3226.—"Lock for Folding Camera Tripod Stands." Birnie.
No. 4498.—"Developing Photographic Images." Hauff.
No. 18,836.—"Burners for Lime Light." Anderson & Wrench.
No. 18,919.—"Lenses for Telescopes," &c. Gunn.

PATENTS COMPLETED.

An Improvement in Carriers used for Holding Slides in Magic Lanterns.

No. 1635. Henry Grant Madan Conybeare, The Hut, Ingatestone, Essex *December* 3, 1892.

My invention relates to improvements in lantern-slide carriers, such as those used for holding slides in optical or magic lanterns, and has for its object the provision of means whereby the lantern slides may be ejected from the carrier, automatically by, and simultaneously with, the movement of slide within its frame, in its operation from side to side, thus greatly facilitating the manipulation of the said slides when changing, and obviating the necessity of handling the slides so that the fingers come in contact with the faces of the slide, and thus soil them.

My invention is essentially an improvement of the invention described in Letters Patent No. 20,972, and dated December 23, 1890, and consists in the application to such a sliding carrier of means for the automatic operation of the ejecting lever by the sliding movement of the carrier.

In carrying out my invention I provide a carrier, into which the lantern slides are inserted through openings at the top of the frames. This slide-carrier is adapted to slide in a suitable frame. I pivot a lifting lever on each side to serve the two slide spaces. The back end of each lever is operated by a pusher-rod.

The under side of the top part of the frame is recessed along its centre portion, such recess terminating at each end by an inclined plane, against which the end of the pusher-rods can engage. The recess is made deep enough to allow the pusher-rods to move high enough for the end of the lever to occupy the lowest position when the lantern slide is resting in proper position in the frame for projection.

When, now, the slide-carrier is moved toward one end of the frame, so that one of the openings in the carrier, with its slide, corresponds with the opening in the frame, the inclined plane at one end of the recess in the upper part of the frame engages the end of the pusher-rod, depresses the shorter end, raises the longer end of the lever, and lifts the slide into such a position as to allow of being taken hold of by the hand for removal from the carrier, upon which a new slide can be inserted. The carrier can then be slid along so as to register the new slide in position, and the slide previously being shown is ejected partially from its position at the other end of the slide-carrier.

A suitable recess may be formed in the lower portion of the frame to allow room for the movement of the levers if thought desirable.

What is claimed is:—1. In a lantern-slide carrier, a sliding frame having levers pivoted thereon in combination with means for the operation of the said levers during, and by the sliding movement of, the slide-carrier. 2 In such a lantern-slide carrier, a pivoted lifting lever in combination with an inclined plane, upon the frame in which the slide-carrier moves, and adapted to engage with the said lever to effect the lifting of the lantern slide, substantially as described.

Improvements in or relating to Photographic Cameras.

No. 2852. Griffith David Hughes, Cheadle Hulme, Chester. *December* 3, 1892.

This invention relates to apparatus I have designed for photographic cameras for holding a number of prepared plates to receive the negatives, one of which will be presented at a time to receive the picture.

It consists essentially in the combination with the apparatus of a rotating holder or carrier, comprising a number of sheaths, or receptacles, or slides, in which the photograph, prepared plate, or other object can be placed, a spring barrel or other motor by which these are rotated, and a catch or clip, which will release one of the sheaths or receptacles at a time whilst retaining or preventing a forward movement of the others.

In carrying out the invention in a suitable position, in the casing which surrounds or contains the apparatus I affix a spring barrel, or other rotating

mechanism, capable, when set, of a continuous movement for several revolutions. Affixed to, or carried by this barrel, radiating from its centre, are a number of sheaths, slides, or receptacles to receive cards, plates, or other flat objects, which can be rotated round the centre of the drum.

The sheaths, slides, or receptacles which carry the object are preferably loose on the spring barrel, and free to move about the barrel centre independently of any movement of the spring barrel. In addition to these, the barrel carries a projecting finger or catch, which comes in contact with, or engages with, the receptacles or objects, and carries them round.

A spring catch or other clip is affixed to the frame to retain the object or plate at the desired position to yield the image or receive the impression, and which, when moved, will release one at a time, which then drops forward of its own gravity. A catch, in the form of an escapement or other similar device, may be employed for the purpose.

The sheaths or receptacles for the plates may rotate in a cylindrical chamber, with a packing of velvet or other light-tight material between the tops and sides, and an opaque back of blackened wood or other material may be applied to each sheath or receptacle to prevent the passage of light through from one plate to another, or to prevent light reaching a plate after it has been exposed.

The patentee claims: 1. A rotating carrier or holder for a number of sensitised plates for a photographic camera, comprised of a number of sheaths loosely pivoted to the periphery of a rotating barrel, and held in position, when not exposed, by a catch, and from which, as the barrel is rotated, they are released or displaced singly, and move forward in succession at each movement, exposing a fresh plate, and withdrawing the previously exposed plate from the field of light substantially as described. 2. The combination with a photographic apparatus of a holder or carrier for a number of prepared plates or other sensitised objects comprised of a number of sheaths, in which the plates are placed pivoted loosely by a wire or rod attached to each on a rotating or movable support, so as to have an independent movement, and provided with a catch, by which they are held in position, and from which they are released by the movement of the holder, dropping forward in succession of their own gravity from a horizontal to a vertical plane (or *vice versâ*, as arranged), substantially as described and shown.

A Process for Developing Photographic Images.

No. 4498. Julius Hauff, Feuerbach, near Stuttgart, Germany. *December* 3, 1892.

In the course of my experiments on substances which may be utilised for the development of photographic images I have made the discovery that the o-p-diamido-phenol surpasses by far all other substances capable of developing photographs. Whereas, with the developing organic substances hitherto used, it was always necessary to add thereto caustic or carbonated alkalies in order to effect the thorough reductions of the halogen silver which had been exposed to the light, the diamidophenol develops without carbonated or caustic alkalies, with the aid of the sulphite of the alkalies, in a quite sufficient manner, so that the use of carbonated or caustic alkalies may be entirely dispensed with. If only a very small quantity of carbonate of soda is added to a solution of muriate of diamidophenol, the solution acts upon exposed plates with such an energy that the unexposed halogen silver is likewise reduced, and thus the appearance of an extraordinarily powerful veil or shroud is caused. Further, I have discovered that the development can be delayed by the addition of diluted acids, whereas hitherto bromide of potassium had to be used under the same circumstances. It is obvious that the use of the bromides or chlorides of the alkalies is not excluded in this case, for if the proper doses are used the desired results can be successfully obtained with those substances.

I am well aware that diamidophenol has been already often mentioned and introduced for the development of photographic images, but it has not yet been properly taken into consideration and appreciated, probably because the product used did not possess the purity with which I am able to prepare it, or because experiments with diamidophenol were not made in this direction.

The properties of diamidophenol are thoroughly misapprehended, especially there is no information as to its extraordinarily great solubility, which alone is sufficient to allow of its being used in the manner before stated.

The particular advantages of this substance are its extraordinary developing power, its practically unlimited durability and utility, its absolute immunity of action on the fingers, as well as on the gelatine films, and the fact that ordinary water can be used therewith.

The developing process is carried on as follows:—A salt of the o-p-diamidophenol, with a sulphite of the alkalies in the proportion of one of the former to ten of the latter, is dissolved in a sufficient quantity of water, and the exposed plate is developed therewith, further quantities of a sulphite solution being added when a powerful development is required, and diluted acids or bromide and chloride of potassium for a weak development.

For ordinary portraits the following recipe will be found to answer the purpose: 0·45 grammes of hydrochlorate of diamidophenol, 4·5 grammes of sulphite of soda, and 60 cubic centimetres of water. The action is slowed either with a few drops of a ten per cent. solution of bromide of potassium or a few cubic centimetres of a ten per cent. solution of sulphuric acid strengthened with a sulphite of one of the alkalies.

Concentrated solution may be obviously prepared beforehand, and diluted according to requirements, for instance, 5 grammes of hydrochlorate of diamidophenol and 50 grammes of sulphite of soda may be dissolved in 100 grammes of water, and diluted to the extent of thirty times its volume. A solution of 0·5 grammes of hydrochlorate of diamidophenol and 5 grammes of sulphite of soda in 100 cubic centimetres of water will properly develop plates which have been too long exposed.

Diamidophenol develops, according to the above given directions, without any veil or shroud being formed, and without colouring the gelatinous film; after weeks of exposure in the light and air, the solution with sulphites of the alkalies takes scarcely a somewhat reddish colour, while the solution, when mixed with small quantities of carbonated or caustic alkalies, takes a brown colour, after about half an hour.

Having now particularly described and ascertained the nature of this invention, and in what manner the same is to be performed, I declare that what I claim is:—A process for the development of photographic images in layers containing halogen silver, consisting in the use of aqueous solutions of a salt of the pure o-p-diamidophenol and a sulphite of the alkalies in the proportion of one of the former to ten of the latter, without the simultaneous presence of carbonated or caustic alkalies, the action being intensified by a further addition of sulphite and weakened by an addition of diluted acids or diluted solutions of bromide or chloride of alkalies.

Improvements in Lenses for Telescopes, Photographic Cameras, and Magic Lanterns.

No. 18,919. Maurice James Gunn, 1, Priory Villas, Brownhill-road, Catford, London, S.E.—*December* 3, 1892.

This invention relates to an improved construction of lenses for telescopes, photographic cameras, and magic lanterns, and has for its object to provide a lens which will be less expensive than the ordinary solid lens, the invention being more particularly applicable to lenses of large size.

In carrying out my invention, I construct a hollow case, as hereinafter described, in the form of a lens but hollow, and made mainly of glass or other transparent material, hereinafter referred to as glass.

Within this case or hollow lens is placed water or other clear liquid, the whole forming a complete lens. The lens is formed by two plates of the transparent substance, one or both of which is or are curved in the desired manner, and the two are connected together by a metal or other tubular case.

According to one arrangement there is an annular projecting part around the interior for each glass, against which the edge of the glass rests, being fixed by cement. This annular part may be formed by turning in a lathe, or by forming a channel in the case at the required parts.

Instead of fixing with cement a cap may be employed, screwed on to or into the tube, and fitting closely around the edge of the glass, and pressing it against the annular projection. With this arrangement the lens can be readily taken to pieces and fresh glasses put in.

Indiarubber or other soft material must be placed between the ledge and the glass in order to render it less liable to get broken. A simpler form, in which the parts are not detachable, consists in making the ends of the tube slightly thinner, forming a ledge against which the glass would rest, the ends being then turned over on the glass, fixing it in place. In order that the liquid may be admitted, a hole is formed in the case, or, in some cases, in the glass itself, closed by a cap or other suitable means, or, when the opening is in the glass, by sealing it after the liquid has been inserted. The tubular case into which the glasses are fitted may be made in two parts, one screwing over the other or sliding over it, the two fitting tightly together in order that the thickness of the lens may be regulated to any desired amount. The lens is preferably filled with liquid at a rather high temperature, higher than it is likely to reach when in use, so that on cooling a slight space is left with vacuum to allow for any expansion that may occur.

This will not interfere in any way with its use, as the sides of a lens are never used, and the tube or aperture used for filling may be made sufficiently large to serve for the empty space. A lens may also be formed with a cell wholly of glass, the two parts being formed with rims, or cylindrical sides, which are placed together, and joined by a band of glass or suitable material, liquid being inserted as before.

In order to form the glasses for the lens, I may blow a hollow sphere in a mould or box of the required form, manipulating the mould in the manner well known to glass-blowers, in order to get an even surface and thickness. I afterwards, with a cutting instrument, cut the sphere into parts of the required diameter, the size of the sphere regulating the curvature of the lens, so that a regular and known curvature is always obtained.

According to another arrangement the glasses are moulded or pressed into shape. When used in photographic cameras the usual stops are employed in front of or between the lenses to reduce the light and give the required clearness of image.

[Probably the patentee was not aware that Archer's fluid lenses, Sutton's panoramic and cylindrical lenses, and some others were constructed on this principle.—Ed.]

Improvements in Photographic Lenses.

No. 21,933. Thomas Rudolph Dallmeyer, 25, Newman-street, Middlesex.—*December* 10, 1892.

My invention relates to a lens for the production of large primary images by the employment of a negative element as a posterior lens, fractional in its focus as compared with the anterior positive lens. This negative element is a double combination, and is corrected for both actinic and spherical aberration. The annexed drawing at figure 1 shows a combination in accordance with my invention.

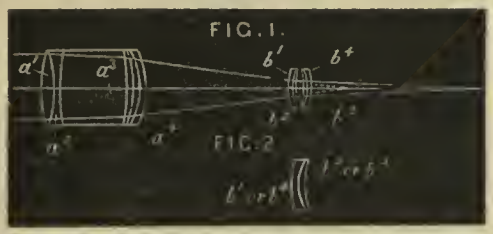
The anterior positive element represented in this figure is a well-known portrait lens; it is in four parts. a^1 a^2 a^3 and a^4, and of these the hindermost, marked a^4, can be screwed out a short distance. The focal length of the combination is 8½ inches, and its aperture 2¾ inches. The negative element is in four parts, b^1 b^2 b^3 b^4, which constitute a symmetrical double combination, b^1 and b^4 are similar, and so also b^2 and b^3. One of the pairs is shown separately and in full size in figure 2. The parts b^1 and b^4 are of hard crown glass (refractive index 1·5179), and b^2 and b^3 are of heavy flint (refractive index 1·6202). The anterior surface of b^1 is convex, and the radius of curvature is 4·396 inches. The posterior surface of b^1 is concave, and the radius of curvature is 0·9 inches. The anterior surface of b^2 has the same curvature, and is cemented to the posterior surface of b^1.

The posterior surface of b^2 has a curvature of 1·375 inches.

There is an air space between the surfaces of b^2 and b^3, and these surfaces may be separated by a considerable interval, but the study which I have made of the subject since the date of my application leads me now to prefer that b^2 and b^3 should be nearly in contact at their edges

The negative focal length of the element b^1 b^2 b^3 b^4 is 2 inches, and it is so mounted that by a rack and pinion the distance between it and the anterior element can be varied.

The correction of this negative element is auch that it is complete for an object 12 feet in front of the camera focussed at a distance of 12 inches. When any deviation is made from these positions there is a resulting aberration in



the combination, which can be corrected by screwing out the lens a^4 a short distance. The measurements which I have given above admit of variation.

For the positive element any (preferably large aperture and short focus) photographic objective may be employed, but it is expedient that it should admit of the spherical correction being varied.

The negative element is in all cases to be a double combination corrected for actinism and spherical aberration; it is to be convex on its anterior and posterior faces and its focal length is to be less than that of the positive element.

The negative element may be constructed as indicated in fig. 1 of the drawings accompanying my provisional specification, the heavy flint glass being external in place of internal, but the arrangement above described is that which I prefer.

In the use in the camera of the instrument represented by fig. 1, the focussing glass is first set at any distance from the posterior face of the negative element, according to the amount of the magnification it is desired to obtain. Then the focussing is effected by moving the positive anterior element to or from the negative posterior element by means of the rack work provided for the purpose. Finally, the sharpness desired is given to the focus by unscrewing the posterior lena a^4 of the anterior element to the necessary extent.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—A photographic lens for the production of large primary images, and consisting of an anterior positive element and a posterior negative element, the latter a double combination convex on its anterior and posterior faces, corrected for actinism as well as for spherical aberration, and of shorter focal length than the anterior positive element.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 16	Camera Club	Charing Cross-road, W.C.
,, 16	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 16	Fillebrook Athenæum	Fillebrook Lecture Hall.
,, 16	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 16	Hastings and St. Leonards	
,, 16	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 16	Richmond	Greyhound Hotel, Richmond.
,, 16	South London	Hanover Hall, Hanover-park, S.E.
,, 17	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 17	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 17	Exeter	City Chambers, Gandy-st., Exeter.
,, 17	Hackney	206, Mare-street, Hackney.
,, 17	Keighley and District	Mechanics' Institute, North-street.
,, 17	North London	Wellington Hall, Islington, N.
,, 17	Paisley	9, Gauze-street, Paisley.
,, 17	Rochester	Mathematical School, Rochester.
,, 18	Brechin	14, St. Mary-street, Brechin.
,, 18	Bury	Club Rooms, 13, Agar-street, Bury.
,, 18	Manchester Camera Club	Victoria Hotel, Manchester.
,, 18	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 18	Southport	The Studio, 15, Cambridge-arcade.
,, 18	Southsea	3, King's-road, Southsea.
,, 19	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 19	Camera Club	Charing Cross-road, W.C.
,, 19	Glossop Dale	
,, 19	Greenock	Museum, Kelly-street, Greenock.
,, 19	Hull	71, Prospect-street, Hull.
,, 19	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 19	Oldham	The Lyceum, Union-st., Oldham.
,, 19	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 20	Cardiff	
,, 20	Croydon Microscopical	Public Hall, George-street, Croydon
,, 20	Holborn	
,, 20	Leamington	Trinity Church Room, Morton-st.
,, 20	Maidstone	"The Palace," Maidstone.
,, 21	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

JANUARY 10,—Mr. T. Sebastian Davis (Vice-President) in the chair.

Mr. H Wilmer was elected a member.

The Chairman announced that the Lincoln Camera Club had been admitted to affiliation of the Society, and that the annual dinner of the Society would be held on February 13 next.

The Chairman also stated that Mr. William Bedford was critically ill.

Auditors and scrutineers were appointed for the forthcoming annual meeting on February 14.

EXPERIMENTS WITH TWO NEW DEVELOPERS.

In the absence through illness of Mr. J. Spiller, his paper on the above subject was read by his daughter, Miss Spiller, who brought a number of negatives developed with both amidol and metol, samples of which were shown.

With regard to amidol, Mr. SPILLER said that, from experiments made at various times during the past six months, he was inclined to think that it is best to weigh out a certain number of charges, and keep these separate lots of amidol in dry glass tubes, dissolving them up, one at a time, in a nearly saturated solution of sulphite of soda to prepare a concentrated developer, which then only requires dilution for use. For professional practice the mixed developer, especially if concentrated, will keep in good working order long enough to justify the preparation of a stock solution. For this take

Water	7 ounces.
Sodium sulphite cryst.	1½ ,,
Amidol	60 grains.

Mix, as required for use, with about three times its bulk of water and a trace of bromide, or none, according to circumstances. It is possible to make the same dose of amidol do duty for two or three plates in succession, and then to fortify it and go on again, but it is better to exhaust it entirely, either by adding weak alkali—dilute ammonia, carbonate of soda, or borax—and then throw it away. For over-exposure, a weak developer and free use of bromide is the best treatment, and for the opposite case, or even for building up extra intensity in normal exposures, use a stronger solution with an increased proportion of sulphite, if the alkaline method is not resorted to. As a rule the image should appear in eight or ten seconds, and be fully developed in about four minutes. The negatives are of a coaly black or pencil-lead colour, more like ferrous-oxalate than pyrogallic deposits, and print quickly. As a consequence it is necessary to carry forward the development to a stage beyond what is ordinarily required in brown negatives. Hence an impression is given that the silver image loses by immersion in the fixing bath, which he does not think is actually the case. "Metol" is the other new developer referred to in the heading, and with this also he had made a good many experiments. Dr. Eder speaks of it in the highest terms of approval, and predicts that it will speedily depose all other known developers. Dr. Stolze and Dr. Just report well of it, and for many reasons he (Mr. Spiller) feels inclined to agree with them, mainly because metol is so remarkably permanent even in solution, and certainly superior to amidol in this respect. On a recent occasion he developed a few plates with a stock of developer prepared last June. The deposit is of the neutral grey colour and free from stains, and can easily be worked up to any required degree of density. Dr. Eder's formula stands thus :—

Solution A.

Water	1000 parts.
Metol	10 ,,
Sodium sulphite cryst.	100 ,,

Solution A.

Water	1000 ,,
Sodium carbonate cryst.	100 ,,

Mix in equal proportions, or less of the soda and more water, according to requirements. For landscapes a more dilute solution is prescribed than for studio work, but the printed instructions are, perhaps intentionally, left rather wide and indefinite, so as to give ample scope for the exercise of judgment on the part of the operator. The leading principle is, however, to use A and B in equal parts for ordinary work, *diminishing* the alkali to get softer results, and *increasing* it to obtain hard negatives or those those presenting the greatest amount of contrast. Then, again, it is recommended to add solution B gradually, using no more alkali than is required to build up the picture, and so be ready to correct for errors of exposure during the progress of development. It is a good plan to begin with a solution which has done duty before, and then no bromide need be added.

Mr. FUERST (Fuerst Bros.), who was present, said that the amidol which was originally put on the market was a potash salt, and that which had recently been introduced (a whiter variety) was an acid salt which might be better to use, although perhaps its action was not so certain.

Mr. A. R. DRESSER had made a series of experiments with amidol, and had found it excessively good for negative work as far as instantaneous exposures went. He had recently given exposures of one two-hundred-and-fiftieth of a second on the ice, and had developed with pyro, eikonogen, and amidol, and found that with the latter there was a distinct advantage in density and detail. With over-exposure it was so excessively quick that many who used it came to grief, but they need not be frightened if the image came up fogged, as the fog, which only seemed to attack the surface, could be removed in the reducing bath. For bromide work he had found no developer to beat it; indeed he had got results with it which he would not have believed possible. He showed a number of 30×22 enlargements from quarter-plates, developed with it. He had come to the conclusion that the formula put on the market was radically wrong. With sulphite alone it did very well as a one-solution developer, but one great fault of it was that it turned brown in a short time. Hence he decided to try the substitution of metabisulphite. The inventor said that an alkali was not to be used; he (Mr. Dresser) got the best results with ammonia, but it must never be used without bromide. He mixed one ounce each of amidol and potassium metabisulphite in ten ounces of water and prepared a ten per cent. solution of bromide and a five per cent. solution of potash carbonate. He preferred the carbonate at the latter strength, as a saturated solution varied with the temperature. For bromide work his developer was as follows :—

Amidol solution	16 drachms.
Carbonate solution, five per cent.	14 ,,
Bromide solution, ten per cent.	2½ ,,
Water	20 ounces.

A grey colour for uranium toning such as he employed could be obtained by using a saturated solution of common washing soda. Developing with amidol

required the shortening of the exposure as given for iron by about a fifth. It was better in all cases to use the amidol at full strength—that is, undiluted, and commence with a weaker solution of the potash or ammonia. The same formula was very good for lantern slides.

Mr. G. L. ADDENBROOKE had also experimented with amidol, which he found would not develop alone. Dealing with its properties as a developer with sulphite, he said that sodium sulphite was formed by passing a stream of sulphurous acid gas into a solution of the carbonate; but, as it was so weak, it only displaced the carbonic acid with difficulty, hence commercial sulphites usually contained alkali, so that a developer of amidol and sulphite contained an unknown quantity of sodium carbonate. It had been suggested, however, that it was desirable to make a developer of known constitution, and that could be done by the use of potassium metabisulphite, which was made by a patented process of supersaturation with sulphurous acid. There was thus a certain amount of free sulphurous acid present, which acted as a restrainer, and, although a mixture of amidol and metabisulphite would not develop by itself, it was well preserved. The same proportion as sulphite, down to equal parts, of metabisulphite to amidol answered well. Nothing could be more convenient to use than the formula given by Mr. Dresser, and he advised starting with a strong solution of developer, and trusting to extra quantities of bromide. The less time the plate was in the developer the better and cleaner the results. Amidol for negative work was as like pyro as it could be, although more energetic. Any one accustomed to use pyro could easily substitute amidol for it, and when it changed colour it did not deposit like pyro, the colouration being soluble throughout. It remained clear for hours without staining the film, and would answer well for dipping-bath development.

A CHEMICAL STUDY OF MERCURIAL INTENSIFICATION.

Mr. H. CHAPMAN JONES read a paper treating of the chemistry of the various forms of mercurial intensification. [This will be given *in extenso* in a future number.] He concluded by recommending the use of mercuric chloride followed by ferrous oxalate, as advised by him in January, 1890. Speaking of the elimination of hypo from the film, he advised the use of an acidified alum bath for the purpose, as it was practically impossible to remove it by simple washing, which would always leave enough to spoil many methods of intensification.

Mr. W. E. DEBENHAM said it was a very useful thing to have a definite account of the chemistry of mercurial intensification, but he regretted Mr. Chapman Jones had not extended his studies so as to include intensification with iodide of mercury and Schlippe's salt—a method which he (Mr. Debenham) preferred to all others. With several methods the image was changed by light; and with the cyanide method there was an alteration of the density ratios, unless hydrochloric acid was added to the mercury. Mr. Arnold Spiller said some time ago that with iodide of mercury no combination with the gelatine took place, so that the addition of hydrochloric acid was not necessary. Much greater increased density was obtainable with it than with ordinary methods of intensification. After the treatment with Schlippe's salt the image appeared to be thoroughly permanent. It was sometimes said that the method stained, and caused a deposit in the clear glass, but that was the case with all methods if the plate were not thoroughly fixed and washed, in which case it was not the hypo alone in the film that was objectionable. Photographers generally did not employ perfectly new fixing baths, so that a certain amount of silver was likely to be left in the film. Mr. Debenham showed a plate one half of which was clear glass and the other half a negative which had been intensified with mercury, iodide, and Schlippe's salt, and drew attention to the clear half, which was free from deposit.

Mr. CHAPMAN JONES, in reply, said he always fought shy of iodides and sulphides in intensification, as he found iodide intensifiers unreliable. A drawback to the use of Schlippe's salt was that, if it produced a thorough change on the image, nothing could be done with it afterwards, as it left a series of compounds which were awkward to attack. By his plan nothing but metallic mercury and metallic silver was added to the image, and they could do anything with it.

GAÏACOL.

The Hon. Secretary gave a brief précis of a paper sent by Colonel J. Waterhouse, in which the author confirmed the experience of Messrs. A. & L. Lumière (see "Continental Notes and News"), establishing the fact that the developing properties of gaïacol were due to its impurities. The author also stated that old carbolic acid had developing action, whereas new carbolic acid had not.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JANUARY 5,—Mr. A. Haddon in the chair.

Mr. P. Everitt exhibited a photograph taken in a Skaife's pistolgraph.

Mr. H. Snowden Ward showed examples of gelatino-chloride printing by Mr. Hanna, of Auckland, New Zealand, who had sent them to this country to learn the opinions of English photographers as to their quality. They were considered excellent by the meeting.

The HON. SECRETARY drew attention to an article on "Spirit Photography" in the *Fortnightly Review* by the Rev. H. R. Haweis, quoting the passage relating to the young lady who was alleged to have discovered the face of her deceased lover on a "blurred" plate.

Mr. DRAGE said Mr. Haweis' contention was this: "May not a surface more chemically sensitive than the human retina be able to receive impressions of things which to us are invisible?"

The CHAIRMAN having recommended photographers to in future examine "blurred negatives" before rejecting them, the subject dropped.

PRINTING-OUT OPALS AND LANTERN SLIDES.

Mr. W. E. WOODBURY demonstrated the Paget Company's new printing-out opals and lantern slides, saying that their manipulation was practically the same as gelatino-chloride printing paper, they being coated with an emulsion of that character. In printing, as sharpness was so desirable, it was necessary to print in the sun, and always to keep the frame in one direction; otherwise, if it were turned another way, probably a double image would result. He exhibited a special printing frame for printing-out purposes, and said that, for toning and fixing, either the combined bath or the sulpho-cyanide, followed by fixing, could be employed. With the combined bath it was necessary to print a little deeper, as the image lost a little in that bath. The tones of the lantern plates were to be judged by transmitted light. In reply to a question, he said that he had not found the plates print out to a purple tone after having been kept for a few months; but with the combined bath the warmth of tone increased when the plate had dried.

Mr. Woodbury was thanked by the meeting for the demonstration.

THE SPEED OF PLATES.

Mr. A. COWAN described how the speed of plates was ascertained by Messrs. Hurter & Driffield's method, saying that for exposure a standard candle was employed, at the distance of a metre, and seconds for the measurement. For practical purposes, however, he placed the plates at a distance of two metres, because with eight plates there would be no error of exposure in the circle thus made. Eight strips were taken out of the middle of a fair-sized plate, placed in the slide in which they were to be exposed, and, with a pendulum swung before the eyes, the strips were gradually covered up, so that a series of exposures ranging from thirty-two seconds on the most dense parts of the strips to half a second on the lightest parts was given. A standard developer, for a given time at a constant temperature, was used, so that the conditions were always alike. In order to avoid reflections, he used the whole of the apparatus in a box, while a diaphragm was used in order that only the light from the candle should strike on the plate. Mr. Driffield, instead of the fixed frame with the strips, used a revolving disk with openings in it of different sizes at a certain distance from the candle, which made straight lines of different densities on the plate. The densities of the slips proceeded arithmetically, so that, taking two strips and superposing them at the point of correct exposure, an equal tint would result by the combination. Having described Messrs. Hurter & Driffield's method of measuring the densities by the ordinary slide-rule, Mr. Cowan went on to observe that, as the standard candle was not very certain, he always had a standard plate for comparative tests. He had found by experiment that one of his standardised plates was exactly the same speed after an interval of two and a half months.

Mr. JAMES CADETT had found a better mean of density with a slow plate than with a quick one, although there might be ten per cent. less emulsion on the ordinary plates than on the quick ones.

The CHAIRMAN asked whether, in burning the standard candle, the amount of wax consumed was weighed? The candle was only constant when consuming 120 grains of fat per hour. Did Messrs. Hurter & Driffield weigh the candle in their experiments?

Mr. CADETT, in regard to the relation of speed to density, said that when people compared two plates in the camera, and those plates had different density factors, the reading of those plates became very difficult indeed. He had recently sent some lantern and extra-rapid plates to a gentleman in order that he might read their comparative speeds in the camera. The result was a fatal one, as the lantern plates were made out to be four times quicker than they were. In such a case they might come to a point in the density where both plates were exactly alike, but at what part should the respective densities be read? People usually looked at that part having the very faintest detail. For a camera test negatives of equal density should be used, otherwise plates would be made out quicker than they ought to be. With negatives of equal density, the Hurter & Driffield reading would be exactly right, the density of the negative being calculated according to the amount of light it passed. With whatever standard light they used, they must read through the succession of densities in that part of the plate where correct exposure took place. The standard candle was a great trouble, but the system held good with a standard light. By trusting to the reading of the candle without a test-plate, errors of as much as twenty-five per cent. sometimes happened. All plate-makers should use the same test-plate, but who was to settle the point? Messrs. Hurter & Driffield had made a great discovery in the proper relation of density to speed. They were the first to show that there was correct period of exposure.

Mr. COWAN said he had undoubtedly obtained different readings with the variations of the standard candle. As many of them might like to know the standard developer he employed, it was as follows:—

Pyro	1 grain.
Sodium sulphite	12 grains.
Anhydrous carbonate of soda	4 ,,
Potassium bromide	½ grain.
Water	1 ounce.

Employed at a temperature of 70° for 7½ minutes.

The meeting then adjourned.

North Middlesex Photographic Society.—January 4, the first of a series of technical evenings for beginners was held, the subject being *Development*. The subject being treated in a purely elementary manner, the general body of members were not invited to attend. A fair number of gentlemen, among whom were several strangers, availed themselves of the opportunity afforded them. They each brought two exposed and undeveloped plates, and were, in their turn, taken in hand by Mr. C. Beadle, who was the instructor for the evening. He opened with a brief description of the various developers most generally in use, their advantages and failings, the correct method of compounding them, and of modifying them to suit the different exposures and subjects. He then questioned each gentleman as to the exposure given to the plates he had brought, and the general conditions under which it was taken, and advised him as to the best method of developing. He then sent him to mix the developer, and stood by while the plate was developed, giving advice during the process. The meeting was thoroughly successful, the gentlemen present expressing their gratification, and a desire to attend future meetings of the same character.

THE Annual Meeting of members was held on January 9, the President (Mr. J. W. Marchant) in the chair. The Treasurer presented his balance-sheet

which was the best during the Society's existence, and showed a sound financial condition. Mr. Pither gave a report of the results of the outings during the past season, and laid upon the table the Society's album, containing the selected pictures taken thereat. The certificate for the best collection of prints taken at those outings was awarded to Mr. McIntosh, the Hon. Secretary, and the second award, that of a view album, which could only be won by a non-member of the Council, was secured by Mr. A. J. Hewson. The annual report was then submitted by the President. He dealt with the satisfactory condition of the Society generally; the increased membership, the greater interest taken by the members in the meetings, as evidenced by the ready help given by them in the reading of papers and the opening of discussions; and especially dwelt upon the advance in the quality of the work shown at the late exhibition, as expressed by the judges. Reference was made to the affiliation scheme, and the advantages derived therefrom, and thanks were given to those gentlemen, not members of the Society, who had rendered assistance by their lectures. Votes of thanks were accorded to the officers for their past services. Mr. McIntosh stated that, finding himself unable to give the requisite time to the secretarial duties, he did not seek re-election. Balloting for the officers for the ensuing year was proceeded with, and resulted as follows:—*President:* Mr. J. W. Marchant (third consecutive year).—*Vice-Presidents:* Messrs. C. Beadle and F. Cherry.—*Council:* Messrs. H. Smith, Gregory, Walker, Wall, Gill, Mummery, Pither, W. Taylor, Golding, Wynne, Lathbridge, Treadway, and Goodwin.—*Hon. Treasurer:* Mr. F. W. Cox.—*Hon. Secretary:* Mr. George Gosling.—*Assistant Hon. Secretary:* Mr. F. M. Aynsley. Mr. John Humphries, F.S.A., who was president of the Society during the first three years of its existence, but who is now resident away from London, was unanimously elected an hon. member. Gentlemen desiring in any way to communicate with the Society will please address the Hon. Secretary, Mr. George Gosling, 13, Lausanne-road, Hornsey, N.

Harringay Photographic Society.—January 5, Inaugural Meeting.—The Chairman (Mr. Dudley Towers) showed the need was great for a society of this kind in this centre of photographic activity. It was proposed that a library be started, and that ladies be eligible for membership. The rules for the management of the Society were drawn up, and the following officers were elected:—*President:* Mr. D. Towers.—*Vice-President:* Mr. Bennett.—*Council:* Messrs. N. Watson and F. Bailey.—*Secretary* and *Treasurer*, C. Frith, 8, Cavendish-road, N., from whom all particulars may be had.

Rotherham Photographic Society.—January 6, Dr. Baldwin (President) in the chair.—The Annual Exhibition on the 7th and 8th of February was referred to, the Hon. Secretary announcing that Lady Abreda Fitzwilliam had consented to open the proceedings. The exhibition, although non-competitive in its character, promised to be most interesting, and photographically successful. An appropriate paper on *Preparing for the Exhibition* was afterwards given by Mr. E. I. Hubbard, Vice-President.

Sheffield Photographic Society.—January 3, Mr. B. J. Taylor in the chair.—The pictures and negatives sent in for the annual competition were fully criticised, and the prizes awarded to Mr. W. M. Toplis and Mr. J. W. Blackwell.

Correspondence.

ALUMINIUM MOUNTS.

To the EDITOR.

SIR,—Like your correspondent, Mr. Everitt, I have been much interested in the prices charged for aluminium mounts since their introduction, for, although the metal can now be had in the raw form very cheaply, there has been no corresponding fall in the mounts for lens. It would have been interesting had the weights of some of the mounts been given to show the cost per pound. With aluminium cast at 2*s.* 3*d.* per pound, its low specific gravity and its greater tensile strength permitting of a lighter cross section, I consider it practically as cheap as good brass for many purposes. But when I weighed a few lens mounts obtained from a *wholesale* source, I found the metal charged at from 50*s.* to 60*s.* per pound! and spun so thin as to exaggerate the comparison with brass, as if it were a precious metal, and to the great risk of damaging from denting or dimpling the true setting of good lenses.

There is no doubt a very heavy outlay on the part of those opticians who undertake to supply all their series of lenses in aluminium mounts. This must be recouped, and no one can blame them if buyers are willing to exchange gold for aluminium to save themselves carrying a few extra *ounces*.—I am, yours, &c.,

ARTHUR SEAT.

January 7, 1893.

To the EDITOR.

SIR,—The letter of Mr. Philip Everett in your last issue has touched a point which has probably puzzled many of your readers, and it would, perhaps, not be out of place to try to discover the cause of the anomalies mentioned by your correspondent. Something is probably due to the fact that the production of aluminium is still in the hands of a few companies who can control the market at their own sweet will, and it follows that in consequence of their operations, those of their customers who have been fortunate to secure their supplies during one of the low tides in the price can undersell the less lucky ones who are obliged to buy at high-water prices; but the principal cause is that aluminium is a very difficult metal to work. Pure aluminium or even ninety-nine per cent. is, for practical purposes, useless; it is too soft and inelastic to stand any strain, neither could it be turned or filed. The commercial aluminium, containing about five per cent. of silicon and iron, is better in all respects, except that it tarnishes more readily. The six per cent. copper alloy put on the market by the Nenhausen Company, is fifty per cent. better than either of these two as regards tensile strength; but its leaden colour and liability to tarnish are against it, besides that it is not much more easily worked. Some of the other alloys are very much superior in that respect. I have had some patent alloys, which could be worked as easily as brass, of a silvery-white colour, and, although somewhat lower in tensile strength than brass, they are, in point of elasticity and rigidity, quite equal to it.

A probable cause for the slow progress which the metal has made in its application to the commoner uses, apart from the question of price, is that the difficulty of working it hitherto has created a prejudice in the minds of the workmen, which time and experience alone will remove.—I am, yours, &c.,

J. V. P.

January 11, 1893.

TINTING MOUNTS.

To the EDITOR.

SIR,—Your editorial on the use of coffee as a stain reminds me of a modification of the same thing which I have found most useful, especially for brown platinum toned prints. Rough or hot pressed drawing-paper is a very suitable surface for mounts, but a pure white surface is not always suitable. I tried an infusion of coffee as suggested for tinting these mounts, but for my purpose the colour was too bright and obtrusive. I wanted to introduce a little grey into the brown, and for this purpose tried the addition of a little common writing-ink with success. A useful stone colour is the result tending towards brown or grey, according to the amount of ink added. My method has been to sponge over the mount with the solution, taking care that the sponge is not overcharged, and that an even surface moisture results. If the tint is not deep enough the process may be repeated after drying. The iron in the mixture may be objectionable for tinting the photograph itself, but it cannot harm if used for cut-out mounts. Some care and experiment is necessary to get a suitable mixture, which should be filtered before use. A very few drops of ink are sufficient.—I am, yours, &c.,

ALFRED WATKINS.

Hereford, January 7.

THE PHOTOGRAPHIC SOCIETY.

To the EDITOR.

SIR,—I shall be much obliged to you if you will allow me space to inform the members of the Photographic Society of Great Britain that the figures opposite the names of Mr. Traill Taylor and Prof. J. M. Thomson, in the table at page 90 of our JOURNAL, have been accidentally reversed, and that Mr. Traill Taylor should have had six instead of two attendances credited to him.

I would also remind our members that nominations for the new officers and council should be sent in without delay, the 24th of this month being the last day upon which they can be received.—I am, yours, &c.,

CHAPMAN JONES, *Hon. Secretary.*

Photographic Society of Great Britain, 50 Great Russell-street, W.C., January 6, 1893.

THE LOUTH EXHIBITION.

To the EDITOR.

SIR,—I herewith enclose you Circular of Invitation for our third annual exhibition. I think we are the only Society that run an absolutely *free to the public* exhibition, without tickets of admission or some other check to the influx of the masses.

That it is appreciated by the people is clearly shown by the numbers visiting. The first year about 500 passed through during the five hours it was open. Last year, in the same space of time, 1000, out of a population of 10,000, availed themselves of the opportunity of seeing work by such workers as Messrs. Gale, Ralph Robinson, Bhedwar, P. Lange, Cyril S. Cobb, F. Sutcliffe, B. G. Wilkinson, Chamberlain, Wade, L. Meldon, Edgar Lea, Court Cole, Armatage, Smart, Wright, Pearson, &c.

This year we go in for two days, and hope to have even a greater success, as we fully expect to secure the kind support of many of the foremost workers of the present day.—I am, yours, &c.,

S. FRANCIS CLARKE, L.D.S.,

Hon. Sec. Louth and District Photographic Society.

Upgate, Louth, January 6, 1893.

A CORRECTION.

To the EDITOR.

SIR,—Permit me to call your attention to the fact that your report of the recent proceedings at Bloomsbury Hall is open to misconstruction, not only on account of the phraseology used, but for direct statements as to facts.

The closing paragraphs of the report are especially unfortunate for me, as I am there reported as speaking of Mr. Eastman as my "assistant"—obviously an impossible relationship.

I am sure that you, together with no small number of the 300 persons present at that time, will not fail to remember that, in my *impromptu* response to the address, I very particularly and specifically pointed out that Mr. Rider had given me far more credit than I was entitled to in connexion with any of the inventions owned by the Eastman Companies, and that in no sense could I be considered as entitled to any credit, excepting as co-inventor with Mr. Eastman of some of the earlier inventions.

I also at that time expressed most earnestly the hope that no misconception of the facts should become current, especially through the medium of the press.

As it is well known, I have been a resident of London *continuously* during the past seven years, and it is, therefore, obvious that my association with Mr. Eastman as co-inventor must have been limited to a very few of the earlier inventions, and this fact will be further borne out by reference to the titles of all the patents taken out for many years past.—I am, yours, &c., W. H. Walker.

London, W., January 9, 1893.

[Mr. Walker is quite correct. He certainly emphasised the part taken by Mr. George Eastman in the various schemes and inventions of the Company, and disclaimed his own sole action in such matters. Our report, instead of saying, "*assisted* by Mr. Eastman," should have read—Mr. Walker, *in conjunction with* Mr. Eastman, which would correctly have expressed the tenour of Mr. Walker's remarks relative to this.—Ed.]

"HALATION AND DOUBLE FILMS."

To the Editor.

Sir,—In reply to the opening remarks of Mr. W. B. Bolton in his "Note on Halation and Double Films" in your issue of the 6th inst., I should like to say that I think he must have somewhat misread my paper on "Multiple Coated Plates," to gather from it, or even continuing on the lines indicated, to conclude that it is impossible to produce a negative with clear shadows on a "Sandell" plate. I cannot find that I said, and I certainly did not intend to say, anything leading to such a supposition—in fact, quite to the contrary, I distinctly stated that if the correct exposure were given—that is, a full exposure for the shadows—then, so far as they were concerned, only the top film was used, and in its action differed nothing from that of an ordinary plate.

This being the case, there is no reason why the shadows should be rendered less clearly, or, indeed, in any way differently than by any one filmed plate.

And even where sufficient exposure has been given to affect the lower film in the shadows, the upper can be reduced till the desired amount of clearness has been obtained.

As to the historical inaccuracy that Mr. Bolton accuses me of, I will only say, without either admitting or denying the accusation, that had I, at the time of writing, had any idea that the article would be published, I should have assured myself of the absolute accuracy of any such statement, instead of trusting to the information of one whose authority on such matters I have never yet had occasion to doubt, for my own limited experience carries me back far short of the dates mentioned. I may draw attention to the fact that I did not say that Captain Abney was the first to discover or notice the causes of halation, my idea being rather that he collected the various suppositions that had been put forward, and by the aid of his own experiments, formulated them into a definite theory. If I am wrong in taking this view of the case, I shall only be too pleased to be put right.

With regard to the chromate of silver question, on which Mr. Bolton lays so much stress, I must still hold that Mr. W. K. Burton made something considerably more than a suggestion, though, perhaps, the less I say on this subject the better, for it verges on a question of priority, which has already been the subject of no little dispute, yet some light may be thrown on the matter by reference to a letter of Mr. Burton's which appeared in *Photography*, No. 208, page 702, and to his article in the The British Journal Almanac for 1888, therein alluded to.

In conclusion, I will only say that perhaps few have read with greater interest Mr. Bolton's remarks on the dual action of chromate of silver than yours truly, Gregor Grant.

The Tower House, Bexley Heath, January 9, 1893.

A VALUATION WANTED.

To the Editor.

Sir,—Would you give us your opinion as to the approximate value of goodwill and negatives of our business? The particulars are as follows: Business established eighteen years; business done this year, 850*l.*; profit, about 350*l.* to 400*l.*; number of negatives, about 70,000; size of town, 13,000, with good district, very little opposition (one very cheap man) besides ourselves; prices obtained as per list; eighty per cent. of business done is for cash. The rent is 30*l.* a year; taxes very moderate. Position of premises good, with ample accommodation.—I am, yours, &c.,

January 9, 1893 Seaside Photographer.

[Possibly some of our friends who have had experience in the valuation of photographers' businesses may be able to furnish an opinion.—Ed.]

Answers to Correspondents.

A. Muirhead.—We can add nothing to the information we have already given.

Jno. W. Spencer.—Since the date you name we believe that the firm in question has failed.

J. H. B. complains of a dishonest canvasser. Such a matter had better be referred to the police authorities.

F. C. Green (Chihuahua, Mexico).—Messrs. Hurter & Driffield have no doubt already sent you a copy of their pamphlet.

J. L. L.—We have had no opportunity of practically testing the apparatus but it is well spoken of in the American press.

John T. French.—Thanks for your letter relating to the South London Photographic Society's Exhibition, but we do not propose to reopen the controversy.

John Macallan.—The fault at first sight seems to be in the plates, but we cannot, except in one isolated case, discover any nucleus which would account for the transparent spots.

D. Avanzo (Antwerp).—The article by Mr. J. T. Hackett on "How to Make a Camera Bellows" appeared in the Almanac for 1876. This answers several other correspondents who have addressed a similar question to us.

Cymro Bach.—The precise distance at which the back elements of your cabinet portrait lens should be apart must be determined by experiment. If you make a ring a quarter of an inch wide, it will be found to be about the correct distance.

A. McDonald.—The subject has several times been referred to. Coal gas compressed in cylinders undergoes deterioration by keeping. Your experience is by no means exceptional. It will quite account for the batch of enlargements all turning out under-exposed.

J. W. C.—The bronze powder, with which the mounts are printed, is probably the cause of the spots. If the maker of the mounts cautioned you against what might happen, you have no cause of complaint. If you brought an action—even if you could prove the mounts were the cause of the spots—you would certainly lose it.

A. W. Curtiss.—If when using a single lens the illumination falls off seriously at the margins when a very small stop is used, remove the ground glass, place your eye at the side, and see whether the whole of the light from the lens reaches the side in an unobstructed manner. If it does not, let the distance between it and the lens be decreased.

W. A. B.—The yellow patches on the prints arise from imperfect fixation. Cold weather may have had something to do with it. When the fixing solution is very cold, a considerably longer time should be allowed for its action. Some of the prints have apparently been allowed to stick together, so that the solution has not had free action. The cause being pointed out, the remedy is obvious.

A Lancashire Lad.—So far as we have been able to learn, the principa towns in Australia are well stocked with photographers, and in most of them, if not all, competition is as keen there, both as regards quality of work and prices, as it is here. Probably, if you were to write to the Secretary of the Photographers' Benevolent Association, he might be able to give you more definite information.

W. A. P. and W. Benn ask for directions for making lantern slides by the wet-collodion process with a copying camera.—It is impossible in the limited space of this column to give any instructions that would be of service. Our correspondents should procure one of the several cheap manuals of photography published, say, twenty years ago. They all give full working instructions, and what is said on the process generally applies equally well to the making of lantern slides.

Thos. Carter.—See a leading article on the subject in the current number. We do not know the exact cost of a prism of the size mentioned, but it would certainly be many times that of a mirror. With ordinary care, a mirror will last a long time without requiring to be resilvered, though it may require to be repolished occasionally. To retain the instrument in good condition, it should be kept in a dry place, and protected as much as possible from the atmosphere when out of use.

H. H. Holden.—1. We cannot estimate the value of the gas-bags. But it would certainly be very little, even if they are in good condition, which is very doubtful. As they were the property of a travelling theatrical company, they are probably of inconveniently large size. Cylinders have quite superseded bags. 2. If the prints sent are the best the negatives will yield on albumen paper, they will not do at all, for platinotype bromide paper will suit them best. 3. It will certainly answer your purpose best to purchase the tissue ready sensitised. 4. There is little doubt that the picture is copyright. The publisher will, we imagine, help you, or, at least, give you some information as to the photo-engraver.

W. F. R.—Stereoscopic pictures may be taken quite well by mounting a small longitudinal table on the stand, and sliding the camera against checks at each end in succession. If the object to be taken be, say, over eight or ten feet away, then may these checks be parallel to each other; but, if it be close at hand, such as a vase of flowers within a few feet of the camera, then will it be well that the checks converge sufficiently to ensure the subject being in, or nearly so, the centre of the plate.

C. Williams says: "Last week I poured some boiling water into a very large porcelain dish to warm it before commencing to tone a batch of prints, and it cracked, and has since come in half. Can you tell me of any cement that will mend it for toning, fixing, and washing, hot water being sometimes used?"—We know of no cement that will fulfil these conditions. During very cold weather hot water should not be suddenly put into earthen dishes, or the result will be similar to that described.

A Correspondent, writing in reference to "F. E. G.'s" query as to sulphur on negatives last week, suggests that the sulphur may possibly be dissolved out by a solution of sodium sulphite. The same gentleman also raises a protest against Mr. A. R. Dresser's recommendation in a recent developing formula to employ saturated solutions of the alkalies. If our friend will turn to our report of the meeting of the Photographic Society of Great Britain on Tuesday, he will see that Mr. Dresser now advises solutions of a definite strength.

Xeno says: "I was shown some prints by one of my customers which were said to be platinotypes, but, from the price paid for them, and the time in which they were produced, I believe they are bromides. My competitor in this town, I am told by one of his late *employés*, regularly sends out bromides printed at night for platinums. Is there any ready test that will for certain detect this fraud?"—If a bromide print be treated with a solution of bichloride of mercury the image will disappear; with the same treatment a platinotype will be unaffected.

Shooter says: "A few weeks since I made a silver bath. I dissolved ten onnces altogether, and made a sixty-grain bath. I have now started using P. O. P., so I should like to know how to get as much of the silver back as possible. I only sensitised ten sheets in it."—The silver can be precipitated in the metallic state by placing in the solution a few strips of copper. But the more usual way is to throw down the silver as chloride by the addition of common salt or of hydrochloric acid, and then add the chloride to the stock of residues.

W. Stephens.—1. Although many rapid rectilinear lenses seem to be symmetrical—that is, having front and back lenses absolutely alike, yet some are not so, hence you must return them to their cells, first one and then the other being placed to the outside, in fact, reversing their position as regards each other, and by aid of a magnifier note the effect upon the ground glass. 2. The rounded or convex surfaces must always be placed to the outside of the cells. It is rare that lenses of that type are confined to their cells by counter screws; they are usually burnished in.

A. M. Z. asks "if there is much difficulty in accurately focussing pictures with hand cameras that require the distance to be estimated, the focus being adjusted by a scale of distances engraved on the camera?"—In reply: Some cameras are so accurately indexed that when the distance of the object is known a perfectly sharp focus may be relied upon when the index figure is set. We have tested this point with two such cameras in our possession, and find it to be so. Of course there may be some which are not so accurate, and with these it would be better to employ a ground-glass focussing screen.

M. B. S. writes: "In your 'Answers to Correspondents,' please advise me what I should do with my nitric silver printing bath, which has unfortunately got an overdose of carbonate of soda, so much so that in printing the paper is quite powdery on the surface; filtering has improved it only a little."—If an excess of carbonate of soda has been added, carbonate of silver has been precipitated. This will be again converted into nitrate of silver on the addition of nitric acid. Add nitric acid, drop by drop, till litmus paper is reddened. If the carbonate of silver has been filtered out, it is probable that the bath will require strengthening with nitrate of silver.

J. Barton writes as follows: "I have a lantern with four and a quarter inch condensers, and the lens is a No. 1 *carte*. When I enlarge a head and bust, or a vignette, out of a quarter-plate to 15×12, I get on all right, but when I try a quarter-plate landscape the corners of the pictures fall off fearfully from unequal lightings. I have always read that the lens that will take a negative the size of the one to be enlarged will do for enlarging it. The lens I use covers a quarter-plate beautifully. What can be wrong?"—The fault is not with the enlarging lens, if it will take a quarter-plate negative—and probably it will—but with the condenser, which is not large enough. No four-and-a-quarter-inch diameter condenser will evenly illuminate a full-size quarter-plate. To do that, one of not less than five and a half inches is necessary.

Stereopticus writes: "1. My stereoscopic lenses are three and a quarter inches apart, my eyes are two and a half inches apart; consequently the cutting and mounting glass stereoscopic slides present considerable difficulties, which are increased when copying in the camera. I want a ready means of making slides in the camera without cutting my negatives. By lessening the distance between the lenses, or preferably some other way, this ought to be easily done, but I do not at present quite see my way to it. 2. I want a new twelve-feet lantern sheet; which do you think the best and most serviceable—paper-covered or flatted in oil?"—1. Knowing "Stereopticus" to be an adept in making transparencies, we assume this to be the class of slides at which he aims. Three and a quarter inches apart is a fair minimum for the separation of the lenses on the camera for taking negatives; but, if the same lenses and camera are to be employed in transparency printing, it will be necessary to have them mounted so as to be adjustable as regards distance apart. 2. Both are good; some prefer the one and some the other.

West London Photographic Society.—January 17, Technical Social Meeting.

Messrs Spicer Brothers are thanked for their "Driquic" blotting case. The blotting-paper is exceedingly absorbent.

Photographic Club.—January 18, *Glass and other Fabrics for Dark Room Illumination.* 25, Annual Lantern and Musical Evening. 27, Children's Entertainment.

Kensington and Bayswater Photographic Society.—The subject of our next meeting, January 16, is *Development by Amidol*, by Mr. L. E. Morgan, and not as on the syllabus.

Brixton and Clapham Camera Club.—January 17, *The Hand Camera and its Use in Picture-making*, by Mr. W. Thomas. February 7, *The Optical Lantern with Special Reference to the Ether Light*, by Mr. B. E. Pinder. 21, *Stereoscopic Photography*, by Mr. J. A. Butler. March 7, Lantern Slides. 21, Annual General Meeting.

Huddersfield Photographic Society.—From January 1 this Society is amalgamated with that of the Huddersfield Naturalists' Society, under the title of the Huddersfield Naturalist and Photographic Society, with Mr. Alfred Clarke, of St. Andrew's-road, Huddersfield, as Hon. Secretary, to whom all communications should be addressed.

Forfarshire Photographic Exhibition, 1893.—This Exhibition is to take place in the town of Forfar in April. The exhibits will require to be there the end of March. Sir John Rigby, the Solicitor-General, is expected to open the Exhibition. The prospectus and rules will be ready about January 20. The show will be international and open to all, and there will be awards, which will be made by a Board of Judges consisting of two photographers and one artist of good standing.

The Louth and District Photographic Society's Third Annual Exhibition will be held in the Town Hall, Louth, on January 26 and 27. There are not any medals or other awards, the Exhibition being got up strictly for the advancement of photography in the locality. To secure that end, the Exhibition is thrown open on both days free to the public. The Society defrays all expenses, including carriage of all exhibits kindly lent. All pictures intended for exhibition must be mounted but not framed. Title, name, and address may appear on front of mount. Pictures must reach the Hon. Secretary, Mr. S. Francis Clarke, L.D.S., 8, Upgate, Louth, Lincolnshire, not later than January 23.

On Wednesday evening, January 25, the Photographic Club hold their Annual Lantern and Musical Entertainment (Ladies' Night) at Anderton's Hotel, when, as usual, a large number of admirable slides will doubtless be shown; and, as Mr. F. A. Bridge, the Hon. Secretary, is to be responsible for the musical portion of the programme, a treat in this direction may be safely anticipated. On the following Friday (January 27) the Club takes a new departure by providing a children's entertainment, to consist, we believe, of a selection of suitable slides, music, conjuring, ventriloquism, and other good things dear to the hearts of the juveniles. This entertainment (a happy thought in its way) is intended for the children of members and friends, and should be as successful as it will be novel.

FORTHCOMING EXHIBITIONS.

January 26, 27	.....	*Louth and District Photographic Society. Hon. Secretary, S. Francis Clarke, 8 Upgate, Louth.
February 1	.....	*Cleveland Camera Club. Hon. Secretary, J. J. Hallam, 11, Amber-street, Saltburn-by-the-Sea.
,, 7, 8	.....	Rotherham Photographic Society. Hon. Secretary, H. C. Hemingway, Rotherham.
,, 14	.....	Durham City Camera Club. Hon. Secretary, R. Hauxwell, The Avenue, Durham.
,, 16–18	.....	*Woolwich Polytechnic Photographic Society. Hon. Secretary, W. Dawes, 145, Chesnut-road, Plumstead, S.E.
,, 18	.....	Holborn Camera Club. Hon. Secretary, F. J. Cobb, 100 High Holborn, E.C.
March 1, 2	.....	*Fillebrook Athenæum Photographic Society. Hon. Secretary, Joseph W. Spurgeon, 1 Drayton Villas, Leytonstone, Essex.
April	.....	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.
,, 17–29	.....	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.

* Signifies that there are open classes.

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1707. Vol. XL.—JANUARY 20, 1893.

ASSISTANTS AND THEIR SPECIMENS.

We have willingly opened our columns on many previous occasions to the complaints and representations of operators, retouchers, and others, of their having been robbed of their specimen pictures by the photographers to whom they had entrusted examples of work absolutely priceless to the sender. The heart of every honest man must burn within himself at the plain, straightforward accounts given by some of the writers referred to. Unfortunately, the class of man whose morality is of so low a grade—if it be permissible to establish degrees of mental turpitude—as to allow him to rob, in this heartless fashion, those able workers who reply to his advertisement, and, after having filched their goods, traded on their abilities, is utterly insensible to any appeal or reproach for his callous and nefarious treatment. The only way to treat him and his kind is by the strong arm of the law, which, more the pity, is often too slow for its strength. A short enforced retirement to study the intricacies of tarred rope, once applied, if such could possibly be brought about, would have more effect than pages of writing.

On this subject we feel more strongly than we care to put into words; but at the same time we feel bound to say that there has rarely been a more cogent instance of the value of the old proverb, "*Audi alteram partem*," than is afforded by the cases of wrong we are now considering. We had recently occasion to call upon a professional photographer, and, when ushered into his presence, were asked to excuse any violent language he might have been heard to use, for he was busy replying to advertisements, and much ruffled by the labour thrown upon him in consequence of the unbusinesslike mode in which the applications were made. "Yet," said he, "let me but lose or missend one single picture out of all this heap, and it will at once become the most treasured property of its owner, and there will be a howl of indignation from one end of the country to the other at the infamous way in which I am treating applicants for a post."

There can be no doubt that the photographs sent in reply to an advertisement, and the letters of application accompanying (or belonging to) them were of the most unbusiness-like kind. Beautiful photographs actually sent with no protection but a small piece of cap-paper tied with a piece of string; others well tied, but guarded from the sorter's stamp by nothing stronger than writing paper; others suitably and sufficiently packed; others, again, with small and large pictures placed higgledy-piggledy, and no guarding sheets between. A business-like man would at once reject an untidily got-up application if one of equal merit were to hand in which everything was neatly and securely put together. But, as this is merely by the way, not forming part of our especial object in writing, we pass on to the next point. Not only are pictures insufficiently securely packed and tied up, they are actually sent without any distinguishing mark inside, except perhaps a piece of paper marked "Portrait of self." Seeing that every one is a "self" at the time of writing, it is evident that something a little less vague would be desirable for identification. In the instance we were referring to, the photographer informed us that he actually had to guess by internal evidence whom certain of the lots of portraits belonged to. The postmark is not enough; more than one may be writing from the same town, and incontestably it is asking too much of the proprietor of any large establishment that out of a score or two, or three, or four applications he should be put in the position of being able to find the address or owner of a good proportion of the photographs sent only by submitting them to a rigid scrutiny and classification of postmarks, dates, handwriting, and so forth. What wonder if now and then some employers, of not over-gentle mien, do retaliate by pitching the unmarked photographs into the waste-paper basket! We do not uphold him in such a mode of dealing with them; we point out the possibilities.

Now, as such remarks as these lose some of their value if not made thoroughly practical, we offer the following advice to any one replying to an advertisement involving specimens being sent at the same time:—

Use some judgment as to the probabilities of the case, seeing it is notorious that specimens have been withheld by the receivers.

Let the producer of the picture or retoucher who sends samples of his work write his name legibly on every individual print, doing it on the face if he like, so as to avoid temptation to use it by others for dishonest purposes.

Let the parcel be well packed and covered by strong boards to protect it against stamping and damage in transit; post officials have no special regard to the contents of every individual package that goes through their hands. Let a very brief descriptive list accompany the prints, setting forth the number and style of prints, and the full name and address of their sender.

Do not send any original testimonial at the outset. Let the outer wrappers be in good condition, and be legibly readdressed (to the owner on the inner page, so that, when the advertiser returns the pictures to their various owners, the least labour may be involved). If it be assumed that an advertiser receives a score of applications, any one who has any knowledge of such things will say that, unless some such method as above

advised be adopted, a half-day's steady, continuous work will be absorbed by examining specimens finding out their owners' addresses, packing up and addressing the parcels again, not to speak of the possible courtesy of an accompanying "declined with thanks."

Finally, we advise that stamps for reply and redespatch be enclosed; they are not essential, and some employers do not look for it, but it is far safer.

In conclusion, we feel justified in saying that, if such a method of application here shadowed forth had been in general use, we should have heard less in time gone by of the robbery of specimens by advertisers.

NON-ALKALINE DEVELOPMENT.

Of late we have observed in foreign photographic journals more han one communication implying that, for the development of the photographic image on the haloids of silver in gelatine, tmany organic bodies recently experimented with were available which would answer the purpose when allied with an acid instead of a free or fixed alkali. It is, therefore, with singular opportuneness that we notice a paper contributed to the Proceedings of the *Société Française de Photographie* a few days ago by those indefatigable experimentalists, Messrs. A. & L. Lumière, which has a distinct and valuable bearing on the matter.

Messrs. Lumière point out that, while hydroquinone, eikonogen, and para-amidophenol, &c., require to be used in an alkaline solution, all organic developers are not to be similarly classed, and they quote Captain Abney as noting that pyrogallol, with the addition of sulphite of soda acidified by hydrochloric acid, or the acid bisulphite, will develop the latent image, while acidified hydroquinone does not possess that property. They recall the circumstance that they have already alluded to the fact that, while, in general, organic substances will not develop except in the alkaline state, in certain cases they found that the image may be brought out by an acid solution, and they now proceed to consider the relations which exist between the chemical constitution of the latter bodies and their property of developing either in neutral or acid solutions, rightly assuming that, besides being of theoretical, the subject is likely to be of great practical, interest, inasmuch as, during periods of heat, the gelatine vehicle would be less liable to attack by weak acid solutions than by those in which either the free or fixed alkalies are employed.

Diphenols, diamenes, and amidophenols, having only two hydroxyl or amide groups, do not, Messieurs Lumière find, fulfil the necessary conditions; on the other hand, substances having three groups of O H, or NH_2, are suitable for development in an acid state. Thus,

diamidophenol $C_6H_2\begin{cases}OH\\NH_2\\NH_2\end{cases}$; triamidophenol $C_6H_2\begin{cases}OH\\NH_2\\NH_2\\NH_2\end{cases}$

pyrogallol $C_6H_3\begin{cases}OH\\OH\\OH\end{cases}$; oxyhydroquinone $C_6H_3\begin{cases}OH\\OH\\OH\end{cases}$

and diamido-naphthol $C_{10}H_5\begin{cases}OH\\NH_2\\NH_2\end{cases}$

are suitable; the molecule, however, should not contain the acid group C O O H, substances containing it requiring the addition of a free or caustic alkali. The presence of C O O H in gallic acid destroys in some cases its developing powers, which Messrs. Lumière proved by effecting in that group methyl and ethyl substitutions when the resulting compounds, methyl gallate and ethyl gallate, were found to develop perfectly.

Amide groups NH_2 impart certain basic properties to the molecules in which they are contained, so that the influence of the acid C O O H on the developing power of bodies containing the amide is less energetic than in those containing hydroxyl, amidosalicylic acid, for example—

$$C_6H_3\begin{cases}COOH\\OH\\NH_2\end{cases}$$

developing with an alkaline carbonate, while pyrocatechic acid,

$$C_6H_3\begin{cases}COOH\\OH\\OH\end{cases}$$

requires a free alkali in order to reduce silver bromide. Hence Messrs. Lumière allege that, in order to arrive at the developing energy of an organic substance, it is desirable to understand not only the number and position of the hydroxyl and amide groups, but also the presence of the body, C O O H, and the basic influence of the NH_2 groups.

Messrs. Lumière conclude their paper by remarking that the substances containing more than two substitutions of O H or NH_2, and more especially those which already possess developing powers, and of which the molecule is free from the acid grouping C O O H, have a developing action either in neutral or acid solutions. Bodies so constituted, and which, besides, would be freely soluble in water, would appear to them to be henceforth preferable to other agents on those grounds.

Although the foregoing *resumé* of Messrs. Lumière's conclusions may seem at first sight to possess interest only to the chemist and the theorist, it points to some likelihood of the introduction of acid and neutral organic compounds for development, which may conceivably be of advantage to the photographer.

CHANGING BOXES *VERSUS* DARK SLIDES.

III.

Perhaps the best, as well as the simplest, application of the grooveless box system is one which, although not in the market, has stood the test of a season's use in the hands of its amateur maker, and, combining as it does the best points of the existing changing systems, may be worth description.

It consists of a plain grooveless box, which may be made to carry any convenient number of either plates or film-carriers. It is in the arrangement of the lid that the chief peculiarity consists. Those who are acquainted with Hare's changing box will be aware that as the sliding lid is moved from groove to groove the rigid top is followed up by a flexible portion, which packs away in the interior, and gives play enough for the slide to be passed over the full width of the box. In the arrangement to be described, this flexible portion is in duplicate, the top of the box carrying the jaws being movable in either direction, and when closed the jaws are in the centre. Immediately beneath the sliding top is a fixed under lid, covering the whole width of the box with the exception of a narrow slot at each end, just wide enough for the passage of a plate or film-carrier, as the case may be. When the box is "closed," that is, when the jaws are in the centre, the slot in the latter is effectually closed by the under lid; but, when the sliding top is moved as far as it will go in either direction, the opening in the jaws comes over one or other of the slots in the

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fixed lid, and communication is made with the interior. The changing box is thus practically automatic in its opening. The opening and closing of the slide is effected by means of a spring back acting in a very similar manner to Hare's changing slide. A catch is provided, by means of which the sliding lid is kept secure in the various positions it has to occupy.

In use the box works precisely as we have already described. One side is marked "out," the other "in." When a plate is required for exposure the slide is inserted in the jaws, and the sliding lid moved as far as it will go in the direction of "out," which is then in the uppermost position, and the top plate slides easily out of the box, the jaws of which are then closed. After exposure the process is repeated, the "in" side of the box being then uppermost, and the exposed plate is returned to the back of the stock.

To prevent the risk of re-exposing any of the plates, should a miscount occur, a piece of thin wood or millboard, the same size as the plates, but just too thick to pass through the slot, is placed behind the last plate or carrier, so that when the latter has been exposed the refusal of the "dummy" to pass announces the fact that the stock is exhausted. In order to guard against the possibility of a plate being taken out of or returned by the wrong opening, each is provided with a thin metal flap—which may or may not extend the whole length of the slot—which, held in position by a light spring, will open by the weight of the plate or carrier in only one direction, and these, being fixed in reverse position over the two openings, effectually prevent the plates being passed through the wrong aperture.

Finally, if double carriers are employed when the whole have been exposed once, an extremely simple arrangement permits the dark slide to be inserted in the jaws in the opposite direction and the reverse sides of the carriers can then be exposed. In this case, however, the safety flaps just mentioned must be removed at the time the box is charged, and it will be needful to bear in mind that the directions "out" and "in" bear an opposite signification.

We had nearly omitted to point out that in employing double carriers the dark slide must be filled with four separate back springs bearing on the corners of the carrier, instead of the usual central springs; and, as these are as easily applied, it is perhaps better to substitute them in all cases where thin metal carriers are used.

So simple is this arrangement that there is absolutely nothing to get out of order, and scarcely any room for making mistakes if a systematic numbering of the double carriers—should such be used—be adopted. It is equally adapted for glass plates or films, but will no doubt prove most useful with the latter, the box to carry fifty films in double carriers having a thickness of little more than an inch and a half.

The film-carriers employed in this apparatus have also the advantage of extreme simplicity and perfect efficiency, combined with lightness, cheapness, and the fact that they are within the power of construction of any one. They consist merely of narrow strips, say a little over a quarter of an inch wide, of thin metal bent in the direction of their length, so as to form a V section. These are cut to the length of the longer side of the film, or the direction in which it slides, and others about a quarter of an inch shorter than the other dimension. A number of pieces of opaque paper—ordinary brown paper answers perfectly—are cut the size of the films to be used, and these, "sandwiched" between two sensitive films, are bound together at the edges by the metal strips, forming one of the cheapest, lightest, and best carriers we have seen, the films lying perfectly flat, and being protected along all four edges. They may, of course, be used as single carriers if desired, and thin metal or cardboard may be used instead of paper for the opaque division if greater stiffness be wanted; but the metal edging forms a quite sufficiently rigid frame for all ordinary purposes.

We have seen another changing arrangement, in which a separate slide is dispensed with, or in which the slide itself forms the receptacle for carrying the films. In outward appearance, it closely resembles the slide of Hare's changing box, only thicker, and is provided with a changing bag attached to a sliding plate that fits into the end when a film is to be changed. When this is necessary, the bag is slid into position, and a spring catch is released, as in Hare's slide, which, however, opens *two* slots, out of one of which the exposed plate emerges, to be seized by the operator's fingers; and, after reversing the slide, it is reinserted at the back of the store, and another surface comes into position for exposure. There are numerous little details in the internal arrangements necessary to the smooth working of the affair that would require diagrams for their proper explanation; but the general idea we have given will enable any intelligent mechanician to construct such a changing slide.

We have described these forms of apparatus in the hope that some of our manufacturers may be induced to take up, and perhaps improve upon, the ideas, and thus supply the want of a really portable arrangement for carrying large numbers of cut films.

Photographers' Risks.—Photographers frequently incur great risks in the practice of their art. Often they will jeopardise their lives, sometimes unnecessarily, in positions that few would venture, in order to obtain a particular view or effect. Here is a case in point. Last week two photographers were taking views in a cave at Niagara Falls, when a huge icicle became detached and fell upon them, hurling them into a chasm below. After a time they were rescued and taken to the hospital. One is expected to recover. Of the other no hopes were entertained. It is to be hoped this may serve as a warning to over-venturesome enthusiasts in the art.

A Big Business.—It was stated in the evidence at the Folkestone Police Court the other day, *re* the Treasury prosecution in the "free portrait" swindle, that no less than eight clerks were employed in the business. This can be understood when from two hundred to three hundred letters were received daily. What do struggling photographers think of that? It appears that the police found nearly 2000 portraits on the premises. This represents the number of disappointed individuals who expected to receive a two-guinea picture for nothing. After the frequent exposure of the fraud during the past few years, some may be inclined to say "serve them right."

Sutton's Half-tone Process.—In the announcement pages of our present issue will be found two examples of Mr. Henry Sutton's half-tone process which our readers will remember we described in the JOURNAL for November 20, 1891, p. 737. In addition to rapidity and cheapness of production, these clichés are of a nature to admit of being printed with ordinary letterpress with fast-running machinery, which should prove a considerable boon to conductors of illustrated periodicals and those requiring phototypic reproductions expeditiously and at a low cost. It will be observed that the results, of which an excellent example is to be found in our ALMANAC, compare favourably in their artistic qualities with half-tone pictures obtained by other methods that have been employed for some time past.

Frozen Water Pipes.—In our last issue a correspondent details his experience of the effect of the frost on a porcelain dish. We fear, ere this, many of our readers have had a more costly one in the shape of burst water pipes. It is somewhat surprising at this age to find that the once popular idea, that the bursting of a frozen pipe takes place at the thaw, still prevails with some persons. It would be superfluous to tell our readers that the fracture occurs at the time of freezing, although it does not make itself manifest until the thaw. But it may be well to remind them that the fracture can always be discovered, and the injury repaired, before a thaw sets in. When a pipe is found to be frozen, it should be carefully examined throughout its length, when the burst, if any, will be easily seen, or even felt. If this were done, many annoying and costly floodings would be avoided.

A False Alarm.—At the conclusion of the meeting of the London and Provincial Photographic Association on Thursday, January 12, Mr. J. G. Hudson gave a practical demonstration of his Kolm magnesium flash-lamp, when several exposures were made by Messrs. Teape and Freshwater. In the course of the demonstration a considerable quantity of magnesium was used, so that a tolerably large volume of smoke resulted. To allow of its escape, the windows were opened, which, in conjunction with the unusually large and brilliant flame of the lamp, so alarmed a civic policeman that he blew his whistle, with the consequence that in a very few minutes three or four fire-engines, together with a fire-escape and a crowd of people, had assembled, under the impression that a conflagration had broken out on the premises occupied by the Association. The incident caused much amusement among the members and no little temporary alarm to the authorities of the hotel.

Strong versus Feeble Light.—There is a point in connexion with the sensitiveness of different materials to light that just now it may be well to direct the attention of experimentalists to, particularly those with the photo-mechanical methods. Some compounds are relatively much more sensitive in a strong light than they are in a weak one—that is to say, a proportionately longer exposure in a feeble light is not equivalent to a given one in a strong light. Notably is this the case with bitumen, so largely used in "process work," and bichromated gelatine in the other processes. With the former, in a weak winter light, several days' exposure will not bring about the same result that can be obtained in a few minutes in a bright summer sunshine. The same also applies to bichromated gelatine as used in collotype, photo-lithography, and other processes—a longer exposure in a dull light does not secure the same result as that obtainable in a bright one. Most carbon printers, for example, know that in a strong light the tissue is much more sensitive than albumen paper, but in a weak one it is very much slower. Sometimes, when the light is exceptionally bad, double the exposure will be required.

Recipes and Recipe Books.—One or more recipe books are usually to be met with on the shelves of most photographers; but, as many have discovered to their cost, not a few of the recipes as given are by no means to be relied upon, while some are nothing less than impossibilities in practice. This remark applies not only to cheap works, but also to the more expensive ones. The compilers of these works have in many instances adopted formulæ that have been handed down from generation to generation in older works, sometimes with printers' errors, without any kind of verification or comment. This should not be the case, for nothing is more annoying than, after taking every precaution to work strictly according to the recipe, that, in the end, the thing is impracticable. In a technical work now before us are six or seven different formulæ for French polish, a material often wanted by photographers. In these the proportion of resins to spirit vary from one ounce and a quarter to five ounces and a quarter to the pint. In some only two resins or gums are given, in others there are half a dozen, some of which are not even soluble in spirit—gum arabic, for example. It is not unusual in some books to find the same material under different names given in the same recipe.

WILLIAM BEDFORD.

With a feeling of sorrow, which we are sure will be shared by all our readers, we announce the death of Mr. William Bedford.

For some time he had not enjoyed robust health, this having been noted when, as President of the Bath meeting of the Photographic Convention of the United Kingdom, he so ably fulfilled the duties then devolving upon him. Mr. Bedford was a man who was universally esteemed, and was foremost in every good work appertaining to the welfare of photographers and the advancement of photography. For several years he was the Chairman of the Council of the Photographers' Benevolent Association; and with what honesty of purpose and assiduity he threw himself into the work of ameliorating the condition of his less fortunate brethren only those know who were associated with him in this beneficent institution, from which no worthy applicant for assistance has ever been sent away empty.

As a careful, pains-taking experimentalist Mr. Bedford had few equals, and when in his own singularly modest way he expressed an opinion on processes or methods based on his own investigations, it was felt by those who listened to him, with that deference which invariably attended his utterance, that they might be accepted as conclusive.

He was an active member of several Societies, including the Photographic Society of Great Britain, of which he has for several years been elected a member of the Council; the Photographic Club, of which he was a Trustee; the London and Provincial; an honorary member of the North London Society; and one of the active promoters of the Affiliation Scheme in connexion with the P.S.G.B.

Individually, he was an artist of great merit, and frequently was awarded medals at the higher class of exhibitions, the last being at the recent Pall Mall Exhibition. He received his education in the science of photography at King's College, the practical part being acquired in the studios of his father, Mr. Francis Bedford, the eminent landscape photographer who accompanied H.R.H. the Prince of Wales on his Eastern tour many years ago. He died of typhoid fever on Friday, January 13 last, aged forty-six years, and was buried at Kensal Green Cemetery on Tuesday, the 17th instant, amongst those assembled at the graveside to pay the last tribute of respect to him being several members of his family; personal friends; and employés, and Messrs. F. A. Bridge, F. P. Cembrano, jun., Alex. Cowan, R. Child-Bayley, W. E. Debenham, R. P. Drage, William England, E. W. Foxlee, H. M. Hastings, H. R. Hume, Alexander Mackie, E. W. Parfitt, John Spiller, J. Traill Taylor, G. W. Tottem, Horace Wilmer, &c.

The large circle of friends William Bedford had made and retained ensures wide sympathy for his wife and son, and for his aged and esteemed father, Mr. Francis Bedford, in their affliction. He will long be remembered for those amiable gifts of character which endeared him to so many, for it is safe to say that seldom in one man was there concentrated so much kindliness of disposition, courtesy, warm-heartedness and generosity, allied with those admirable qualities of mind which elicited the respect as well as the affection of his numerous acquaintances.

Our portrait, which was the last one taken of him, was reproduced for us by Messrs. B. Dellagana & Co. of Shoe-lane, at short notice.

Art Reproductions.—Seeing the extensive sale that photographic copies of some of the pictures in Continental galleries, and modern Continental paintings, command in this country, one is naturally led to speculate as to whether reproductions of the works in English galleries, as well as British modern works, would not meet with a similar sale if they were forthcoming. Of course we mean in the sizes and at the prices that the foreign productions are to be obtained here. It is often said that the British public generally do not care for art, but this, to an extent, is disproved by the fact of the large business done in the foreign copies. English publishers do not apparently care to issue reproductions of paintings in which they are interested in anything but large sizes and at high prices, and in the they are generally supported by the artists. Foreign publishers, on

WILLIAM BEDFORD.

Died January 13, 1893.

the contrary, issue several sizes, from cabinet upwards, printed in silver and carbon as well as collotype, and at popular prices. These pictures are available for either albums or folios, whereas the expensive English reproductions are only suitable for framing. In connexion with this topic we are given to understand by print dealers that the copyright in the popular German picture, *The Mock Tyrolese*' has proved one of the most profitable of late years. Copies of all sizes and by all processes have, for some years past, met with an extensive sale, not only in England and the Continent but also in America.

STUDIO HEATING.

Our esteemed Editor, knowing I have had considerable actual experience in this subject, and having asked me to give my views upon it for the benefit of any reader of the JOURNAL who may be contemplating adopting some one or other of the many methods recommended by persons interested or otherwise, I will do my best to carry out his wishes. So many studios being connected with dwelling-houses, it is natural that first thoughts would turn to the open fireplace, and I may say at once that I share the Briton's prejudice in favour of a good, hot, coal-fire; but it has certain disadvantages that render it at times the very worst heating medium possible. There are few chimneys which do not occasionally "smoke;" that is to say, the smoke, instead, of ascending the nice channel made for it, occasionally comes, instead in puffs into the rooms. This is annoying enough in a living room, but in a studio it simply means cessation of work for a long period afterwards; for it is difficult enough at this time of the year in the best weather to obtain a sufficiently clear atmosphere to enable one to take good portraits when the camera is any distance from the sitter, as for half or full-lengths. It is within the mark to say that, with a slightly foggy air to start with, no good negatives can be taken for an hour or two after one whiff of smoke, be it ever so slight, has come into the room. Hence, unless the chimney is known to behave perfectly—and how few have such a good reputation?—it will be better to eschew open fireplaces. Of course, if the draught be confined by restricting the open area of the grate by sheet-iron "blowers," or otherwise, there will be less danger of smoke. I have employed this plan with a very small fireplace, which I had specially lined with fire-brick, after finding the ordinary brick burnt out with a few weeks use. By using a blower coke can also be conveniently employed, which reduces risks of smoke to a minimum. There is always, however, the danger of the "boy"—ubiquitous when mischief can be done—exercising the usual carelessness when lighting the fire. One further reminder, and we may consider another aspect of the subject With open fires, even with perfect chimneys, there is always danger of smoke being blown down by the wafting of a lady's dress or similar cause. Those only who have experienced the ill effect of a slight amount of smoke in the air of the studio have any idea of the miseries it causes.

Far better are closed stoves, of which there is an infinite variety to choose from; but a good-sized slow-combustion stove, if room can be found for it, or a couple of them if the studio be a long one, is a very efficient mode of warming a studio. Their drawback is the unsightly flue or stove pipe needed for carrying off the products of combustion, though in this respect the makers are very accommodating, and nowadays construct them so as to reduce this disfigurement to a minimum by carrying the pipe downwards. This, however, implies a chimney near at hand to lead these portable flues into, and they also need a good draught, or the stove will not work. Further, there must not be lost sight of the pleasures of taking the pipes down periodically for cleaning, with the attendant dust, and dirt, and soot particles. When I had one of these in use, it was generally discovered that the flue wanted cleaning just when taking down the pipes would produce the utmost possible upset and inconvenience.

I have had personal experience of the building, in various places, of not much under a dozen studios, and if I built that number again I candidly say that I should be thoroughly averse to any method of heating that involved the slightest possibility of the entrance of smoke into any room where a portrait would have to be taken. It is very probable that throughout the country many a negative is produced with foggy characteristics all owing to the presence of smoky air, so slight as not to be noticed by the inexperienced, and for which defects the unfortunate plate-maker is blamed.

These smoke troubles are by no means confined to the fuliginous particles that escape from fires in the studio, for, if there be an open fire in adjacent dressing-rooms, any smoke wafts entering them will inevitably result in the ultimate contamination of the studio air. Indeed, one of the defects of studios situated over dwelling-houses is the liability to the entry of smoke from any room from basement to attic in which a fire is burning.

With the knowledge of all these possible defects, gained by painful experience, I advocate most strongly a system of heating by hot water. I built a very large studio more than twenty years ago and heated it in this way, and when, after seven or eight years' occupation, I left the premises I had the very same apparatus removed and set up in my next studio. They are in use now, apparently as good as the day they were first put in, and, I think, do not cost any more than—if as much as—I should have to pay with open fireplaces. The heat is produced in a brick furnace in the cellar, and the pipes traverse the studio, the dark room, a dressing-room, and my office, and there is never any complaint; sitters often say, "How comfortable the studio feels—just like a sitting-room." This is high praise, for one most important matter in professional portraiture is attending to the physical comfort of the sitters. Whatever the cost, it is money well laid out.

Every one, of course, will have his own preferences as to the particular kind of hot-water apparatus to employ. The one referred to is on what is known as the high-pressure system. The pipes are of narrow bore, the external diameter is only an inch and a half; there is no boiler, no safety valve, no water reservoir, all is self contained, and the last addition of water was about a wineglassful after over two months' constant use. The pipes for the high-pressure system are made of wrought iron, and so instead of the unsightly pipes of the more familiar kind occupying space and pulling premises to pieces when they are put into a series of rooms in a building already erected, there are merely these narrow tubes invisible in comparison with the others, which can be carried through room after room and requiring little more wall piercing than could be done with a good-sized auger.

I should like to say before concluding my remarks upon this branch of the subject that there is much to be gained by keeping the water hot night and day. In my own premises the fires are never allowed to go out during the winter; the furnace was lighted early last autumn, and, except for a few minutes occasionally while the slags are being raked out, has been burning ever since. The fire is banked up at night, and next morning is still alight, and studio, dark room, and dressing-room are at a most pleasant temperature however early work begins in the morning. What this means will be well understood by operators and others who, during such weather as we have lately experienced, come to cold rooms first thing and have to wait some hours before there is any real comfort.

I will conclude my remarks by reference to gas stoves, which are highly approved of by many. There cannot be two opinions as to their convenience, and, if sufficiently large, and supplied with gas through-pipes of large enough bore—a very unusual thing—they are efficient. They are also rather expensive when used at full power for large studios, there being usually such a considerable amount of ventilation, or air change, through the glass roof and otherwise. My own experience of this form of heating has been confined to dressing-rooms of late years. I have one of Fletcher's in use for that purpose, which can be turned on and off just as required, and thus is decidedly economical, and free from possibilities of my *bête noire*—smoke. It may be well to point out that the manufacturer named makes three types of gas fires, in which the incandescent materials are respectively asbestos fibres, hollow fire-clay balls, and corrugated iron, their economy of gas being most with the last named, and least with the first. There is, however, with the asbestos pattern power to turn the gas down—when full power is not needed—to a much greater extent than the others. In them, if the gas be turned too low, the flame passes down to the inner jet, and then lights, like a Bunsen with too much air supply. When that happens no value is obtained from the gas, and, what is still more important, this jet becomes coated with soot, the supply of gas is lessened, and if this lighting down be not noticed and continue for some hours, the

choking up of the jets is so great, and the efflux of gas so reduced, that it is with the utmost difficulty that when next required for use the burner can be lighted properly—the flame will shoot down and very little heat is obtained. I allude to this owing to my having seen gas fires in this condition; it was only a week or two ago that I was in a professional friend's studio whose burner was in the condition I describe without his being aware of the fact.

In concluding my brief survey, I can only say I hope some of my readers may gather useful hints from it; and, if I can throw light on any obscure point, I shall be happy to supplement it by details of personal experiences. G. WATMOUGH WEBSTER.

AMERICAN NOTES AND NEWS.

The Social Status of Photographers.—In the *Canadian Photographic Journal*, Mr. John Clarke recommends his brethren to adopt carbon and platinum printing, in order to impart variety to the contents of their reception-rooms, and bring them pecuniary success. He adds: "But the exhibition and judicious introduction of such pictures will do more, it will help to raise the tone of the establishment in which they are produced, probably a more valuable thing. It will be admitted, and it is true whether admitted or not, that photographers do not as a rule enjoy the social status to which they are entitled—are not, socially, on the plane of, say, the doctor, the lawyer, or the clergyman. It is true that a few who are commercially successful enjoy the social position that is an attendant on wealth however produced, but the great bulk of the fraternity are, in pull estimation, merely photographers. Much has been written about the status of photography, but photography itself is all right enough; it is the status of the photographer that needs raising, and anything that will act as a lever in that direction should be regarded with favour." The social status of English photographers, according to the foregoing reasoning, is higher than that of their Canadian *confrères*, inasmuch as here platinum, carbon, and other methods of printing only slightly in favour in America are largely practised. By the way, is not Mr. Clarke somewhat rash in assuming that platinum paper—or, indeed, any sensitive paper—will keep "indefinitely?"

Remedies for Over and Under-printing.—A method of treating prints which have been over or under-printed has been recently devised by Mr. J. Huntly, says *Anthony's Bulletin*. Those that have been over-printed are toned and fixed in the usual manner, and then immersed in a dilute solution of cyanide of potassium until reduced to the desired shade, when they receive a thorough washing in running water. Under-printed proofs are developed with hydroquinone in the same manner as a negative, and then finished in the ordinary way. The results obtained are said to be excellent, and we would advise our readers to make the experiment.

A "New" Ceramic Process.—According to the same journal, Mr. Geo. G. Rockwood, of New York, has recently invented a method for burning in photographs on glass which bids fair to become a very important one. "It is based on the property that gelatine possesses of becoming insoluble when exposed to light in the presence of a bichromate salt. Indestructible pigments are combined with the gelatine, and remain upon the glass after treatment with warm water, wherever it has been affected by the light, as, for instance, exposure under a negative. When dry, the glass is fluxed and placed in a kiln, and the pigments melted into its surface."

Anti-halation Plates.—Plates specially coated to avoid halation in interior work are being introduced by American manufacturers of dry plates. The M. A. Seed Plate Company have, it is said, such a plate on the market, and the Wuestner Eagle Dry Plate Company are also preparing a similar plate. On behalf of English plate-makers we here take leave to acknowledge the delicate compliment paid to them by our American friends in following the former's lead.

A Coin-controlled Stereoscope.—A patent (in the United States) has recently been taken out for a "Coin-controlled Stereoscope." The claims relate to the special construction and arrangement of parts for uncovering the object-glass, bringing the views into position, &c. Electricity, in conjunction with clock-work, is utilised as the motive power.

A Divided Interest.—"Watchman" in the *Beacon* writes: "I learn from *Wilson's Magazine* that one of its subscribers has long divided his attention between photography and grape-culture. I have known many who divided theirs between photography and the fruit of the vine, and my observation has led me to believe that, attractive as photography is, the grape, especially when it has been corn or rye, sooner or later ousted his colleague." Not always, we hope and believe, good "Watchman."

"A Useful Dodge for Aristotype Printers."—Mr. J. H. Reuvers, in the *Photographic Times Annual* for 1893, says: "Users of aristotype paper very often are annoyed in their printing by having some of the paper stick to the negative. If not successfully removed, an entire negative may thus be ruined. I have hit upon a dodge which removes the difficulty completely without injuring the negative in the slightest. Immerse the negative which has thus been marred in a hypo solution, and leave it there until the brown spots or streaks caused by the paper have entirely disappeared. Then remove the negative from the hypo bath and wash thoroughly by laying the negative in clean water, changing the water frequently. Do not allow the water to run on the negative, as it would remove the retouching. When the hypo has been removed from the plate by washing, remove the negative from the water bath and set it up to dry in the usual manner. If the process is accomplished with care, the negative will dry as perfectly as if nothing had happened, and the retouching even will not be marred." This reads like a very simple method of removing silver stains from negatives. Perhaps some of our professional friends will try and report upon it.

NOTES ON SILVER.

[American Journal of Science.]

Action of Ammonia.—Aqueous ammonia is supposed to be without action on normal silver, but this is not so; under favourable conditions, silver is gradually taken up by this solvent.

The first experiments were made with silver reduced from the nitrate by the action of sodium hydroxide and milk sugar. The silver was very carefully purified from any possible trace of oxide. Placed in contact with ammonia for a few hours, silver was taken up. Its presence could be recognised either by ammonium sulphide, or by adding a drop or two of hydrochloric acid, and then supersaturating with dilute sulphuric acid; a dense cloud of silver chloride forms, and this result can be obtained any number of times in succession by acting with ammonia on the same portion of silver.

A similar reaction was obtained with silver reduced from chloride by cadmium and hydrochloric acid, removing afterwards all traces of cadmium. Silver reduced in this way is liable to contain traces of chloride. These were removed by covering the silver with strong ammonia, letting it stand over night, and thoroughly washing out. This was repeated five times. From this silver, ammonia by twenty-four hours' contact always took up enough to give a dense white cloud when treated as above.

Portions of solutions obtained in the last-mentioned manner were evaporated to dryness over the water bath, and left brownish-black films. These were non-explosive, and therefore did not consist of silveramine; they yielded a large proportion of silver to acetic acid, leaving behind a little metallic silver. The ammonia, therefore, does not dissolve the silver as metal, but as oxide. The presence of a little metallic silver in the residue left by evaporation was probably due to slight traces of oxidable organic matter contained in the ammonia. This opinion was confirmed by the fact that the solution, when heated, acquired a transparent red colour.

It appears, therefore, that, in the presence of ammonia, silver has a tendency to oxidise, for when the silver was placed in a vial with an air-tight fitting stopper, filling it about half full, and was then completely filled with liquid ammonia and tightly closed, it was found that in twenty-four hours a mere trace of silver was taken

up. On the other hand, when the silver was placed in a flat basin and merely moistened with ammonia, more silver was taken up in five minutes than in the preceding case in twenty-four hours.

This action of ammonia in promoting oxidation recalls its behaviour with cobaltous salts and with copper. It is probably the only case in which silver is oxidised (at ordinary temperature) by atmospheric oxygen.

Action of Dilute Sulphuric Acid.—It is generally held that silver is insoluble in cold dilute sulphuric acid. Almost any form of silver, provided it is finely divided, is slightly soluble in sulphuric acid diluted with four or five times its bulk of water. With more dilute acid, different varieties of silver act very differently. The most easily attacked is that which is obtained by reducing the oxide with alkaline hydroxide and milk sugar; from this a distinct trace is dissolved by sulphuric acid, diluted with 100 times its bulk of water. From silver reduced from the chloride by cadmium, this very dilute acid takes up nothing.

Nitric acid, sp. gr. 1·40, diluted to ten volumes, and allowed to stand for an hour with finely divided silver, took up an extremely faint trace.

Hydrochloric acid, sp. gr. 1·20, was totally without action. The silver, after being well boiled with water to remove every trace of acid, dissolves completely in nitric acid.

Acetic acid has no action upon metallic silver.

Various Reactions of Normal Silver.

Normal metallic silver, even in a state of very fine division, does not abstract the slightest trace of nitric acid from perfectly neutral cupric nitrate obtained by acting on pure cupric sulphate with barium nitrate. After fifteen hours of contact, not a trace of silver had been dissolved.

But silver easily reduces cupric chloride with formation of purple photochloride. If the copper salt is present in slight excess, the silver is so thoroughly acted upon that nitric acid does not extract a trace of it from the purple photochloride.

Metallic mercury instantly reduces silver nitrate, but metallic silver takes chlorine from corrosive sublimate. The precipitate contains calomel and blackens with ammonia.

Silver in fine division slowly reduces a neutral solution of potassium permanganate.

Silver nitrate, as is well known, is reduced by ferrous sulphate or ammonia ferrous sulphate, the iron at the same time becoming peroxidised and the silver assuming the grey metallic form. On the other hand, silver powder rapidly reduces a netural solution of ferric sulphate. A solution of iron alum readily dissolves metallic silver without the aid of heat;* in a few seconds the solution strikes a blue colour with potassium ferricyanide, and if the iron alum is in excess the whole of the silver is dissolved. It has been before noticed that the reactions between silver salts on the one hand and iron salts on the other are to some extent reversible: the observations just described place the matter in a somewhat clearer light. With a view of ascertaining whether ferrous sulphate could be completely oxidised by argentic oxide, a portion of the ferrous solution was treated with successive portions of the oxide until the latter was no longer affected by it. But when this stage was reached the solution no longer contained a trace of iron, the whole of it had entered into combination with the silver. This combination is perfectly black, and may probably have consisted of the compound described by H. Rose as Ag_4O, $2FeO\ Fe_2O_3$, and obtained in the same way.

When ammonia iron alum is placed in contact with finely divided silver in considerable excess in a tightly closed vial, the solution, after a few days' standing, with frequent shaking acquires a deep red colour. This may last for a week or more. The solution then decolourises, and becomes greenish, but still contains abundance of ferric salt. Thus it appears that, although silver has a powerful reducing action on ferric salts, the action is self-limited, and ceases long before complete reduction is effected, for, after many weeks' contact in a closed vial, there are abundant indications of the presence of ferric salt, although silver has been present in large excess.

M. Carey Lea.

ESTIMATION OF OXYGEN.

[London and Provincial Photographic Association.]

In bringing before you such an out-of-the-way subject as the estimation of oxygen, we are chiefly influenced by the hope that it may be of some use to the large section of photographers who practise lantern work, and who use oxygen compressed in cylinders. That this oxygen may be of more than doubtful purity, was pointed out recently by Mr. Hepworth in a letter to *Nature*, and who had obtained results showing from 5 to 45 per cent. of impurity, which has also been the experience of one of us. We need hardly point out that not only has the amount of impurity present in oxygen a very bad effect on the light given out—when used for producing the lime-light—by cooling the flame, but also on the pocket of the lanternist, by his having to use more gas than he would otherwise have to do if the oxygen were pure.

Various Ways of Estimating Oxygen.

To estimate oxygen very accurately, complex apparatus such as Bunsen's, or modifications thereof, in which mercury is the trapping fluid, must be used, but for ordinary purposes Hempel's, or some such apparatus, in which water is the trapping fluid, may be employed.

The estimation of oxygen in a mixture may be carried out in several ways, of which the two most important are, first, by mixing the gas to be analysed with an excess of hydrogen, exploding the mixture by means of a spark from an induction coil, and measuring the decrease in volume. One-third of the contraction, due to the combination of the oxygen with the hydrogen, will be the volume of oxygen present in the original gas. Second, by bringing the gas to be tested into contact with a solution of pyrogallic acid and caustic potash, and noting the decrease in volume which occurs. The diminution in volume gives the amount of oxygen present in the original mixture, and the unabsorbed part the diluent.

We have chosen the latter method as being the most convenient and easy of manipulation, and it possesses the advantage that both pyro and caustic potash are well known to, and most probably on the shelves of all practical photographers.

We have bought a Hempel's apparatus to show how oxygen would be analysed in a chemical laboratory if the greatest accuracy were not needed, and also a modification designed for the use of lanternists.

The Hempel Method.

The Hempel consists of two parts—the one the measuring apparatus, and the other the absorption bulbs. The former consists simply of two glass tubes about three-quarters of an inch in diameter and eighteen inches long, connected together at their lower ends by india-rubber tubing. One tube is open at the top, and the other is closed by a glass stopcock and graduated. To start an analysis, the graduated tube is filled completely with water; when connexion has been made with a supply of gas, the stopcock is opened, and as much gas as necessary is introduced; the communication is then cut off, and the level is made the same in both tubes and the volume read. The object of making the level of the water in both the same is to avoid reducing to constant pressure. The graduated tube is then connected by means of capillary tubes to the absorption apparatus, which consists of two bulbs, joined together, one terminating in a capillary U tube. The bulb nearest the graduated tube, is filled with a solution of pyro and caustic potash in water. All the capillary connecting tubes and indiarubber tubes must be filled with water in order to eliminate errors. The following is the best proportion of pyro and caustic potash for the absorbing solution:—

Pyro	1 ounce.
Caustic potash	24 ounces.
Water	20 „

The gas under analysis, after being passed into the bulb, is brought into intimate and renewed contact with the alkaline pyro by constant shaking, three to five minutes being generally sufficient. The gas is then drawn back into the burette, and again measured as before; the decrease in volume represents the amount of oxygen in the gas. In order to make sure that no oxygen is left unabsorbed, it is again passed into the pipette, and if there is no decrease in volume on again measuring, the analysis is complete.

A Simple Plan of Estimation.

The other piece of apparatus we have here is of very simple construction, and could be procured at a small cost; or, if you have practised glass-blowing from the practical lessons given you by one of us, you could easily make it for yourselves. It consists of a tube, three-quarters of an inch in diameter, eighteen to twenty inches long, and drawn out at each end. To each end is attached a short length of indiarubber tubing, provided with a pinchcock. Beyond the lower pinchcock is another piece of glass tubing, which enables the tube of large diameter to be connected to a funnel, or other containing vessel, by means of indiarubber tubing of suitable size.

In order to use it, the tube is first completely filled with water

* The statement in the new *Encyclopédie Chimique* that heat is required and that the metal separates again on cooling (tome iii., cahier 15, p. 218) appears to be incorrect.

Connexion is then made with the vessel containing the gas to be analysed. Both pinchcocks are pressed, the one to allow the gas to enter, and the other to allow the water to escape. The lower end might, with advantage, be plunged into a tumbler or beaker full of water. As soon as the tube is full of gas, both pinchcocks are allowed to close the tubes, and the supply of gas disconnected. The funnel, or other convenient vessel containing the supply of pyro solution, is now, by means of the indiarubber tubing, connected, making sure that the tubing is completely filled with liquid. The bottom pinchcock is now opened, and if the reservoir of pyro be raised, a sufficient pressure will be obtained to force some of the pyro solution into the tube containing the gas to be tested. At once absorption of oxygen will commence; and, in order to facilitate this by increasing the surface of the liquid, the tube may be tilted or shaken, the pinchcock being opened occasionally in order to prevent too great a reduction of pressure inside, and thus cause a probable leakage of air into the apparatus, but this danger can be removed if the indiarubber tubing is wired on. When the absorption is complete, place the vessel of pyro, with the pinchcock open, so that the level of the liquid is the same in both tube and reservoir.

The tube must either have been graduated before, or, if only a few measurements are to be made, and the operator does not care to go to that trouble, the volume of the tube can be ascertained by completely filling it and measuring the contents in an ordinary graduated measure, then turn the tube upside down and fill with water up to the mark occupied by the unabsorbed gas.

The percentage of diluent can be easily obtained by dividing the volume of the residue in drachms or cubic centimetres by the original volume and multiplying by 100. Thus, suppose the volume of the unabsorbed gas to be 17 drachms or c.c., and the volume of gas operated on 80 drachms or c.c., then the percentage of diluent will be $\frac{17}{80} \times 100 = 1700 \div 80 = 21{\cdot}25$.

There are one or two precautions to be observed in using pyro and potash. First, it is no use to try and absorb oxygen with a weak solution of pyro; it must be about the strength given above. Secondly, it must not be used too often, or left exposed to the atmosphere, as after a time it begins to give off carbon monoxide, which would seriously vitiate the result of the analysis.

Results of Analyses.

The results of the analyses of various samples of oxygen, which have been obtained during the last fortnight are as follows:—

	N %	O %	
No. 1	15·5	84·5	Same maker at different times.
No. 2	39·4	60·6	
No. 3	43·1	56·9	
No. 4	43·8	56·2	
No. 5	25·4	74·6	
No. 6	7·0	93·0	Another maker.
No. 7	3·8	96·2	Made from chlorate and M_2O_2 at R.N.C. for limelight.

In conclusion, we hope that every one who uses a limelight, for whatever purpose it may be, will, if he wishes the light to be at its best and constant, take the small amount of trouble that is necessary in order to master the few details, so as to enable him to test the gas sent in, and, if it should contain more than a certain percentage of diluent, either return the gas as unsatisfactory or demand a reduction in the price, as, under these circumstances, not only is the article supplied bad, but apt to cause the user to acquire a bad reputation, which is of far greater importance than the cost of the gas.

We trust that the time will soon come when makers will guarantee that the percentage of purity is between certain limits, and then, if it is not, a remedy can be easily obtained. Salts of the precious metals are usually guaranteed of a certain percentage of purity, and, if any one took the trouble to analyse them, and found they were not so, we think he would be perfectly justified in seeking redress in a law-court. To issue as oxygen a mixture of air and oxygen, so that it contains thirty or forty per cent. of an inert and flame-cooling gas, is no better than the act of a publican who adds water to his beer and dilutes his whisky below what is allowed by Act of Parliament, and sells them as unadulterated. The one is certainly as much of a fraud as is the other.

F. B. Grundy and A. Haddon.

DISHES AND TRAYS.

It is not an impossible task, the repair of a broken porcelain dish; it must be a small one indeed that is not worth the trouble. A careless operator broke clean off one corner, the spout of course, of a 24×20 dish; this was very satisfactorily repaired with "coaguline." The parts should be carefully cleansed and hot, the hot cement applied to the edges, the latter then brought together, and while so held a second pair of hands may attach strips of gummed paper along the line of fracture; the paper, contracting as it dries, holds the piece very firmly at the most critical period, *during the drying of the cement*. To make the repair more certain and reliable and to prevent a mishap during use, the *outside* of the dish was at this corner taking in a good four inches outside the breakage, covered with a piece of stout linen, the same being applied with a *strong* solution of shellac in methylated spirit. The dish has, since this repair was effected, gone through some eight years of use.

For a breakage right across I should still use coaguline carefully, applied hot, the edges to be held with gummed paper. By the time union is considered perfect we can consider what best to do to make assurance doubly sure. If the dish were 15×12 or so, I should apply *broad tape* saturated with the shellac over the outside bottom and sides of the dish, putting it on in the same way as upholsterers affix the broad tapes to the seats of chairs, then all round outside, covering the *ends* of the cross pieces with a long strip of tape. I rather think this would hold the thing together. If preferred, we can, after cementing the pieces and bringing them together and drying, get made a shallow wooden tray, well put together at the corners, and big enough to hold the tray with a space of half an inch or so all round. Give it a good coating of the shellac varnish, and, when this is dry, mix plaster of Paris to a creamy consistence with water, adding the plaster *to the water*. As this stuff sets very quickly, we must make a rough estimate of the quantity required in order not to run short. The creamy plaster is run into the wooden tray, which it should cover to the depth of at least an inch; now lower the dish into the tray, one side or end a little in advance of the other, and, if enough of plaster has been mixed, the sides and ends will be comfortably filled, any excess running over, the plaster to be nicely bevelled off, and the whole allowed to set and get thoroughly hard. When quite set (and if made hot) it will be well to apply a good coating of the shellac varnish; the plaster, if dry, will absorb a good lot of this, and will be all the better for it.

On one occasion, while repairing a rather small dish in this way, I well soaped the bottom of the dish before dipping, so that, when quite set and hard, the dish was readily removed from the plaster bed; this latter was then well dried, and received three coatings of shellac varnish, and it made a very useful dish.

I have for some time now used almost exclusively *wooden* trays, three of which, measuring respectively 20×16, 22×18, 24×20, cost 16s., well made, dovetailed, and screwed. I gave them three coats each inside and out of the shellac varnish, and finally the insides received two coats of *enamel* paint, *bath* enamel preferred. They are carefully sponged out after use, and wiped with a damp leather. They are light, easy, and comfortable to handle, take up little space, and are likely to last for years.

J. Pike.

WINTER PHOTOGRAPHY.

Many of our amateurs (says *Anthony's Bulletin*) lay aside camera and tripod with the advent of the winter months, confining themselves to lantern work, bromide printing, enlarging, and the various other especially winter branches of the art. To these we would say, You are making a mistake; you are closing your eyes to Nature in some of her grandest forms; keen winds, Jack Frost, and even snow and ice, are well worth facing for the prizes that she offers at this time of the year.

When the leaves first begin to turn, and the green still predominates—enlivened here and there with a patch of yellow or red, or with edges just tinted, make an exposure, and see the increase of detail in the foliage that the picture will show. Are you near the water, where the rich warm browns of the sedge stand out in strong contrast to the still green foliage and grass? It is at these times more than ever that we long for the photographic millennium, a true reproduction of colour, obtainable with the same ease as the present monochrome results.

At this season of the year are visible huge banks of fleecy and ominous-looking clouds, infrequent at other times. Just before sunset these cloud effects are particularly fine, masses of brilliant colours, light and shade, that produce most desirable cloud negatives for printing in with such pictures as need it, and there are few that cannot be improved by treatment in this way.

There is a treatment of grounds known to landscape gardeners as "planting for winter effect" or "winter landscape." It consists in breaking the sky line or foreground with a judicious mixture of evergreen and deciduous trees. A landscape properly selected to produce an effect of this kind in the picture will be found a task worthy of the

skill of the artist. Bold, heavy masses of light and shade may in this way be utilised, while the delicate tracing of the leafless branches against the sky serves to remove what might otherwise prove too sombre an effect. Allow the white trunk of a silver birch to stand out sharply against some dark object in the background, while its upper branches are changed to dark slender threads against the high light of the sky.

It has fallen to the lot of many of us after a heavy snowfall to try an exposure, tempted by the glistening drops and icicles, the bright sunlight reflected with dazzling brightness from the snow-covered ground, and the trees overladen and bending far down under the weight of their burden. The first time we wait with impatience for the negative, but what a disappointment the first print brings us. "Nothing, with a few black specks floating aimlessly around in it," was a disgusted verdict once rendered by a disappointed worker, and one which seemed to describe the result remarkably well. Unfortunately, this is too often the case, and yet there is no good reason why it should be. Remember, that in a composition of any kind balance is needed and conditions must be carefully considered. It is unreasonable to expect that detail in the shadows can be obtained from an exposure sufficiently short to properly render the intense high lights of such a picture. Any object to appear clearly against such a background must be more or less in the nature of a half-tone or shadow, and to secure detail in it under such conditions without hopelessly over-exposing the high lights is an impossibility.

On the other hand, if the high lights are over-exposed and detail obtained in the shadows, these same high lights will be weak in the negative and appear as greys in the finished print. Now, grey snow is somewhat of an anomaly, save in our cities, when it is frequently black, and a picture representing it as such in bright sunlight is manifestly an absurdity and a failure.

It is by the careful study of our failures that we learn more than by our successes. Success must never come to be looked on as synonymous with perfection. As our experience grows, our ideal must expand with it. To-day's success must mean only something better than yesterday's attempts, otherwise we have reached the egotistical stage, and no sooner do we become thus perfect than we begin to retrograde.

But *revenons à nos moutons* and let us see what our first snow scene failure has taught us. Evidently strong sunlight is not permissible, and the balance between high light and shadow must be perfectly observed, letting the half tones and the blacks predominate in such a way as to remove that patchy unfinished look. To do this carefully they must be connected rather than isolated, and here Dame Nature steps in and beckons us to the recesses of her woods, by the side of some sluggish brook, rebelling against and half breaking its frozen bonds, with glimpses of mirror-like surfaces reflecting the overhanging boughs of brush and tree heavily laden with their ermine coat, yet preserving their graceful outlines, their under sides coming out sharp and distinct, as black lace upon a foamy surface.

That gnarled and knotted tree trunk, half covered in its white mantle, gives the requisite boldness to the right in the foreground, and serves to accentuate the feathery detail of the undergrowth, while the patches of dwarf hemlock, cropping up everywhere through the snow, break what would otherwise be a foreground of monotonous white.

Select a cloudy day for a picture of this kind, stop the lens down well, and let the exposure be ample, say, three seconds with *f*-32. It will be found advisable to reduce the amount of sky to a small proportion, that seen through the branches being all-sufficient. Grey snow, under circumstances such as these, will not be anomalous, and thus the correct rendering of the lights and shades is rendered easier.

There is something exhilarating about such picture-taking as this: the crisp biting air, of wonderful clearness after the storm, the almost absolute stillness, even footfalls are muffled in the snow, and the occasional sharp snap of a twig, breaks on the ear almost like a pistol shot. Warm clothing, thick gloves and rubber boots are necessaries which make all the difference between discomfort and a sense of defying the elements, and keeping dry and warm withal.

If you can find some bold masses of rock, with summits snow-covered and sides only slightly touched here and there, you will have an excellent opportunity for marked contrasts. Secure a surface which the water from the melting snow has darkened, and aim to secure the effect of looking into the sombre and unlighted depths of a forest from some point where a momentary rift in the vegetation overhead only serves to accentuate the gloom beyond. Be careful to avoid a few dark spots of rock cropping out from a snow-covered mass, otherwise the patchy effect will appear again, and the whole picture will be marred.

Let the summit be covered and the snow, patchy if you will, upon the dark background of the rock, or the few remaining leaves of some vine or creeper, together with its tendrils standing out in bold relief with the snow which they have retained upon them.

Isn't it nearly time that camera was unpacked, those rubber boots looked up, and some spot in the country (you need not go far to find what you want, especially if you live in this city) decided upon, where the next day off is to be spent? Try it once, remember the cautions we have given you, and see if the reward is not meet for the deed.

REVERSED NEGATIVES—AMIDOL.

There are some subjects touched on in the last issue of The British Journal of Photography on which I should like to state my experience. The question of reversed negatives is one that is bound to come to the front now that carbon printing and photo-engraving are becoming such important processes in the reproduction of negatives. I am very inclined to think that celluloid films will much facilitate the production of these reversals. I tried last summer printing on ordinary silver paper through celluloid negatives, and found the falling off of definition exceedingly small: indeed, quite insufficient for the purpose I had in view, viz., to produce a soft, slightly out-of-focus effect. Should, however, it be necessary for some reproduction processes that there should be *no falling* off of definition, it is easily accomplished by taking the negative through the film; if the lens is fairly stopped down, the loss of focus imperceptible, and, in any case, it only requires a slight turn of the focussing screw to set things right. I found the films perfectly free from blemishes, and the backs without the slightest traces of emulsion on them. I think there was a slight falling off in rapidity, and the image came up a little slower in development. The resulting negative could be printed as a reversed negative with absolute sharpness, or as an ordinary one with very little falling off in definition. There is another advantage in exposing films in this way, that there is no danger of the sensitive surface getting scratched by the shutter, as sometimes occurs, and, when printed on silver paper, there is no danger of staining the film.

I read with pleasure the debate on amidol, and particularly Mr. Dresser's experience, as he is such an authority on instantaneous exposures. He does not, however, say whether the formula he uses for these exposures is the same as the one he gives for bromide work. My experience with amidol, used according to the formula issued with it, does not agree with his. I find that amidol gives less detail than eikonogen, and altogether a harder negative; density comes quicker, but with patience I get as much with eikonogen.

George Mansfield.

NOTES ON SILVER CHLORIDES.

[American Journal of Science.]

Experiments made by J. J. Acworth* at the suggestion of E. Wiedeman showed that by heating silver chloride to a temperature of 220° C. it passes into a modification that was insensitive to light.

I think this change may be due to the complete driving off of moisture. Abney showed by a well-known experiment that silver chloride, when exposed perfectly dry in vacuo in a glass tube, was totally unaffected by light; but I have shown that fused silver chloride, poured into petroleum and placed in the sunlight without removing it from the liquid, was instantly darkened.

These three experiments taken together lead to the following conclusions:—

1. Silver chloride dry and perfectly isolated is insensitive to light. (Abney's experiment.)

2. The presence of atmospheric air does not restore the sensitiveness if the silver chloride has been absolutely dehydrated at 220° C. (Acworth's experiment.)

3. The presence of oxygen is not necessary or important for the darkening of silver chloride. The presence of moisture is not essential; its place may be taken by another substance capable of taking up chlorine. This follows from my experiment above mentioned.

There is no doubt that silver chloride retains the last portion of water with great obstinacy. I have frequently tried to dry silver chloride in hot air, so that it should lose nothing further by fusion, but never quite succeeded. There is always a loss, which may be roughly taken at half a milligramme, and from thence upwards to nearly one milligramme, in a gramme. When the water is thoroughly driven off, it is probable that the silver chloride is left in an insensitive condition. Acworth's experiments seem to show this.

So long as moisture is present the molecule of silver chloride easily

* *Wied. Referate*, 1890, p. 515.

breaks up, not merely by the action of light, but by the application of any form of energy. The part played by moisture in chlorine reactions is somewhat remarkable. It has been lately stated that absolutely dry chlorine has no action upon copper foil. As soon as a trace of moisture is introduced, energetic action sets in.

M. Carey Lea.

AMIDOL.

[Putney Photographic Society.]

Thursday, January 12.—Mr. L. E. Morgan, representing Messrs. Fuerst Bros., gave a lecture and demonstration on *Development with Amidol*. In a short preface Mr. Morgan claimed for amidol the following important advantages:—Good keeping qualities in its dry state, ready solubility, cleanliness during manipulation, great energy in bringing out detail without the addition of free alkali, power to give the necessary density, and absence of stain, even in prolonged development. Comparing amidol with other developers, he said that experienced workers might perhaps be prejudiced against it, as practically being a one-solution developer; they might think they were sacrificing some of the power which they possessed in older developers of readily modifying the proportions of the constituent parts to meet the requirements of varying subjects and of over or under-exposure. He would, however, prove that amidol also was quite capable of such modification—in cases of over-exposure, by using a weak solution and an extra quantity of bromide; for under-exposure, a strong solution and only a small quantity of the bromide. For uncertain exposures it was desirable to begin with a weak developer, and gradually increase the strength as occasion required. The ordinary stock solution (2 per cent.) is made up as follows:—

Amidol	10 grains.
Sodium sulphite, cryst.	100 ,,
Water	1 ounce.

This solution will keep well in full bottles, well corked, and although after a time it may discolour, it does not lose its developing power to any extent, nor does it stain the negatives or prints in any way. For use, dilute the stock solution with three to four times its bulk of water, 5 to 20 drops of a 10 per cent. solution of bromide of potassium being added for each ounce of stock solution. This diluted solution may be used successively four or five times without losing developing power to any extent. For his own use Mr. Morgan preferred to keep the following stock solution, which will keep for any length of time:—

Sodium sulphite, cryst.	1 ounce.
Water	20 ounces.

For use, 8 to 10 grains of amidol powder, and a few drops of potassium bromide (1 : 10) are added to 4 ounces of the above solution.

Mr. Morgan then proceeded to develop a negative which had purposely been given a somewhat short exposure, using the ordinary strength of developer; the image appeared in about thirty seconds, showing full detail in that time, development being allowed to proceed. The necessary density was obtained in about three minutes; the result was a brilliant and soft negative of a good printing quality. As showing the capability of amidol for developing bromide paper, he exposed a piece under a landscape negative and proceeded to develop with a solution of the same strength as that used for the negative. In this case also the result was extremely satisfactory, the tone of the print being very like a good platinotype. No clearing bath was necessary, and the manipulation throughout of the simplest. To prove that amidol is really a good all-round developer, Mr. Morgan proceeded to expose two lantern plates, giving the one an exposure of one minute, and the other six minutes, still using the same strength of developer, but in the latter case with an additional quantity of bromide he produced two very brilliant and satisfactory slides.

It was apparent as the demonstration proceeded that the members were agreeably surprised at the powers of amidol, particularly as the experiences of some of them with other developers recently introduced with great flourish of trumpets were of a disappointing nature, only confirming them in their preference for their old and tried friend, pyro. Mr. Morgan brought several bromide prints for inspection, but a portrait of a native of Morocco, a very fine enlargement by Mr. Gorin, and developed by him with amidol, showed most strongly that good results can be obtained with it without previous experience by an amateur, this having been Mr. Gorin's first attempt with the new developer.

A hearty vote of thanks to Mr. Morgan concluded an enjoyable and instructive evening.

[Kensington and Bayswater Photographic Society.]

Monday, January 16.—Mr. Morgan gave a demonstration on development of negatives, bromide paper, and lantern slides, by that chemical. He showed bromide prints from one negative which had received exposures varying from one minute to ten minutes, each of which was considered a good print. The leading points he claimed for this developer are its freedom from producing stain, when dissolved, either upon the hands or the plate or paper, though the crystals themselves, if allowed to remain in contact with the hands, will produce a brown stain.

Mr. H. E. Davis (of the Camera Club), who has largely experimented with the new developer, especially for lantern slides, gave his new formula for development (for warm tones only). He stated that he considered the ordinary formula used for the development of lantern plates by amidol made a too active developer, veiling the plate before development was complete. His practice is to use a *strong* developer *well restrained*. Thus:—

Amidol	160 grains.
Metabisulphite of potassium	2 ounces.
Water up to	20 ,,

This is the stock solution. Of this take half an ounce, and add to it 1 ounce of a 10 per cent. solution of bromide of ammonium, and water up to 2¾ ounces, then add a quarter of an ounce of a 10 per cent. solution of carbonate of potassium. This will develop twelve or fourteen lantern plates.

The following are the official instructions for the use of amidol:—

I.—*Concentrated Stock Solution.*

Water	7 ounces.
Sodium sulphite, cryst., pure	1½ ,,
Amidol	60 grains.

May be kept for a long time in full bottles well corked.

For use, mix one ounce of this concentrated solution with three ounces of water, and according to the make of the plates, add a small quantity, at most twenty drops, of potassium bromide (1 : 10). In this state the solution may be used four or five times successively, without much loss of developing power, but it is not advisable to leave the developer standing too long, nor to prepare more of it than necessary for the work in hand.

For landscapes, or strongly lighted subjects, the developer may be employed in a still more diluted form.

II.—*Two-Solution Developer.*

Water	20 ounces.
Sodium sulphite, cryst., pure	1 ounce.

This solution will keep for any length of time.

For use, eight to ten grains of amidol powder, and a few drops of potassium bromide (1 : 10) are added to four ounces of the above solution. To be saved the trouble of frequent weighings, keep a little horn or bone spoon for measuring the required quantity of amidol. To retard development, use a ten per cent. solution of bromide, and to accelerate it add a twenty per cent. solution of sodium sulphite. On very hot days, or for plates inclined to fog, it is recommended to add a few drops of citric acid (1 : 10). With normal exposures the image should appear in from eight to ten seconds, and be fully developed in about four minutes. Over-exposure is recognised by the immediate appearance of the picture, in all its details, as soon as the developer is applied, the deep shadows becoming veiled, and all more or less fogged. For over-exposure it is necessary to use a weak developer, and to increase very largely the quantity of bromide, using, in extreme cases, even up to one-quarter bulk of the amidol solution. In every case of unknown exposure it is advisable to begin with a weak developer, or one which has done duty before, and increase the strength, when, from first indications, it is found safe to do so. For under-exposures, a strong developer, or a large addition of the sulphite is recommended, and these also help to give greater density, which end may likewise be secured by prolonging the development. The degree of intensity is best judged of by transmitted light, remembering always to make allowance for reduction in the fixing process.

III.—*Special Developers.*

Solution A.

Water	20 ounces.
Potassium metabisulphite	2 ,,
Amidol	1 ounce.

This solution will keep for a very long time if well corked.

Solution B.

Water	20 ounces.
Soda crystals	2 ,,

Solution C.

Water	20 ounces.
Sodium sulphite, cryst., pure	4 ,,

Results similar to pyro may be obtained with

Solution A	10 parts.
,, B	6–10 ,,
Water	70 ,,
Bromide (1 : 10)	3 ,,

But this formula may be considerably modified, according to requirements; it is not, however, advisable to increase the quantity of alkali, for fear of inducing fog.

For over-exposed plates, add the solution B in the above formula little by little, until the desired effect is obtained, never exceeding the amount above prescribed.

Images of a softer character are obtained as follows:—

Solution A	10 parts.
,, B	20–40 ,,
Water	70 ,,
Bromide (1 : 10)	½–¾ part.

IV.—*Separate Developer.*

Solution D.

Water	20 ounces.
Sodium sulphite, pure cryst.	¾ ounce.
Amidol	2 ounces.

This solution keeps colourless for a long time in full and air-tight vessels. When opened it goes from yellow to red, which, however, does not affect the developing power, or colouration of plates.

Solution C.

Water	20 ounces.
Sodium sulphite, pure cryst.	4 ,,

For use take—

Solution D	5 parts.
Water	50–70 ,,
Solution C	20–30 ,,
Bromide (1:10)	1½ ,,

This formula also has the advantage, by gradually adding solution C, of controlling development up to the point desired, which is specially important for over-exposed plates.

As the image loses on fixing it is recommended to develop more strongly.

For Bromide Paper.

Both for prints and enlargements either of the above formulæ may be used, and the freedom from stains will prove of great advantage. With diluted solutions clear grey tones are obtained.

For Chloride Plates and Lantern Slides.

Transparencies of the blackest tones are developed with:—

Water	20 ounces.
Sodium sulphite, cryst., pure	1 ounce.
Amidol	40 grains.

Warmer tones are obtained through longer exposure and the liberal addition of bromide, even up to one ounce in the four ounce developer.

THE WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY'S EXHIBITION.

This Society held its first Exhibition (members' work only) on Thursday 12th, at the Public Hall, Sidcup. The President, Mr. Andrew Pringle, opened the Exhibition with a short address. Mrs. Pringle then presented medals to winners. Class A—Lantern slides, set of twelve. Any subject. President's silver medal, E. J. Crowe; bronze, Gregor Grant. Class B—Enlargements. Vice-President's silver medal, E. Hawkins; Society's bronze, C. J. Crowe; diploma, G. I. Gill. There were a large number of entries in this class, and a very tough contest. Class C—Set of four prints. Society's silver medal, E. Hawkins; bronze, Gregor Grant. R. H. Pickell was awarded an extra special diploma for photograph of lightning flash taken June last. Class D—Not sufficient entries for an award. E. Hawkins very highly commended. The Judges were Messrs. Cembrano, Pringle, and Dresser. The programme of the evening consisted of a good selection of music, with lantern shows at intervals. Slides by Messrs. Carpenter, Edgar Lee, Pringle, Dresser, and members, were shown and much appreciated by audience.

ENLARGING APPARATUS AND THE ILLUMINANTS FOR SAME.

At the Manchester Photographic Society, on January 12, the President (Mr. Heywood) in the chair, Mr. H. M. Whitefield gave an address on *Enlarging Apparatus and the Illuminants for same.* At the outset he remarked that most of what he had to give the meeting had appeared from time to time in The British Journal of Photography, a source in which nearly all things photographic could be found. Assuming that daylight was generally not available to the bulk of amateurs, his remarks would be confined to artificial lighting of the negative. He passed in review the various methods suggested to obtain this object, most of which he had tried. The plans to obviate the employment of condensers, by rows of gas jets, magnesium wire, diffusion of the light by opal or ground glass, &c., he considered unsatisfactory, as not giving evenness of illumination, and gave uncertainty of exposure. The three-wick lamp, used with a condensing lens, was also faulty for the same reasons.

He considered the limelight the best, both for enlarging and reducing; but, for those who did not care to go in for this illuminant, he highly recommended the "albo-carbon" gaslight, as advocated by Mr. Traill Taylor some years ago. This was an invention to increase the illuminating power of gas for ordinary lighting purposes, and in its simple form consisted of a reservoir above the burner containing a supply of naphthaline, over which the gas passed before reaching the burner, taking up the vapour from the naphthaline, which was very slowly evaporated by the flame of the light itself, the result being a small bright light. To adapt this for working in an enlarging lantern, he added a second burner, placing the two jets one behind the other, with the flat sides towards the condenser. The flames must be separated just sufficient to prevent them joining. This arrangement gave a more solid light than a single burner. The whole of the flame was not required, and he enclosed the burners in a tin box having suitable air inlets at the bottom and a dark chimney at the top, a circular aperture, about three-quarters of an inch in diameter, being made opposite the brightest part of the flame and covered with a piece of glass. He found that the albo-carbon light was very actinic, and the difference in the exposure of a print as compared with that by the limelight was not as great as many might suppose (experiments given showed the advantage of the naphthaline very markedly), and the use of the light no more trouble than an ordinary gaslight.

Mr. Whitefield showed his enlarging lantern, which differed little from the usual form, and explained the necessity of having a condenser large enough to include the whole of negative without using the extreme edges of the lens, and practically demonstrated the working of the lights.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 468.—"Improvements in Lighting Apparatus for use in Photography." S. O. Taylor.—*Dated January* 10, 1893.

No. 614.—"Improvements in Photographic Dark Slides." S. J. Levi, A. J. Jones, and E. Holmes.—*Dated January* 11, 1893.

No. 686.—"Improvements in the Construction of Stereoscopes." W. Middlemiss.—*Dated January* 12, 1893.

No. 741.—"Improvements in and Apparatus for the Manufacture of Films especially intended for the Production of Transparent Films for Photographic purposes." W. H. Walker.—*Dated January* 12, 1893.

PATENTS COMPLETED.

Improvements in Apparatus for Changing and Focussing and Exposing Photographic Plates or Films.

No. 3680. Thomas Edward Heath, Oakbridge, North-road, Cardiff.—*December* 10, 1892.

This invention is intended principally to be used for that class of camera known as hand cameras, but it may be used for others. It enables a large number of plates to be carried in a very small camera, and the plates to be selected and exposed in any required order, and it allows a focussing screen being used when desired, and the focussing to be adjusted either to the picture shown upon the screen, or to an estimated distance, or to what is known as "fixed focus," and it also allows of an approximately equal exposure being given all over the plate, or a greater exposure being given to the foreground than to the sky, and I am enabled to use a rising front and swing back.

In order that my invention may be better understood, I will explain how I should apply it for taking the ordinary "quarter plates," and assume the lens to be a rapid rectilinear of four and a quarter inches equivalent focus. For this size I construct a rectangular camera box, which need only be about six and a half inches long, five and one-eighth inches wide, and seven and a half inches high, and yet it will carry about two dozen plates besides a ground-glass focussing screen. If a lens of longer focus be used the camera box must be longer, but then more plates can be carried. In the upper half of this camera box I have the exposing chamber. I fix a lens to the front wall, and at the back I have a door which is light-tight when closed. Along this exposing chamber travels an exposing frame which is carried by a base plate, which is pierced with a slot so shaped as freely to admit a sensitive plate. The sides and top of the exposing frame are grooved, so as to allow the plate to slide freely in and to hold it approximately in position. The base plate travels in suitable grooves, which extend from end to end on either side at the bottom of the exposing chamber. To the base plate I attach, at the front and at the back, bands of leather or other suitable material which may be stiffened by narrow strips of wood. These leather bands extend to the grooves on either side of the exposing chamber, and slide in them so that all light from the exposing chamber is excluded from the lower half of the camera box. In the lower part of the camera, and extending from very nearly under the back of the lens to nearly to the plane of equivalent focus, I have a store box, which is grooved on either side to hold the plates. For the size under consideration, the store box may be about three and five-eighths inches long, so that it will hold about twenty-four sensitive and one focussing plates. The bottom of the store box has a light-tight door, through which the plates are inserted.

The leather bands which pull the exposing frame to and fro are carried over suitable rollers all round the lower half of the camera box and below the storage box. The end of each band is here secured to a plate, and the two plates can be drawn together by a bolt or otherwise. The plates also carry pointers, which slide in a long slot at the bottom of the camera, and the bottom of the camera may conveniently be formed by doors hinged to each side, and leaving this slot when the doors are closed. Along the slot I have a marked and numbered scale which corresponds with the grooves in the store box, and the scale extends further, and is marked to show the position of the focussing screen. By pulling the pointers backwards or forwards, the exposing frame is moved in a like degree, but in an opposite direction, and thus any required plate can be selected, and if the camera is inverted it will fall into the exposing frame. The camera being then turned on its side, the exposing frame can be moved back to focus position. The ground glass plate can be selected, and the door at the back of the exposing chamber being opened, the picture can be focussed by moving the pointers backwards or forwards, the position of the pointers on the scale is then noted, the door

closed, the ground glass returned, and a sensitive plate inserted, and the pointers moved back to the position noted. This plan of focussing is only convenient when the camera is firmly held upon a stand—when it is held in the hand it is more convenient to use what is known as "fixed focus," or to estimate the distance of the principal object. For this purpose I provide a screw which passes through a bearing in the door at the back of the exposing chamber, which carries on its inner end a flat plate which is adjusted so that it will just make contact with the back of the sensitive plate when the latter is in the plane of "fixed" or equivalent focus, and the screw is screwed home on its bearing—and the distance of the object which is in exact focus when the screw has been moved through one—two three or more revolutions is found by experiment and noted for future guidance. The storage box must not extend so far as to be under the slot of the exposing frame when the latter is at equivalent focus—but below the focussing range must be a plane surface making a light tight joint. It is advisable to blacken about one-eighth of an inch on the top and bottom of the focussing plate, and to keep it in the nearest groove. The front of the camera which carries the lens is made so as to rise when required, sliding up in suitable grooves which may be notched at intervals to permit removal, and it has a circular recess cut in it in which works a thin disc with a drum on the middle to which two cords or wires are attached and wound in opposite directions. The disc can be revolved upon suitable bearings. The cords are carried down to opposite ends of a rocking lever passing freely through holes therein, and thence over guides to the end of a lever or trigger, which is attached at right angles to the rocking lever, and which extends a little below the bottom of the camera front. The cords are tied or made fast to the trigger in any suitable manner. I have a spring which engages in suitable catches to prevent the trigger being accidentally pulled over. The trigger may be pulled over by the finger or by a spring, or elastic band for rapid exposures. The disc is perforated, so that when the trigger is pulled fully to one side or fully to the other side the lens is completely covered, but between these points it is more or less open, and upon one side of the disc I shape the perforation so that the exposure is approximately equal all over the plate, whilst on the other side the perforation is so shaped as to give more exposure to the foreground than to the sky. If one side of the disc has been in use, and it is desired to use the other side—and the trigger is fully over on one side—the over is held firmly and the cords are untied, and the trigger can then be pulled disc (the cords sliding through the holes). Then the cords are pulled tight and again secured to the end of the trigger, when it will be found that the other half of the disc is now in use. There are suitable stops in connexion with the rocking lever or trigger which prevent its ever pulling the disc more than half a revolution.

The exposing frame may be attached to the base plate by suitable springs at each side, which normally keep it at right angles thereto, but allow of the exposing frame being pulled over to the front or to the back by suitable cords or other devices. I may have a set screw or other catch to prevent the leather band from moving when required. I have a slot in the top of the camera box with a sleeve attached lined with velvet, through which the diaphragms (which are pierced upon each end of a long flat plate) are let down into the lens, and there may be a loose apron secured to the back of lens to ensure perfect darkness. Films can be used in suitable sheaths as well as plates, and, if desired, plates can be used in sheaths, in which case the storage box will not require grooves, but to be covered at the top except for a slot at each end. The plate in its sheath being raised by a suitable lever, rack, or other device into the exposing frame, and, when used, returned by gravity to the other end. This does not allow the plates to be selected conveniently.

Improvements in or Applicable to Photographic Cameras.

No. 2879. George Howard Cricks, Woodford-green, Essex, and George Alfred Taylor, 53, Norcott-road, Stoke Newington, London. — *December* 17, 1892.

Our invention relates to photographic cameras, and comprises improved means for successively releasing a series of sensitised plates after exposure, and it also comprises an improved shutter.

According to the first part of our invention, the sensitised plates are carried in suitable frames, upon the exterior edges of which are projections designed to pass through slots formed in stops at the front end of the chamber in which the said plates are placed. The plates are pressed forwards towards the stops by a spring, but the slots in the said stops are so placed that the projections upon the frames cannot pass therethrough until the plates are shifted to the required position. In order to effect this movement of the frames carrying the plates, we provide a slide of the same thickness as the plates, and designed to be operated from the exterior of the apparatus.

When one of the frames is moved by this slide to bring its projections opposite to the slots, the spring presses the series of plates forward, the front plate falling into a receptacle designed to receive it.

Our improvements in lens' shutters comprise a sliding frame carrying the plate or diaphragm for closing the aperture of the lens. This sliding frame is normally retained with the shutter in a closed position by means of a spring, and is opened for the exposure of a plate by means of a rotating cam operated by clock mechanism, and arranged in conjunction with an escapement in such a manner that when the cam is released by the escapement it will make half a revolution to open the shutter, the closing thereof being effected by the spring. In conjunction with the cam, we provide a stop which serves to arrest the rotation of the cam when the shutter is open in order to enable the said shutter to be used for time exposures.

Improved Automatic Lock or Spring Catch for Folding Camera Tripod Stands.

No. 3226. Alexander Birnie, 118, Perth-road, Dundee, Forfar, N.B.—*December* 17, 1892.

This invention relates to folding tripod stands for cameras, its object being to retain the parts of each leg securely and firmly in position when unfolded for use, and also to allow of the said legs being readily folded up when desired.

In carrying out my invention I employ an automatic lock or spring catch, consisting essentially of a cross bar in combination with or part of a bent spring of suitable design, the whole being fixed to one section of the leg of the tripod stand. On the other and adjacent section of the leg is fixed a cross bar, with a recess for receiving the releasing knob of the spring when the two parts of the leg are unfolded—that is to say placed in line—the remainder of the spring, when it has passed the recess, springing out and catching the said cross bar.

Improvements in Burners or Jets for the Limelight.

No. 18,836. James Edward Anderson, 9, Crawford-passage, Farringdon-road, and Alfred Wrench, 50, Gray's Inn-road.—*December* 17, 1892.

This invention relates to burners of the kind used in magic lanterns for the production of the limelight. Such burners as hitherto usually constructed are provided with a spindle, upon which the block of lime used with the burner is adapted, to be raised and also rotated, and in some cases such burners are adapted to be adjusted bodily both vertically and laterally relatively to the socket, by means of which the burner is supported upon the supporting pillar, thereby avoiding the necessity of moving the said socket relatively to the pillar.

The means heretofore adopted for adjusting the burner relatively to the said socket have been defective, inasmuch as the vertical adjustment of the burner caused the spindle carrying the lime block to be moved more or less out of a vertical position.

The object of this invention is to provide for effecting the adjustment of the burner without affecting the perpendicularity of the said spindle.

In carrying out the said invention we employ a socket adapted to be fixed to the pillar in the ordinary manner, and having its upper end screw-threaded and provided with a nut. The burner proper is carried by a second socket, which slides upon the first-mentioned socket, and is acted upon by the said nut, a spring being placed between the second socket and the fixed socket in such a manner that when the nut is turned in one direction the burner will be moved downwards against the pressure of the said spring, and that when moved in the reverse direction the spring will raise the burner to keep the second socket in contact with the nut.

To effect the lateral movements of the burner, the rear side of a collar upon the second socket is provided with gear-teeth, with which a pinion carried in bearings upon the fixed socket is designed to engage, the said pinion having a knob or handle for operating it.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 23	Camera Club	Charing Cross-road, W.C.
,, 23	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 23	Lantern Society	20, Hanover-square.
,, 23	North Middlesex	Jubilee House, Hornsey-road, N.
,, 23	Putney	Boys' Gymnasium, Charlwood-road.
,, 23	Richmond	Greyhound Hotel.
,, 24	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 24	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 24	Hackney	206, Mare-street, Hackney.
,, 24	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 24	Paisley	9, Gauze-street, Paisley.
,, 25	Bath	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 25	Burnley	Bank Chambers, Hargreaves-street.
,, 25	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 25	Southport	The Studio, 15, Cambridge-arcade.
,, 25	Stockport	Mechanics' Institute, Stockport.
,, 26	Camera Club	Charing Cross-road, W.C.
,, 26	Glossop Dale	
,, 26	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 26	Hull	71, Prospect-street, Hull.
,, 26	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 26	Liverpool Amateur	Percy-buildings, Eberle-street.
,, 26	London and Provincial	Champion Hotel, 15, Aldersgate-st
,, 26	Oldham	The Lyceum, Union-street, Oldham.
,, 27	Cardiff	
,, 27	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 27	Holborn	
,, 27	Maidstone	"The Palace," Maidstone.
,, 27	Swansea	Tenby Hotel, Swansea.
,, 27	West London	Chiswick School of Art, Chiswick.
,, 28	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

January 12,—Mr. J. Hay Taylor in the chair.

Angle of View.

Mr. P. Everitt criticised the rule for finding the angle of view included on a given sized plate which Mr. Haddon states in an article appearing in the current Almanac. The rule is, with a given plate, to take its longest dimension, divide it by the focus of the lens, seek the corresponding or the nearest corresponding tangent, read off the arc, double, and that will give the angle included on the plate. He (Mr. Everitt) thought that Mr. A. Haddon was not altogether correct, as the angle would be determined by the centre of vision on the plate. Mr. Haddon should have taken the point of intersection nearer the margin. According to his (Mr. Everitt's) idea the rule should be to measure the furthest focus from the optical centre, divide by the focus of the lens, and then seek the nearest tangent and read off.

Mr. W. E. Debenham pointed out that the angle varied with the position of the plate in relation to the axis of the lens, hence he thought both Mr. Everitt and Mr. Haddon right.

Mr. HADDON maintained that the rule he had given was the correct one, and after some further discussion the subject dropped on the understanding that it would be brought up again.

THE ESTIMATION OF OXYGEN GAS.

Mr. HADDON read a paper, by himself and Mr. Grundy (of the Royal Naval College, Greenwich), on this subject (see page 39). At its conclusion, Mr. Haddon remarked, in reference to the tabulated percentages given, that, if one took oxygen diluted with only five per cent. of oxygen and mixed it with its own volume of atmospheric air, a result would be obtained just about the mean of Nos. 2, 3, and 4 in the table. A practical demonstration by the Hempel method, as described in the paper, was then given, the sample of oxygen tested being found to contain 6·9 per cent. of nitrogen, the oxygen being considered a very good sample. Another sample was then tested by the second method described in the paper, and found to contain 46·8 per cent. of nitrogen. Mr. Haddon claimed for both tests that they enabled one to estimate the purity of oxygen to within one or two points of its true value.

Mr. J. B. SPRAGE said that the tests used as technical analyses were all that could be desired. As regards the Hempel method he used an extra bulb, so that the atmosphere did not get in contact with the gas.

Mr. T. E. FRESHWATER always understood that oxygen made from chlorate of potash was much better than that made from common air, and gave a great deal more light. People who used compressed oxygen in optical entertainments often found it necessary to increase the pressure nearly double on account of its admixture with atmospheric air. There was a question of price, of course, as lanternists who could get a gas for a penny or three halfpence a foot would not use the chlorate of potash gas at a much higher price. Chlorate of potash fluctuated so much in cost that some oxygen-makers found that it made as much as 100*l.* difference to them in the course of a season, though there was no gas to come up to that made in an ordinary retort over a fire and carried into a bag. For experimental purposes, photographic or otherwise, if they did not mind the trouble of making and washing the gas, they would get better results with the chlorate gas than with that in cylinders; or if people did not care to prepare it, and would pay a little more for the gas, they would find it a very great advantage. It was remarked that with the Association's lantern people often said that they got a beautiful light. This was a great deal to do with the gas they used, which was a chlorate gas. He would like to ask Mr. Haddon the loss in percentage of light when using oxygen containing forty-six per cent. of nitrogen as compared with a gas only containing six per cent.?

Mr. HADDON had not studied that subject, but the light would certainly be very much inferior where the smaller quantity of oxygen was present; the nitrogen, of course, also pulled down the temperature.

Mr. F. A. BRIDGE had never tested oxygen but once, and that accidentally. He always used it for enlargements, drawing it from a gas-holder, the gas being prepared by the chlorate method. He was making some enlargements when his gas ran short, so that he refilled his holder from a cylinder of gas which he happened to have by him. He gave subsequent enlargements the same exposures as he had already made, but he found, upon development, that they were much under-exposed.

Mr. FRESHWATER asked if oxygen deteriorated by being kept in iron cylinders?

Mr. HADDON said, No. He also hoped that members would not run away with the idea that oxygen, kept for some time, would change into nitrogen.

Mr. THOMAS BOLAS said that all lanternists were indebted to Messrs. Haddon and Grundy for their paper and demonstration. The methods of testing were simple enough to any one who had had practice in handling gas apparatus, although, perhaps, people unaccustomed to that work might make failures in connecting. They could always verify their results by analysing samples of air.

In reply to a question from the CHAIRMAN,

Mr. HADDON said that both the samples of gas that Mr. Grundy and himself had analysed that evening were commercial samples. He might point out that they had checked the accuracy of the apparatus by analysing air with it, and it came out as containing twenty-one per cent. of oxygen. In reply to a question from Mr. BOLAS, he said that the chlorate gas could be got even purer than three per cent. of nitrogen.

Mr. BOLAS observed that there was, then, no excuse for the commercial maker in sending out oxygen with a higher proportion of nitrogen.

Mr. HADDON said the proportion of the latter should never ever exceed five or six per cent.

At the conclusion of the discussion a vote of thanks was passed to Mr. Haddon and Mr. Grundy.

Mr. Paget (of C. A. Rudowsky & Co.) exhibited samples of mica plates to be employed as supports for carbon transparencies.

Before the meeting closed Mr. J. G. Hudson exhibited and described his "Kolm" magnesium flash-lamp, by which both the intensity and the duration of the light are under the control of the operator, and, several groups of members having been taken, the proceedings terminated.

Hackney Photographic Society.—January 11, Mr. J. Traill Taylor presiding.—Messrs. H. Snowden Ward and W. Harvey were nominated for membership. Mr. Hudson showed a lantern-slide printing arrangement of design originally given by him, and Mr. R. Beckett handed round a Ross Concentric lens. The CHAIRMAN said the chief advantage of this was its extreme flatness of field. From the question box: "If a short and long-focus lens are both suitable for a subject, which is best to use?" The Chairman said for this time of year short focus was *perhaps* the best; at any rate, it would be for copying. Generally, however, a long focus was best for most purposes. Question 2: "Is there any difference in working solio paper in winter or summer?" Answer: "None." Question 3: "Can a bag (gas) that has got stiff be softened?" Answer: "Best to keep bags in fairly warm temperature." No other answer was forthcoming as to how to renew. Question 4: "Is there any advantage in using the Monocle lens?" Mr. HORSLEY HINTON said it depended what result was required. The word wanted properly defining. Mr. Grant thought it suitable for fuzzy pictures. The Chairman, however, did not quite agree. Mr. Dean showed a frame of lantern slides, and asked what was the best means of backing them in place of opal glass? The Chairman advised a mixture of collodion and ordinary spirit varnish. Mr. PAGET (of C. A. Rudowsky & Co.) explained their flash lamp, and stated that to obtain a continuous flame a double ball was necessary. The Chairman then called on Mr. Horsley Hinton for his paper, *Some Contributories to Artistic Effect*. Mr. Hinton at length went into the question of suitable frames, mounts, &c. Photographers nowadays thought too much of size of plate, and were afraid to use knife and scissors enough, so that often what would have been a good picture was spoilt by not taking out objectionable pieces. Among his remarks, he said he was looked upon as a champion of fuzzy effects, but must disclaim it. He could admire a sharply defined picture, and often used a small stop. A very great contributory was reflection. Too much hurry was the case nowadays. The Chairman asked what Mr. Hinton's ideas were about the hand camera. Mr. Hinton said it was to the camera proper what the sketch-book was to the artist. The Chairman said that, with respect to gilt frames, he had some pictures in common gilt frames, and which he preserved by the use of a solution of celluloid in acetone (amyl). In answer to a question raised about lantern slides, Mr. Hinton said the uncontrollable result produced on the screen stood in the way of their always being complete pictures. Mr. Hinton then summed up generally on remarks. He could not give a rule as to when pictures should be broadly treated—experience and judgment must decide that. The idea was to interpret nature as it appeared to impress one. Excursions were generally hurried over. It was more advisable to go, but leave the camera at home until details were fully thought out.

Leytonstone Camera Club.—January 11, Mr. A P. Wire in the chair.—Mr. TOM SYMMONS gave a lecturette, *Small* versus *Large Cameras*. In the larger sizes he thought that there were a number of drawbacks. First, the expense of the outfit; second, cost of materials; third, owing to the weight, the great difficulty in getting about. He, having had experience with large cameras, would not advise any beginner to exceed whole-plate; in fact, if only one camera to be purchased, that should be half-plate. The recent Exhibition had proved that enlargements were to be had from small negatives that were equal, and in some cases better than direct prints, owing to the facility of dodging and getting better effect in the process of enlargement. He next urged the great importance of getting the best of apparatus. In the discussion which followed the general verdict was in favour of small cameras.

Greenwich Photographic Society.—January 4, Mr. G. S. Criswick presided.—The Chairman announced that Admiral Sir R. Vesey Hamilton and Professor Reinold, M.A., had been elected honorary members of the Society by the Committee. Mr. E. J. WALL delivered a lecture on *Isochromatic Photography*. By means of an electric-light spectrum the use and effect of yellow screens of varying density was clearly demonstrated. Mr. Wall illustrated his lecture by many fine pictorial comparisons of his own results in isochromatic and ordinary photography.

Croydon Camera Club.—January 16, the President, Mr. H. Maclean, F.G.S., in the chair.—Upon his proposition, seconded by Mr. B. Gay Wilkinson, the following members were appointed Vice-Presidents:—The Honourable Sidney Herbert, M.P., and Mr. T. F. Edridge, J.P. Mr. Cembrano then proceeded to exhibit his Granada and Alhambra slides. These have already been described in our pages, and allusion has also been made to the happy and attractive items of archæology and history with which this lecturer intersperses his more technical remarks. Respecting the latter, Mr. Cembrano strongly criticised the contention that a slow plate should be used for interiors, he himself having obtained his results upon extra rapid ones. Considering that the views shown were all taken within the space of six winter days, it is obvious that, if slow plates had been employed, whatever other results ensued, only about half the negatives would have been secured in the limited time at the disposal of the operator.

Birmingham Photographic Society.—January 12, Annual Meeting, Sir J. B. Stone (President) in the chair.—The TREASURER reported an exceedingly gratifying condition of the finances of the Society, and drew attention to the fact that more new members had joined the Society in 1892 than in any previous year. The PRESIDENT, in the course of his address, said that the Birmingham Society had made for itself a permanent place among the public bodies of the town, and a foremost place among photographic societies. He pointed out the desirability of each member having some definite object in his work, and instanced the photographic survey of Warwickshire. A prominent Society such as the Birmingham Photographic Society could not, he said, skirk its responsibilities and obligations, and after explaining that, through the medium of sight, information was more readily conveyed than perhaps by any other means, he exhorted the Society to use to the full its power of educating those who had not the means of educating themselves by extensive free exhibitions of pictures, and by widened enterprise in connexion with the lantern entertainments. The following gentlemen were elected officers and members of the Council for 1893:—*President:* Sir J. B. Stone, J.P., F.G.S., F.R.G.S.—*Vice-Presidents:* Messrs. J. J. Button, J. T. Mousley, J. H. Pickard, W. Jones.—*Council:* Messrs. F. S. Goode, A. R. Longmore, E. Underwood, A. J. Leeson, Geo. Thomason, G. E. Miller T. Taylor, E. C. Middleton.—*Treasurer:* Mr. W. Rooke.—*Librarian:* Mr. W. S. Horton.—*Hon. Secretary:* Mr. James Simkins.—*Assistant Secretary:* Mr. Ernest Winn.

Bristol and West of England Photographic Association.—January 13, Annual Meeting.—Mr. H. A. Hood Daniel was re-elected President; Colonel Playfair and Mr. Ed. Brightman, Vice-Presidents; Mr. F. Bligh Bond, Secretary, with Mr. H. A. Hutchinson as Assistant Secretary; and Mr. W. Moline as Treasurer. The existing members of the Council were re-elected.

Shropshire Camera Club.—January 11, Annual General Meeting.—The following officers were appointed:—*President:* Mr. W. W. Naunton.—*Vice-Presidents:* Messrs. J. R. Greatorex, G. Ridlake, W. S. Buddicom, M. J. Harding.—*Council:* Messrs. W. Alltree, W. Bowdler, Dr. Cureton, S. L. Della Porta, R. J. Irwin, W. G. Preece, I. Pyefinch, F. W. Williams.—*Treasurer:* Mr. W. Barson.—*Hon. Secretary:* Mr. Martin J. Harding.—*Assis*

tant Secretary: Mr. W. Heath. A special vote of thanks was passed to Mr. Naunton for his valuable services as Secretary since the formation of the Club, and to Mr. Irwin for his services as lanternist. A Sub-committee was appointed to consider a scheme for acquiring permanent Club rooms, including dark room, and five new members were elected. The meeting was adjourned to the 20th inst. for the purpose of revising rules, &c.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

HALATION, DOUBLE FILMS, AND CHROMATE OF SILVER.

To the EDITOR.

SIR,—I have to thank Mr. Gregor Grant for his reference to Mr. W. K. Burton's article in the ALMANAC for 1888, which I find pretty well corroborates what I have already said. My own recollection of Burton's experiments with chromate of silver is that they date much further back; but I cannot at the present moment refer to them, but the article alluded to will for the present suffice.

In that article Mr. Burton himself says his experiments with chromate of silver as a preventive of halation "did not succeed," the chromate being reduced by the developer; and then proceeds to make what I believe to be merely a suggestion as to a method by which this result may be avoided, namely, soaking the plate before development in a weak solution of bromide of potassium. I conceive it to be a suggestion merely, for two reasons: first, because no actual statement is made that the experiment has been made; and secondly, because, if it had, the result seems scarcely likely to be any more of a practical success than before, though from a different reason.

Mr. Burton seems to have overlooked the fact of which he, of all men, is perfectly aware—the fact I alluded to in my previous communication as having been just pointed out by Captain Abney, that the soluble chromates destroy the effect produced by the action of light upon a sensitive film. If we imagine such a duplex film as that alluded to by Mr. Burton and Mr. Grant, silver bromide upon silver chromate, to have been exposed to light, we can readily believe that it will have an image impressed upon it; but it is not so easy to see how that image is to be developed, even by Mr. Burton's plan. The immersion in solution of potassium bromide will certainly convert the substratum of chromate into silver bromide; but, at the same time, it will, by double decomposition, form potassium chromate, which cannot but have full access to the overlying film of bromide of silver. What, then, about the image?

It is true that the bichromate is far more powerful in its destructive action on the latent image than the neutral chromate, on account of the loose atom of chromic acid, and it would be the neutral chromate that is formed under such circumstances. But the latter salt alone, and more particularly in the presence of a soluble bromide, is quite powerful enough to destroy any image with which it may be brought into contact. I should not like to say that it is impossible to obtain any sort of image by development under such conditions, but it seems quite impossible that a practically useful one could result. By using a very weak solution of bromide, and a great volume of it, so that the chromate would be converted slowly and a little at a time, the bromide film would be submitted practically to the action of a very feeble solution of potassium chromate, which might possibly not exert the full effect.

One other point I may note in passing. If the chromate film referred to by Mr. Burton is made in the same manner as that he recommends in another place as a substitute for ruby glass, namely, by adding silver nitrate and potassium bichromate to solution of gelatine to form an emulsion, from which the soluble matter is not subsequently washed, I am afraid there would be still further reason for failure. Even supposing the equivalent proportions of the two salts are so exactly hit that there is no excess of either, there would still be a soluble silver salt present in the form of dissolved chromate of silver. When the two salts just mentioned are mixed, neutral chromate of silver is formed together with nitrate of potash, and nitric acid is set free; and this latter dissolves a small quantity of the silver chromate. The experiment is easily made of adding silver nitrate in excess to solution of potassium bichromate, when, after the precipitate has subsided, the supernatant solution will be found to be highly coloured. A drop of the chromate solution will give a further precipitate of silver chromate, showing that the colour does not come from excess of that, but if the supernatant liquid is poured off, and treated with a solution of carbonate of soda until no further precipitate occurs, it will be decolourised, and the red precipitate will show that the colouration was due to chromate of silver held in solution by the liberated nitric acid.

If such a film were treated with an alkaline, or, indeed, any developer, it is not difficult to believe that reduction would occur without any question of exposure, and that may explain the first of Mr. Burton's failures, but does not affect the general question of the practicability of the plan suggested.

If any of the readers of the JOURNAL are desirous of testing this plan, the best way to proceed is to employ the neutral chromate of potassium in conjunction with nitrate of silver, the former slightly in excess, and to wash the emulsion so formed. Or carbonate of silver may be emulsified in the usual way—by precipitation and decantation before adding the gelatine—and then converting by means of chromic acid or bichromate of potash.

A still better plan was published by M. Paul Roy, of Algiers, some ten or twelve years ago for forming an emulsion of pure chromate of silver. It is based upon an alleged action of the soluble chromate in excess to precipitate gelatine in conjunction with chromate of silver. The process consists in dissolving one part of gelatine in 100 parts of water, to which ten parts of silver nitrate are subsequently added. When this is dissolved, a saturated solution of ammonium or potassium bichromate is added with vigorous stirring; the first result is of course the formation of chromate of silver, and when the soluble chromate is in excess, the gelatine in combination with the silver salt is said to separate, and may be washed and redissolved by heat.

I fully agree with what Mr. Burton says in the article I have referred to in regard to the probability of chromate of silver being found eventually to be a useful photographic salt. But I am afraid we shall have to find an altogether new developer first.

It was far from my intention to criticise Mr. Gregor Grant in a carping manner. My allusion to the impossibility of getting clear shadows with the double films was aimed at the theory propounded rather than the plates, and I must adhere to the belief that if such a "proper" exposure is to be given as to reverse the image of the more sensitive film, then there *must* be a deposit in the shadows.

Again, when Mr. Grant says that Captain Abney was "the first person to lay down any law," &c., and "the theory *just advanced by him*"—the italics are mine—was the reflection theory in fact, I naturally thought he meant it, and therefore gave the date of an earlier publication. Now, as he denies having stated that Captain Abney "was the first to discover or notice the causes of halation," I am in doubt as to how he came to be the first to "advance" them. Captain Abney has done a very great deal in connexion with the investigation of the various causes of halation, but, I repeat, Marlowe was the first to draw attention to reflection from the back surface as one of them.—I am, yours, &c., W. B. BOLTON.

January 17, 1893.

"KEEPING OF CARBON TISSUE."

To the EDITOR.

SIR,—Every now and then I see it stated that carbon tissue will keep about a fortnight after sensitising.

It appears, therefore, not to be generally known that it may be preserved, in good condition, for a much longer time if stored in a calcium tube.

I am using some to-day, received from the Autotype Company about the 2nd of December, which has been so stored, and is in the same condition now as when it came to hand.—I am, yours, &c.,

Watford, January 16, 1893. WILLIAM COLES.

OPTIMUS COMPETITION.

To the EDITOR.

SIR,—We have just received the enclosed awards for the Optimus competition, and shall be glad if you will announce them in your JOURNAL.—We are, yours, &c., PERKEN, SON, & RAYMENT.

99, *Hatton-garden, London, January* 18, 1893.

Class I.—Landscape, with and without figures. Sub-class A, The Haunted Cottage; sub-class B, White Star.

Class II.—Seascape. Sub-class A, Per-son-ray; sub-class B, Detective.

Class III.—Portraiture and Figure Study. Sub-class A, Mezzo; sub-class B, Joan.

Class IV.—Instantaneous Work. Lannul.

Having opened the envelopes bearing the above *noms de plume*, we find that the following are the successful competitors:—

Class I.—Landscape, with and without figures. Sub-class A, C. Field, West Bromwich; sub-class B, W. D. Welford, Birmingham.

Class II.—Seascape. Sub-class A, Mrs. M. E. Marriott, Liverpool; sub-class B, Charles M. Berry, Belfast.

Class III.—Portraiture and Figure Study. Sub-class A, John H. Gear, London; sub-class B, John Wickens, Bangor.

Class IV.—Instantaneous Work. James W. Morgan, Tunbridge Wells.

THE VENTILATION OF OPTICAL LANTERNS.

To the EDITOR.

SIR,—I read in last week's BRITISH JOURNAL OF PHOTOGRAPHY an article by Mr. T. N. Armstrong on the "Ventilation of Optical Lanterns," which refers to one at Edwards' establishment which was placed at his disposal. I would just like to call your attention to the following: The very lantern he refers to was made in White's workshops, to my design when I then

represented the firm in their sale shop. Now that the firm has no retail business, I on my own account, at the address below, make and use lanterns of the same kind. I may say that the lantern Mr. Armstrong refers to was made about two and a half years ago. There is not much in the idea further than that the bottom lantern is ventilated at the side. All the above facts are well known to Mr. Armstrong, but it is wonderful what some folks will do for a little favour.

Trusting you will see your way to correct such mistakes, and feeling sorry to trouble you over such little affairs, which are better corrected.—I am, yours, &c., JAMES MOIR.

77, *Renfield-street, Glasgow, January* 10, 1893.

A VALUATION.

To the EDITOR.

SIR,—Respecting the inquiry of your correspondent, "A Seaside Photographer," I should be disposed to say that, if there are no other considerations of weight beyond those mentioned in his letter, the business would be cheap at 1000*l.*, and if bought at 1100*l.*, the transaction would be fair on both sides.—I am, yours, &c., R. S. V. P.

January 17, 1893.

A BUSINESS MYSTERY.

To the EDITOR.

SIR,—How do the enclosed assimilate? I cut them out of two papers of last week.—I am, yours, &c., SCEPTICAL.

January 17, 1893.

[The following are the conflicting announcements to which our correspondent refers.—ED.]

From the *Stockport Advertiser*, January 6.

DAY AND ELECTRIC LIGHT STUDIOS.—Mons. Sauvy (of Paris) has just returned from his usual visit to Paris, and was successful in procuring a FIRST-CLASS FRENCH ARTIST, who will attend to the customers, as well as himself personally as usual, from 10 a.m. to 6 p.m. daily. 22A, King-street, Manchester.

From the *Manchester City News*, January 7.

MRS. KATE HARGREAVES begs to intimate to the public that she has purchased the entire PHOTOGRAPHIC BUSINESS of Monsieur Sauvy, 22A, King-street, Manchester. All the eminent Artists formerly engaged have been retained.

Mrs. Hargreaves can assure her patrons that the same high-class work will still be produced, and that the whole of the Negatives of Portraits taken at 22A, King-street are in her possession, and copies can be had at any time. Every branch of the business is under her personal supervision.

Mrs. Hargreaves draws particular attention to and invites inspection of her Speciality (recently introduced), viz., the highest class of Opal and Ivory Miniature Painting.

THE WEEKLY HALF-HOLIDAY.

To the EDITOR.

SIR,—The adoption of a weekly half-holiday, which has been occupying the attention of various trades for the past few years, is worthy the consideration of those engaged in the photographic business. When originating the movement in Glasgow and Paisley, we found that all the principal members of the profession acceded to the proposal, and strictly carried it into practice. As the spring is drawing near, it is expedient for a successful issue that those concerned interest themselves on the subject, and by their energies establish the movement, much to the satisfaction of those capable of recognising its advantages.—I am, yours, &c., BENJAMIN R. FAULKNER.

10, *St. James-street, Paisley, January* 14, 1893.

Exchange Column.

Will exchange 13*l.* single lantern for a 12×10 camera.—Address, FRANK LOBLEY, Hanley, Staffordshire.

Dallmeyer's 2B lens in exchange for centerlever enlarging lantern, eight and a quarter inch condensers.—Address, A. SIMMONS, 253, Westminster Bridge-road, S.E.

Exchange Thornton-Pickard's "Special" shutter, also "Cyclist" tripod, for Watson's half-plate turn-table and tripod.—Address, T. BERNARD, 101, Goldhawk-road, W.

Exchange six-inch Weston burnisher and burner, backgrounds, 12×10 camera and slides, flag, Pumphrey's telescopic stand, for anything useful.—Address, A. HOLLIS, Barrow-in-Furness.

WOOLWICH PHOTOGRAPHIC SOCIETY.—January 26, Lantern Night.

WEST LONDON PHOTOGRAPHIC SOCIETY.—January 24, *The Royal Palaces of England*, illustrated by lantern, by Mr. H. N. King.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical Meeting, January 24, at 50, Great Russell-street, W.C. *Photo-lithography*, a demonstration by Mr. W. E. Debenham.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

A. J.—Messrs. Hurter & Driffield's actinograph may be used for ascertaining studio exposures

AUGUST BAER.—We shall be very pleased to receive the communication. Thanks for the enclosure.

T. N.—The Vergara films are not made now. The Company has ceased to exist. The slides will have to be modified to take glass plates.

W. G.—We do not know the name of the publisher of Mr. Joseph Pennell's works. Your local bookseller would obtain the information for you.

HORACE JACKSON.—You may employ either of the two lenses as a single combination. The focus will be much longer and the covering power greater.

C. RAY.—Obtain what is known as masticated rubber, and no difficulty will be met with in its solution in benzol. Vulcanised rubber has been the cause of the trouble.

STOP.—There is no necessity to use a wide-angle lens for making lantern slides by reduction. Use a lens with a narrower angle (one of the rectilinear type), working at a larger aperture.

D. LEITCH.—So far as we are aware, no camera answering to the description of Dr. Marey's chrono-photographic apparatus is to be had commercially. The camera would have to be specially made.

NO. "49."—1. Citric acid has the double action of being a restrainer and of keeping the whites pure. 2. The new paper is probably twice or three times more rapid than the other rapid paper.

BOLL.—1. The studio will answer very well, but we prefer a direct side light in addition to the top light. 3. You may accept Mr. Brother's teachings as quite sound. Procure his book by all means.

A. R. TAYLOR.—Unless you can tell us the composition of the cement in question, we can give no opinion whatever as to the probable effect it may have on photographs. Its nature indicates nothing.

M. J. E. TILNEY.—Amidol is not employed for the purpose of developing under-printed images on chloride. Study two articles on the subject by E. Valenta at pages 247 and 279 of the last volume of the JOURNAL.

AT HOME.—We are not aware of any books having been published on the subjects referred to. *Carte* or cabinet portrait lenses will fulfil your requirements for rapid indoor portraiture under the conditions named.

LANSDOWN.—1. A good single lens, or, by preference, a doublet, will answer. 2. We do not know the nature of the head-rest mentioned. 3. See two formulæ for the P.O.P., page 794, in our ALMANAC for current year.

A SUBSCRIBER (Basingstoke).—If you can colour other photographs, we see no reason why you should not colour bromide priats. The same colours, whether oil or water, that are used for ordinary prints will do equally well for bromides.

A. E. W.—Your reading of the Act is quite correct, and, as you say, it is very unsatisfactory. The Copyright Act, as it stands, is very unsatisfactory indeed, and we fear that at present there is but a very small prospect of its being amended.

A. M. Z.—A little practice in judging of the distances when focussing with a hand camera having a focus scale will enable you to do so with sufficient accuracy for the purpose. There is no rule available. Both the hand cameras you name enjoy high reputations.

H. D.—1. A ten per cent. solution is one in which in every ten parts there is contained one part of the salt. 2. A view-finder, if constructed for the purpose, will show precisely what is to be seen on the ground glass. 3. There are no books published on such simple matters.

E. R. B.—If, instead of suspending the priats on a line to dry, they are dried in a blottiog-book, they will not curl up, and will be much more convenient for mounting. Greater distortion occurs from expansion, and the stretching of the paper in mounting, when the pictures are mounted wet than when they are mounted dry.

W. BARTLETT.—Slides such as those sent will not do at all for the lantern. The lights must be perfectly clear glass. In your slides they are represented by a thick veil of fog. Moreover, there is a decided trace of green fog. Better purchase commercial plates and get proficient with them, then go back to making your own.

A. LEACH.—1. Working in an experimental way with bichromated gelatine, there need be no fear of any harmful effects from the chromium salt. It is only with long and extensive working that any ill effects need be anticipated, and not then even if care be taken. 2. The films were probably over-dried, and too high a temperature used.

RODNEL.—The rooms where you witnessed the demonstration of enlarging are now closed, ths firoi having since ceased to exist. So far as concerns apparatus for enlarging, some notices relative to these have recently appeared in this JOURNAL. If you desire to know anything technically concerning enlarging appliances, we will be happy to give you any further information.

S. Bateman.—It has frequently been suggested to immerse albumen prints in a mixture of alcohol and glycerine to prevent their curling when kept unmounted. But we cannot recommend the method, inasmuch as glycerine has always a tendency to take up moisture, and that is conducive to fading. Roll the prints under very heavy pressure, and they will have little tendency to curl afterwards.

S. A. W.—As you have not a lens of the "rapid" type, the best amongst those you have for taking a large group will be the orthographic. As it is twenty-four inches focus, we should imagine it would cover a 15×12 plate with its full opening. Then it would be quite as quick, or, indeed, quicker, than a "rapid" of sixteen inches focus stopped down to make it cover that size plate with equal marginal definition.

Flexible.—Coiled-wire spring, suitable for a flexible chimney to convey away the smoke from a magnesium lamp, cannot be obtained in commerce, so far as we can learn. Solomon, of Red Lion-square, who first introduced such chimneys, had them made to order. Get a round rod of wood and wrap hard iron wire around it, and you will have just such a spring as we have in one procured from the late Mr. Solomon.

T. H. Price writes: "Kindly inform me if anything can be done to get oil out of a photographic print. Only a portion of the print is saturated with oil. I think from the smell it is linseed oil."—Pour a little pure benzol on the print, and allow it to soak for a short time, then blot off with clean blotting-paper, and apply more benzol and again blot off. Repeat the operations till the grease is entirely removed.

C. Ballard.—Evidently the plates were kept too long after they were prepared. Collotype plates should be used within two or three days of their preparation. It is not surprising, if they were kept for a fortnight, that they behaved as stated. After the plates are printed, and the bichromate washed out, they may be kept for months before they are printed from in the press. Possibly that is what you were told, and you have misunderstood the matter.

C. E. T. Tenby.—Prisms would certainly take up less space than mirrors. But why not fit the mirrors behind the lenses as you propose to do the prisms? That will do away with part of your difficulty. Any of the leading opticians would supply the latter to order. So far as we know, they are not mentioned in any English catalogues. The only quotation we can find is in the list of Steinheil & Son, Munich. There they vary in price from 4*l.* to 60*l.*, according to size.

R. A. M.—After an apprentice has served two years of his apprenticeship it seem a little unreasonable to expect him, after the usual business hours, to act the part of an errand boy in delivering pictures and parcels, and we are not at all surprised that he and his friends are beginning to rebel. Surely this employment is not teaching the young fellow the business his friends paid a premium for him to be taught. The friends would no doubt succeed in their threatened proceedings.

W. Pennefather (St. Austell) says that he is desirous of studying retouching in London during occasional visits which he has to make there on business, and asks for our guidance in recommending him the best course to pursue.—In reply: One could not do better than apply to Mr. Redmond Barrett, whose services as a teacher of retouching we, from the testimony and skill of many of that gentleman's former pupils, are happy to recommend. Mr. Barrett is also, we believe, instructor in retouching at the Camera Club.

T. A. Green complains that he cannot get the chloride of silver from the washings of prints to settle down. He says with the washings of paper of his own sensitising he has no trouble, but the difficulty is with the ready-sensitised and printing-out paper. We have heard the same complaint many times before. The best way is to add to the refractory residue, when it will not settle down after the addition of the salt, an ounce or two of nitric or hydrochloric acid, and then stir it up vigorously for several minutes. In a day or two after this treatment it will generally settle down.

A. B. (Belfast) writes: "I often see it in print, and often hear it stated, that the best slides for the lantern, and also for the stereoscope, are those by the old albumen process. Is this the case, and if so, why is it that the process is not worked more than it is, both by amateurs and professional slide-makers? If the process is as good as some claim that it is, why is it so neglected?"—The albumen process is undoubtedly an excellent one for transparencies, but it involves more trouble in working, and also requires more skill than other methods that are capable of giving excellent results. Hence amateurs fancy it is too troublesome for them, and professionals prefer the more expeditious process of wet collodion.

A. J. Henderson (Thames Ditton).—We cannot undertake to advise you as to the selection of particular makes of lenses, cameras, enlarging apparatus, &c. To this rule we make no exception. Consult a photographic friend in whose advice you have confidence, or, failing such, place yourself in the hands of one of the dealers advertising in this Journal or its Almanac, and state your requirements. With respect to your other questions: Messrs. Percy Lund & Co., Memorial Hall, E.C., or any dealer will supply you with all the books named. In our Almanac for 1892 is contained a series of articles for beginners. When enlarging with the lantern a bellows camera is not required. There is not necessarily any difference in quality between daylight and artificial enlargements on bromide paper. Their sharpness is dependent (1) upon the degree of sharpness on the negative; (2) upon accurate focussing of the enlargement, and (3) upon the qualities and proper use of the enlarging objective.

Aston Natural History and Photographic Society.—The numbers of this Society are increasing, but any who are desirous of becoming members are asked to communicate with the Hon. Secretary, Mr. Fred. W. Pilditch, 133, Wills-street, Aston.

Photographic Club.—January 25, Annual Lantern and Musical Entertainment (Ladies' Night). 27 (Friday), Children's Entertainment. February 1, *The Limelight and other Illuminants for the Lantern.*

Mr. H. A. Chapman, Photographer, of Swansea, who was elected to the Town Council twelve years ago and an Alderman three years ago, has been promoted to the Civic Chair of that town for the coming year. We congratulate Mr. Chapman on the distinction conferred upon him.

The Blackheath Camera Club will hold an Exhibition of Photographs and Photographic Apparatus in the Hall of the Art Club, Blackheath, on Friday and Saturday, March 3 and 4, when medals will be offered for competition in the following classes:—A (for members only): Prints, any subject by any process. B (for members only): Lantern Slides, any subject (set of four). C (Open): Prints—landscape, seascape, architecture, &c., any process. D (Open): Prints—portraiture, animal and genre, any process. E (Open): Lantern Slides, any subject (sets of four). F (Open): Hand-camera Work, any subject, taken with camera held in hand, not on tripod (sets of four prints). G (Championship): Any subject by any process, open only to pictures that have taken first and second-class prizes in any previous exhibition. Awards: Silver and Bronze Medals in Classes A to F, and a Gold Medal in Class G, will be placed at the discretion of the Judges. The Judges are Messrs. F. P. Cembrano, jun., George Davison, Andrew Pringle; and the Hon. Secretaries Messrs. Thomas B. Earle, The Cottage, Handen-road, Lee, S.E., and C. W. Piper, A.R.I.B.A., 46, Shooter's Hill-road, Blackheath, S.E.

Richmond Camera Club Conversazione.—The Richmond Camera Club, which last year held its annual *conversazione* in very modest fashion at the Cottage Hall, this year launched out in much bolder style, taking the Richmond Theatre Royal for the purpose on Monday, January 9. The venture was a distinct success, both as regards the numbers that attended (over 350) and the character of the entertainment that was given. A feature of the evening was the arrangement of the ground floor of the theatre, which we heard remarked by many visitors looked "quite like a drawing-room." The seats were removed, only a few velvet-covered stalls being retained and placed here and there in such positions as to allow free passage for those present to view the select exhibition of photographic work done by members of the Club, which was displayed on screens along the sides of the arena. Refreshments were served at two tastefully arranged counters under the gallery, which were partially curtained off from the main body of the theatre. From the neatly got-up programme we see that there were seven musical selections, sandwiched between four optical lantern displays, in which altogether some 180 slides were shown on a sixteen-foot screen at a distance of sixty feet from the lantern. For those whose memories go back to the Photographic Exhibition held in Richmond in 1889 in a part of the same building, the improvements arrived at during the intervening period, especially in the way of artistic effect, were very noticeable. The Mayor and Mayoress, many of the Town Councillors, and the *élite* of the neighbourhood, honoured the *soirée* by their presence. We are informed that H.H. the Duke of Teck, G.C.B., &c., has kindly consented to become patron of the Club.

FORTHCOMING EXHIBITIONS.

January 26, 27	.....	*Louth and District Photographic Society. Hon. Secretary, S. Francis Clarke, 8 Upgate, Louth.
February 1	.....	*Cleveland Camera Club. Hon. Secretary, J. J. Hallam, 11, Amber-street, Saltburn-by-the-Sea.
,, 7, 8	.....	Rotherham Photographic Society. Hon. Secretary, H. C. Hemingway, Rotherham.
,, 14	.....	Durham City Camera Club. Hon. Secretary, R. Hauxwell, The Avenue, Durham.
,, 16–18	.....	*Woolwich Polytechnic Photographic Society. Hon. Secretary, W. Dawes, 145, Chesnut-road, Plumstead, S.E.
,, 18	.....	Holborn Camera Club. Hon. Secretary, F. J. Cobb 100 High Holborn, E.C.
March 1, 2	.....	*Fillebrook Athenæum Photographic Society. Hon. Secretary, Joseph W. Spurgeon, 1 Drayton Villas, Leytonstone, Essex.
,, 3, 4	.....	Blackheath Camera Club. Hon. Secretary, C. W. Piper, 46, Shooter's Hill-road, Blackheath, S.E.
April	.....	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.
,, 17–29	.....	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.

* Signifies that there are open classes.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1708. Vol. XL.—JANUARY 27, 1893.

REPRODUCING NEGATIVES FROM PAPER PRINTS.

We have lately been retrying the old experiment of reproducing negatives, which have long been lost or destroyed, from prints that have been taken many years since, and the success attending the effort has been such as to warrant our bringing the subject before such of our less experienced readers as may not be aware of this method of reproducing a negative.

It is very curious that, in prints produced from some of these negatives, there is to be found *more* detail than is to be seen in the prints from which the negative was made. This is not difficult to understand when we consider that in a strong print —one obtained from an intense negative in which much of the finer details in the shadows had to be sacrificed, in order that the lights might not be altogether chalky, and thus get buried in the substance of the paper, presenting only a uniform blackness on the surface — such details are still found to exist if the print is examined when held against a strong light. Make a print on albumenised paper from any intense negative, continuing the exposure until nothing but the highest lights remain visible on the surface, and when held up against a strong gas flame, and viewed as a transparency, the details that are lost under examination by reflected light are still to be seen when the light is transmitted through it.

The print selected for making a negative of ought to be as vigorous a one as possible; and, from what has just been said, it will be seen that it is not an objection, but quite otherwise, that the deep shadows are clogged or seemingly obliterated.

The way by which the prints are removed from their mounts is to place them in lukewarm water for a few minutes, until, upon raising up one corner of the print from the mount, it is found to strip off. It is sometimes necessary to increase the heat and prolong the time of immersion to ensure this, as much depends upon the nature of the paste by which it was mounted. When removed, the back of the print must be carefully sponged, so as to remove any adherent paste. It must then be dried between sheets of blotting-paper.

The printing frame that is to be employed in reproduction must be fitted with a plate of stout and flat glass. On this the print is laid, face up, and a dry plate superimposed, face down, of course. It is not easy to indicate the exposure that should be given, but five seconds to a common gas flame with an ordinary slow plate proved ample in the last trial we made. A slow-acting weak developer has been hitherto preferred by us, but the selection of this depends upon the softness or the intensity of the print. When the negative thus made has been finished, it is ready for being printed from.

The method here described presents important advantages over the reproduction of a negative by the camera. By the latter nothing is copied but what appears on the surface, whereas the method advocated reveals what is concealed in the texture of the paper. We have one reproduction which forcibly illustrates this. The scene is one in the Maraposa Grove, California, and in the original print one portion is presented in such deep shadow as to reveal no detail whatever. It was first copied by the camera without showing more than was originally visible; but, when copied by transparence as described, a group of figures not hitherto seen in the print became plainly visible, and now forms an addition to the pictorial value of the print, more especially now that a lantern slide has been made from it sufficiently crisp and sharp as to betray no suspicion of its having had a paper origin.

Without having yet tried it, we can scarcely suppose that a print on a gelatine emulsion paper will show the same discriminative power in the burying of detail that one on albumenised paper will, seeing that in the former case the image is confined to the thin pellicle which contains the silver haloid, whereas in the latter the silver nitrate not only sensitises the albumen film, but penetrates beyond it—a fact that is easily proved by the stripping off of the albumen and observing the vigour of the image still visible on the denuded paper.

With a view to facilitating the printing and destroying granularity in the paper, we have rendered one-half of a precisely similar pair of stereoscopic prints translucent by Canada balsam varnish, allowing the other half to remain *in statu quo*, but have not found any advantage to arise. It may, however, prove advantageous with thick and uneven paper.

While on this subject, and correlative to the foregoing, we may remark on a useful application of the principle of producing a negative from a paper print with which, several years prior to the advent of modern dry-plate photography, the names of Valentine Blanchard and Claud Leon Lambert were associated. Given a negative imperfect from whatever cause, a print is produced from it which, when fixed and washed (it need not be toned), has the lacking detail put in with a pencil or a brush or the too dark shadows lightened by any of the reducing agents now so well known. This then forms a *cliché*, from which a negative is printed on finely surfaced paper, and which in turn, after further retouching if requisite, is employed as a negative to reproduce perfect impressions of the original. Some sixteen or eighteen years ago this system formed the means of producing many excellent prints, which were justly much admired. We mention this, as the method appears to have fallen into abeyance.

CHROMATE OF SILVER.

The question having arisen of the sensitiveness of chromate of silver or its power of forming a developable image, it may not be out of place here to state a few facts which seem, so far at least as our present knowledge goes, to set the matter at rest.

There are two chromates of silver analogous in their composition to the neutral and acid chromates of potassium, but it is the neutral or monochromate with which photographers will have more particularly to deal. This salt is formed when solutions of nitrate of silver and of a neutral alkaline chromate are mixed, or when carbonate of silver is treated with an acid chromate. It is also formed when bichromate of potash is added to a solution of nitrate of silver, but in this case nitric acid is liberated and a portion of the silver chromate remains in solution, owing to the solvent action of the free acid. The neutral chromate is insoluble in water, but is soluble in nitric acid, especially when hot, and particularly so in ammonia.

The acid chromate is formed when a solution of bichromate of potash, acidified with sulphuric acid, is added to one of nitrate of silver, or when carbonate of silver is acted upon by the same compound solution. It forms a reddish-purple precipitate, almost identical in appearance with the neutral chromate, but, unlike the latter, it is slightly soluble in water. A more detailed description of these salts will be found in an article on "Chromate of Silver and Chromates," at page 190 in our Volume for 1886, to which we must refer those who desire further information.

Up to the present time, chromate of silver has found little practical application in connexion with photography; one or two attempts have been made to use it as a stepping-stone to the formation of the gelatino-bromide emulsion, and an emulsion of the chromate itself was suggested some ten or twelve years ago by Mr. W. K. Burton as a means of forming a substitute for ruby glass for the dark-room window, and also, as will be seen from recent correspondence, as a preventive of halation. In connexion with the first application, it was pointed out that the chromate emulsion films were of little actual use in daylight, owing to the fact that, being sensitive to strong light, they quickly darkened, and soon became too dense to transmit light, and from this it came to be imagined that the chromate of silver was itself sensitive to light.

This, however, is not the case, so far, at least, as we have been able to discover, the discolouration that takes place being really due to the action of light upon the bichromatised gelatine of the emulsion. As all our readers are aware, the soluble chromates and bichromates in the presence of organic matter are sensitive to light, one of the results being a visible image due to the reduction of the chromic salt. Thus ordinary paper, floated in a strong solution of bichromate of potash and dried, becomes sensitive to light, forming a brown image on a yellow ground, which only requires washing in water to "fix" it or render it permanent. If the paper is sized with gelatine, the sensitiveness will be greater, and the colouration proportionately deeper. Solutions of gelatine, gum, dextrine, glucose, sugar, or other similar organic substances in combination with chromic salts, also darken under the action of light, or even spontaneously, and it is to this action alone that the deterioration of the ruby-glass substitute must be attributed, we think.

If, to a solution of gelatine, bichromate of potash and nitrate of silver be added, a deep red emulsion is formed, the pigment being chromate of silver; but, in addition to the silver chromate in suspension, there will also be a minute quantity in solution, owing, as we have shown, to the presence of free nitric acid. If the equivalent proportions of the silver nitrate and bichromate have been pretty closely adjusted, such an emulsion will not possess a very high degree of sensitiveness—that is to say, it will not discolour or darken very rapidly, owing to the very small quantity of *soluble* chromate present, though that small quantity is sufficient to cause it to change eventually. Moreover, the fact of there being a salt of silver also in solution forms another cause of instability; but, if, as is most likely to be the case, an excess of bichromate has been used, then the sensitiveness will be very materially increased, and a comparatively short exposure to daylight will produce an appreciable change of colour.

It will be readily understood, therefore, how it is that an emulsion of this kind darkens under the action of light; but, if before it is spread upon the glass it be "washed" in the same way that a negative emulsion is, to remove the soluble salts, although the appearance of the resulting film is in no way altered, it will be found to have practically lost its tendency to change under the action of light—to have, in fact, lost its sensitiveness. We say "practically," because the absolute desensitising will depend upon the thoroughness of the washing.

In other words, what we wish to convey is that chromate of silver, *per se*, is insensitive to light, or, at any rate, incapable of forming a visible image. The experiment is easily made without the trouble of forming an emulsion by floating paper upon a solution of nitrate of silver, and, after drying, refloating on bichromate or, preferably, neutral chromate of potash, and subsequently washing very thoroughly to remove all excess of either salt. It is important that the paper in the first instance and the water used be free from soluble chlorides, otherwise chloride of silver will be formed, and may lead to false judgment. If the layer of chromate of silver be thoroughly freed from soluble matter, and be clear of silver haloids, the paper so prepared may be exposed under a negative without producing any trace of an image. If, however, any traces of chromic salts remain in the paper, more or less discolouration will occur, and, if an excess of silver should have been used, a similar result will accrue.

So far we have only dealt with the capability of chromate of silver for forming a visible or direct image; let us now turn to the question of development. It is an easy matter to say that it is sensitive if we only knew how to develop the image formed; but what we have particularly to deal with now is whether with our known methods of development it is possible to produce an image. So far, we have not found it possible.

For the purpose of experiments made some years ago, and which we have repeated quite recently, an emulsion of pure silver chromate was prepared. In order to avoid as far as possible any secondary action that might arise from the action of silver salts or excess of chromic salts on the gelatine, the emulsion was made with precipitated carbonate of silver converted into chromate by the cautious addition of a weak solution of chromic acid, followed by washing in distilled water. For all practical purposes the film of chromate of silver thus obtained was as pure as could be.

So far as actual trials were concerned the results were identical, and afforded no opportunity of varying the conditions under which they were made. With every kind of developer used, including the most recently introduced, the chromate was blackened, whether exposed or not. Further than this, the same result followed the employment of plain

solution of pyro, without any alkali whatever. In fact, chromate of silver is reduced without exposure to light by any of the developers in ordinary use.

Acting on the suggestion originally made by Mr. Burton, and referred to in the recent correspondence on the subject, the experiment was made of converting the chromate into bromide of silver before development, but with little better success. Before development the films were immersed in a solution of bromide of potassium of the strength of half a grain to the ounce until the red colour of the chromate was completely discharged, and the developer then applied in the ordinary way. The result was invariably the same, the film appeared absolutely insensitive, no matter what exposure was given, and it was only on the application of an abnormally strong solution—sufficient to produce fog—that any result in the way of development could be obtained.

It is, of course, possible that with other forms of development—acid silver, for instance—a better result might be obtained; but, looking at all the circumstances, we are scarcely encouraged to hope so. At any rate, for the present we may rest content that chromate of silver is of no practical use as a photographic agent.

PHOTO-PLASTIGRAPHY.

A few weeks since, it will be remembered, we devoted a descriptive article to a new style of sculpturesque portraiture by an American artist. Although there is but a comparatively small demand for that class of picture in this country, there is, we believe, a greater demand for it in America, also in some parts of the Continent. Seeing that statuesque portraits are still being produced here as well as abroad, and that, notwithstanding their frequent incongruities, they meet with a certain degree of favour, it is not inopportune to consider whether or not genuine statuettes would not, at the present time, meet with commercial success if they were forthcoming.

It will possibly be new to many of our readers to learn that veritable statuettes—bust and full-length—were produced commercially by photographic means in the earlier days of photography. The first process—that of Mr. François Willéme, of Paris—was patented in this country just thirty years ago. We well remember seeing at the time some really very fine examples of the work, alike in Parian, plaster of Paris, and bronze, that were made by the inventor himself, and also by the late Mr. Claudet, of Regent-street. Mr. Willéme's process was this:—

The studio in which the negatives were taken was circular, and about thirty feet in diameter. In the centre was a raised polygonal platform with twenty-four faces, numbered consecutively from one to twenty-four. In the centre of this platform the sitter was posed. Round the studio were placed twenty-four cameras, one exactly opposite each of the faces of the polygon. A negative was then taken, simultaneously, or as nearly so as possible, with each of the cameras on wet collodion, so that twenty-four different views of the sitter were obtained. The negatives were then numbered according to the face of the platform from opposite which they were obtained. These negatives completed the actual photographic portion of the work.

The statuette was made in the following manner:—On a block capable of being rotated on its axis was placed a cylinder of soft modelling clay. This block waspolygonal in shape, and its faces were numbered from one to twenty-four; in fact, it was an exact counterpart in miniature of the platform on which the sitter was posed. At a certain distance from the clay was fixed a ground-glass screen, upon which the enlarged image of one of the negatives was projected by mean of an enlarging camera. One of the sides of the block, whose number corresponded with that of the negative, was then brought opposite the image. The outlines of it were then gone over with the tracer of a pentagraph furnished with a cutting style or knife, which cut a corresponding outline in the clay. Then a second negative was taken, this time by preference one obtained at right angles or nearly so to the first, the clay being rotated to the corresponding number, so that the cut then made by the style would intersect that previously made, by which a wedge-shaped piece of clay was set free, and could then be removed. This operation was repeated with all the negatives in turn, so that in the end a perfect transcript of the contour of the sitter was obtained. All that now remained to be done to complete the statue was to touch out a few of the hollows and scrape away the trifling edges left between the various incisions made by the cutter of the pentagraph. Instead of projecting the image on to a ground-glass screen, it was sometimes thrown on to white paper or card, and the outline then traced with pencil. This tracing was then used with the pentagraph instead of the ground-glass image. When the clay model was obtained, any number of duplicates could be produced in plaster of Paris, Parian, or bronze in the ordinary way. As illustrating the practicability of the process, it may be mentioned that Mr. Willéme used to supply a full-length statuette, fifteen or eighteen inches high, for three hundred francs, equal to twelve pounds English.

A couple of years after the date of Willéme's patent Mr. Claudet patented another method of working. In this method the pentagraph was dispensed with, the enlarged image being thrown direct upon the modelling clay, and then manipulated by hand. The clay was fixed on a rotating table, as in the process just referred to; but it was capable of being moved backward or forward by means of a slot, as required. Thin plates of metal were placed in the clay, upon which the outlines of the figure could be seen as the clay was cut away. Such are the brief outlines of, at least, two practical methods of producing sculptures by photography, and others will suggest themselves to the ingenious.

At the time these processes were introduced only wet-collodion was in use for portraiture, and all familiar with its working know quite well the difficulty there would be in obtaining a couple of dozen negatives with long exposures from the different points of sight at the same time, particularly in hot weather, when the plates will only keep a few minutes after preparation. No such difficulties would be encountered with dry plates. Twenty-four cameras were formerly employed; but if the platform upon which the sitter is placed were a turntable, and he were posed on its axis, one camera could practically be made to answer the same end, provided it were rotated for the different views. Two cameras might, however, be found more convenient in practice. In this case they might be placed so that they were opposite alternate sections of the platform. The exposures could be made simultaneously by one operator with pneumatic shutters. The cameras would be furnished with repeating backs carrying, say, half a dozen quarter-plates each, so that two slides for each would suffice for the twenty-four negatives, supposing that number were required.

Some portraitists, suffering from stagnation of business, often sigh for a novelty or new style in portraiture. Here is a style which, though it cannot in any way be termed new, would cer-

tainly now be novel to the public generally, and it requires very little outlay for its practice in any ordinary studio. It may be said that photo-sculpture when introduced did not prove a commercial success. That is true, but the same may be said with regard to other things in connexion with photography on their first introduction, though they have proved successful later on. It may be well to mention that at the time photo-sculpture was introduced the *carte-de-visite* furore was at about its full, and only small pictures that could be put in albums were entertained.

As regards cost. Of course, statuette portraits cannot be produced so cheaply as paper pictures; but there is no reason why a sculptured portrait should not be very profitably supplied for the same price as that usually charged in good establishments for well-finished enlargements, while duplicates could be supplied for infinitely less than duplicates of finished enlargements.

The Proposed New Central Photographic Institution.—We are informed that considerable progress has taken place in the preliminary discussions necessitated by the suggested formation of a new broad-based photographic club or institute, several meetings of the originators having been held. At the present moment a very strong and representative committee, counting some of the foremost men in all departments of modern photography, is in process of completion, of which a meeting is to take place at an early date. We understand that the attitude of the principal London Societies, and of large numbers of photographers, is distinctly favourable to the scheme.

Photomicrographic Stereograms.—An alleged novelty in stereographic photographs was described by Dr. Hausemann at a recent meeting of the Berlin Physiological Society; he stated that he had obtained photographs of microscopic objects which, when placed in a stereoscope, gave the impression of solidity. They were produced, he said, by taking one photograph of the object in focus for a given level, and then a second photograph at a different level, the two when united in the stereoscope giving the impression of solidity. This method, among several others, has long been employed by us in producing micro-stereo-photographs, and ought to be well known to attentive readers of this Journal, seeing that it has been published more than once.

Absorption of the Sun's Radiations. — Professor Langley and others have, during their investigations of the solar radiations, come to the conclusion that "the heat reaching us from any point of the sun's limb is only about half that reaching us from its centre; but the Astronomer Royal for Ireland and Mr. W. E. Wilson have been engaged upon a farther investigation of the sun's rays, and have almost proved that the sun's own atmosphere absorbs fully one-third of the sun's heat. To fully sustain their argument, the two named astronomers suggest the use of photography. They would have photographs taken from time to time through an entire sunspot cycle, and all reduced in a precisely similar manner, from which deductions could be drawn as to any real change in the absorbing power of the sun's atmosphere, and change of condition in the sun's surface, which would be entirely lost in direct observations, owing to our atmosphere varying so continually in its optical properties.

The Eclipse of April next.—M. de la Baume Pluvinel has made a communication to the Astronomical Society of France indicating the points he considers of most importance to be investigated during the period of the shadowing. The ever increasing prominences, he says, can be studied any time, and therefore should be left alone, and the brief moments put to other uses. The corona is most important, and should be photographed to show its general aspect with various exposures; its spectrum also should be photographed. Several plates should be used, as, owing to the various degrees of brightness of different parts of the corona, it will be impossible to obtain all the details in one exposure. He recommends isochromatic plates for the spectrum work. Mr. Lockyer proposes to obtain a special image with each portion of the spectrum by using an objective prism which would give monochromatic rings. Instantaneous photographs are wanted to possibly set at rest for ever the problem of the "reversing layer."

The Electric Light in Practice.—The cost of producing the electricity is the one cause why its use for illuminating the sitter is not almost universal in large portrait studios; but it is true that the continual progress of discovery has already resulted in cheapening electric lighting, and a communication to the Institution of Civil Engineers by Mr. J. Emerson Dowson on *Gas Power or Electric Lighting*, is one of the most practical contributions to the study of its cost and practicability yet brought forward. We need not here quote his paper beyond giving the conclusions he arrives at, the following being a summary: — "1. When town gas was used for driving the engines of an electrical station, the consumption was about fifty per cent. less than the volume of gas required to give the same amount of light by ordinary burners. 2. When town gas was used neither boiler nor firemen were required, and there were no ashes to be removed; less space was needed; no accumulators were required, except such as might be necessary to equalise the load of the engines, and to provide for a small amount of storage. The engines could be worked in the most crowded districts, close to where lights were required, and where boilers were not allowed. 3. When 'generator gas' was used, the consumption of fuel under a full load would be at least fifty per cent. less than with steam power, and the loss due to steam boilers not being fully worked could be almost entirely avoided."

LECTURES ON PHOTOGRAVURE.

In connexion with the affiliation of Photographic Societies with the Photographic Society of Great Britain, we are happy to announce that two lectures, together with a practical demonstration of photogravure or photo-etching on copper, will be delivered by Mr. Herbert Denison (of Leeds), at Bloomsbury Hall, Hart-street, Bloomsbury, London, W.C., on Friday, February 17th, and Friday, February 24th, at 8 p.m., when Mr. J. Traill Taylor will preside.

The syllabus of the first lecture is as follows:—General introduction and the principles of the process; appliances and materials required; the negative; the reversed transparency and its preparation for the printing of the resist; printing the resist; and that of the second lecture:—*Résumé* of first lecture; preparation of the copper plate; laying the ground; fixing the ground; transfer of the resist to the copper; development of the resist; drying off; protecting the margin; the etching; finishing and retouching the plate; pulling a proof. A practical demonstration will be given of each step in the process after the verbal description.

Admission to members of affiliated societies is by tickets, to be obtained beforehand from the Hon. Secretary of their Society, one shilling the two lectures. Non-members will be admitted, by tickets obtainable at the doors, or on application to Mr. R. Child Bayley, Assistant Secretary, P.S.G.B., 50, Great Russell-street, Bloomsbury, W.C., two shillings and sixpence for the two lectures. Bloomsbury Hall is within two minutes' walk of the British Museum, Mudie's Library, and the Bloomsbury Tramway Terminus.

There are now, we believe, something like thirty societies affiliated to the parent Society, and during the past year a joint committee, of which the late Mr. William Bedford was one of the most active members, has been constantly at work in the endeavour to ascertain the best means of giving beneficial effect to the scheme. It will be remembered that members of the affiliated societies were conceded admission to the Society's Exhibition at reduced rates; that several of the papers read at its meetings were placed at the disposal of bodies affiliated; and that other minor advantages were either promised or bestowed. The lectures on photogravure about to be delivered are the further outcome of the desire of the affiliation committee to confer

advantages of a practical nature upon members of societies that have supported the parent society by seeking affiliation to it.

The opportunity of witnessing a practical and complete demonstration of photogravure does not often occur, and the present one therefore should be seized by all those interested in the subject. We appeal to members of affiliated societies and to our readers generally to support by their presence the two to be given next month, which we hope will be so successful that they will be but the forerunners of many practical demonstrations on other subjects.

A SEASONABLE PRINTING PROCESS FOR AMATEURS.*

In the matter of pigments the amateur can avail himself of the finely ground and carefully prepared artists' colours in tubes, but on a large scale, in such an establishment as the Autotype Company's, it is necessary to grind the colours on the premises, and this, together with their thorough mixing in large quantities of gelatine, absolutely necessitates costly and extensive mechanical arrangements. Again, the coating of the continuous rolls of tissue can only be performed by means of elaborate machinery, whereas the amateur may in a single evening coat sufficient paper or tissue to last him for a very long while, and with no more complicated arrangements than a sheet of plate glass and a levelling stand.

One word of caution may be offered to any of your readers who may embark in the preparation of tissue for carbon work, namely, that the samples of gelatine that are sold for emulsion purposes, and which answer best when so employed, are *quite unsuited* for our present purpose. It cannot be too strongly borne in mind that the treatment such gelatines undergo during the process of manufacture in order to harden them, confers upon them the very opposite characteristics to those required for carbon work, where a perfectly soluble and yet sound gelatine is a *sine quâ non*. Many of the artificially hardened gelatines become spontaneously insoluble in contact with bichromates, or may even be actually precipitated, and the employment of such can only lead to the most complete failure. Nelson's photographic gelatines Nos. 1 and 2, and their No. 1 Flake, are suitable kinds, but the "X Opaque" of the same makers, together with most of the foreign brands specially made for emulsion work, are to be shunned.

Beyond the careful and thorough diffusion of the finely divided pigment throughout the mass of gelatine, and the subsequent straining through swan's-down or similar material to remove accidental particles as well as air-bubbles, there is no special care required in the preparation of the tissue. The paper employed may receive some little attention, as it is important that it be readily penetrable by water, without partaking too much of the bibulous character. The various papers sold for photographic purposes will answer well, but are of unnecessarily good quality for the purpose. A stout and fairly good sample of printing paper will serve every purpose; but highly surfaced and sized papers should be avoided as not permitting the free access of the water to the under side of the film in development.

In coating with the pigmented gelatine it is only necessary to thoroughly damp the paper and squeegee it on to a sheet of levelled plate glass, removing all superfluous moisture. A measured quantity of the coloured gelatine is then poured on and allowed to set, after which the sheet is tacked by two of its edges to light laths, after the style of a map, and hung up to dry, which it will then do without much cockling or distortion. It is absolutely impossible to give any definite proportion for mixing the coloured gelatine, as the pigments themselves vary so considerably, and actual trial is the only safe plan. The best course to adopt is to first mix a quantity of colour to the desired tint, using as the basis liquid Indian ink or China ink and any of the more permanent of the tube colours to produce the modification of tone. Then, having prepared a solution of gelatine of the strength of from eighty to one hundred grains to the ounce, add the colour gradually until the correct depth has been obtained. It will probably be necessary to prepare, sensitise, and develop one or two sample pieces of tissue before the exact depth is reached, but there is in this process as in others considerable latitude.

I do not advise the preparation of sensitised tissue for the reason already given that it keeps too short a time. Besides this, in the absence perhaps, of very perfect drying arrangements, if the operation should be, in consequence of the presence of excessive moisture in the atmosphere, a protracted one, the presence of the bichromate would very probably lead to partial or total insolubility of the tissue before it was ready for use. The unbichromated gelatine, however, runs no such risk, and the operation of drying it after sensitising is a far shorter one than the original dessication.

That tissue making is not a particularly difficult process is proved by a series of prints that were shown to me a few days ago, the production of an amateur on home-made tissue. Compared with duplicates in silver the carbon prints were in every case superior, although the negatives were all of them fairly good ones for silver printing.

W. B. Bolton.

* Concluded from page 20.

JOTTINGS.

Thank you, Mr. H. M. Whitefield, for your handsome acknowledgment that The British Journal of Photography is a "source in which nearly all things photographic can be found." The high falutin', in which some recently established photographic journals are fond of indulging, and by which alone they exist, looks very funny to old students of photographic journalism, who must derive great amusement from the frequency with which, in those papers that are constantly telling their unsophisticated readers that they never publish intelligence after their contemporaries, items of photographic news are reproduced weeks, months, and sometimes years after their original appearance in these pages. More than one of your contemporaries not only conveys your matter, but also the style of it; and, as for the genial journalist who a year ago accused you of copying his "side headings," and more recently said that the Almanac imitated his annual in the matter of illustrations. I am sure he would not have said such things had he known what was done in photographic journalism long, long before he entered it.

The Editor's warning as to the danger to health lurking in the careless use of mercuric chloride should be laid to heart by photographers, who, however, I should like to point out, when employing it for intensification purposes, have no need to immerse a greater portion of the hands than the finger tips in it. This reduces all danger to the minimum. I have, nevertheless, watched photographers, when using a tolerably large volume of the solution, place their hands as freely in it as if it were merely plain water, and not attempt to dry them afterwards. I do not know how surgeons treat their hands after they have had them in a mercury solution, but not long since I was present in the laboratory of a friend who was conducting some experiments necessitating the sterilisation of the substance he was working upon, and after the hands had been bathed in the mercury they were carefully dried and then rapidly passed through a gas flame to "sterilise" the hands and possibly to remove the last traces of mercury.

There are undoubtedly some good points about the piece of apparatus for developing plates in a vertical position without the use of a dark room which Mr. Alexander Watt describes; but the fact, that such a system is useless except for correctly exposed plates, at once places it out of court as regards practical utility, except, of course, to the experimentalist, who works on different lines and for different objects to the average professional or amateur photographer. Until we have all learned to expose our plates with absolute accuracy, such attempts to obviate the necessity of using a dark room must naturally be just so much wasted labour. As regards vertical development, however, I think that, if ever I desired to employ it, I should not search further for the necessary piece of apparatus than one of those grooved vertical porcelain baths to be had of the dealers. These, I believe, are made to hold three, six, or a dozen plates, and would answer just as well for developing as they do for fixing or washing.

Reading all that has been written about amidol—or, at least, a considerable part of it, for to an old hand a new developer on

paper will only go down in homœopathic doses—one conclusion is irresistibly forced upon me, and that is, that, after all, pyro has outlived the rivalry of hydroquinone, eikonogen, and para-amidophenol, and takes rank as the standard developer by which newer substances must be judged. I have submitted amidol both with and without alkali to a series of trials, but save and except that it is extremely energetic in cases of under-exposure, cleaner in working, and conserves its power for a longer time than other compounds, I can discover no advantage in it over pyro and ammonia sufficient to justify the abandonment of an old friend where it gives satisfaction. At any rate, for negative work I can get all that I require with the latter, and so long as that is the case I shall not relinquish its use. For bromide work, however, amidol is, I think, superior to iron, as I find it does not clog the shadows, gives a nicer colour, and requires no subsequent acid bath.

I have often wondered whether any practical advantage could be taken of the phenomenon of shearing stress—that is, the fact that the application of a developer to a plate of gelatino-bromide of silver which had received mechanical pressure produced reduction to the metallic state, and more recently, on the publication of Mr. Carey Lea's experiment proving that great mechanical pressure alone suffices to darken the silver salt, the same thought occurred to me. There seems to me to be some feasibility of utilising the idea for reproduction purposes, and I commend it to the attention of experimentalists.

I should like to know why (1) Mr. Henry Crouch believes that ordinary cameras are being gradually superseded by the hand camera, and that sooner or later the former will be a thing of the past. (2) Mr. A. R. Dresser believes that stopping down the lens does not increase the definition for enlarging purposes, although it may appear to do so. (3) Mons. Sauvy has resumed business at Manchester, and advertises the fact, when "Mrs. Hargreaves" also advertises that she has bought the business. (4) Retouching by electricity is regarded by some men as practicable. (5) Whether, judging by the financial success of the "free portrait" scheme, there are not more fools than Carlyle imagined in the population. (6) Why Mr. Horsley Hinton does not like his friends to say that he believes in "nothing but photographs put confusedly out of focus, printed on exceedingly rough papers, and in a reddish brown colour, fallaciously called sepia;" and (7) why (by the kindness of the Editor) I have received several letters containing all sorts of painful threats against

COSMOS.

FURTHER NOTES ON METOL AND AMIDOL.

Journal of the Photographic Society of India.)

I HAVE not been able to work much more with metol and amidol, but the following few notes in continuation of those in last month's *Journal* may be of interest.

METOL.

Metol, I find, seems to work best with potash carbonate, but it has a decided tendency to give veiled images, and may require a little bromide to give the best results. The stock metol solution with sodium sulphite keeps well, and it is altogether a clean developer.

The electrolysis of metol solution presented some peculiarities, and made up as a developer with carbonate of lithia it has shown itself more active in evolving hydrogen than any other developing agent yet tried except ferrous oxalate. I have not yet been able to try a metol-potash solution in the voltameter.

A solution of metol at 1 to 200 of distilled water was electrolysed in a tube voltameter with platinum electrodes, using 4 gravity cells giving a fairly constant current of half an ampère under a pressure of 4·4 volts The current through the voltameter at starting was about 10 milliampères, with a pressure of 2·8 volts; but after about 10 minutes it sank to 6·5 milliampères, with a pressure of 2·3 volts, and remained steady at that for the next 20 minutes. The yield of hydrogen was about ·3 c.c. in 5 minutes; ·5 c.c. in 10 minutes; ·1 c.c. in 20 minutes; and about 1·5 c.c. in 30 minutes. A purplish substance formed round the anode, colouring the solution in the oxygen tube and working out into the body of the solution, which at the end of the experiment was of a purplish brown inky colour.

With silver electrodes the result was very different. The current through the voltameter at starting was about 8·5 milliampères, with a pressure of 2·5 volts, and in about 30 minutes it had slightly increased to 8·75 milliampères with a pressure of 2·55 volts. The yield of hydrogen was greater than with platinum electrodes, being about 3 c.c. in 5 minutes; ·7 c.c. in 10 minutes; 1·3 c.c. in 20 minutes; 1·9 c.c. in 30 minutes. In this case the solution round the anode and in the oxygen tube remained quite clear, while the purple substance was formed about the base of the cathode, discolouring it and the solution in the hydrogen tube. The anode was covered with a pulverulent deposit of silver, and very finely precipitated silver was also diffused in the solution. In both cases the hydrogen formed a brownish froth at the top of the hydrogen tube, and it was difficult to estimate the amount of gas liberated. A second experiment with a battery of three dry cells gave a similar result.

A solution of metol and lithia carbonate—

Metol	1
Lithia carbonate	2
Sodium sulphite	10
Water	200

was electrolysed with platinum electrodes, and a current from 4 gravity cells. The current through the voltameter at starting was 35 milliampères with a pressure of 3·25 volts, and remained fairly steady. In 5 minutes 1·8 c.c. of hydrogen were given off, and in 15 minutes 6 c.c., which is a very much larger proportion than usual. Some gas was also given off from the anode, but not in measurable quantity. The hydrogen was frothy as before. After 15 minutes the solution was only slightly yellow. The anode was surrounded by a deep yellow solution, and the solution in the oxygen tube was yellow. In the hydrogen tube it was quite colourless.

AMIDOL.

A plain solution of amidol at 1 to 200 of distilled water was electrolysed with platinum electrodes and a current from 4 gravity cells. At starting the current through the voltameter was 10 milliampères with a pressure of 2·1 volts, which decreased to 9 milliampères and 1·75 volt in 30 minutes. The yield of hydrogen was ·5 c.c. in 5 minutes; 1 c.c. in 10 minutes; 1·8 c.c. in 20 minutes; and 2·3 c.c. in 30 minutes; about ·5 c.c. of gas was also evolved from the anode. The anode was stained brown, and the solution turned a deep claret colour. No decolourising action was noticed in the hydrogen tube.

With silver electrodes and the same battery and general arrangements, the current at starting was 23 milliampères with a pressure of 3·1 volts, and at the end of 30 minutes it was 19 milliampères with a pressure of 3 volts. Hydrogen was given off more freely than with the platinum electrodes, the yield being in 5 minutes ·6 c.c.; in 10 minutes, 1·3 c.c.; in 20 minutes, 2·4 c.c.; and, in 30 minutes, 3·5 c.c. No gas was set free from the anode. The anode was covered with a compact deposit of dark purple on the outside and greyish inside, which separated afterwards in flakes, probably an oxychloride.

The cathode was quite clean. The solution was very dark but clear, and no decolourising action was noticed in the hydrogen tube.

It may be noted that, if a solution of amidol be added to a solution of silver nitrate, a thick white deposit as of chloride of silver is at first thrown down, but the solution speedily takes a rich crimson colour, and the precipitate is redissolved, silver being reduced.

The voltameter used on the above experiments consits of a glass vessel holding about 4 ounces of solution, closed at one end with a cork about 1¼ inch in diameter. The electrodes are of platinum or silver about ⅜ inch wide, 1 inch long, and about 1 inch apart, the wires from them passing out through the cork below. The gases are collected in graduated measure glasses divided into tenths of a cubic centimetre.

The galvanometer used is one of Edelmann's absolute unit galvanometers reading up to 12 volts with 1000 ohms resistance, or to 12 milliampères with 100 ohms resistance; with 10 ohms resistance up to 120 milliampères, and with 1 ohm resistance up to 1200 milliampères. It also has a separate shunt of 0·1 ohm resistance, by which stronger currents can be read up to 12 ampères, and an extra resistance of 9000 ohms, which enables pressures up to 120 volts to be measured. I find it a very useful and convenient instrument, and it is quite portable.

COLONEL J. WATERHOUSE, I.S.C.,
Assistant Surveyor-General of India.

ON THE PRODUCTION OF BLACK AND WHITE NEGATIVES BY MEANS OF ARTIFICIAL LIGHT.

I.

AT some time or other it generally falls to the lot of most workers, be they amateur or professional, to copy a subject in black and white, such as a manuscript, engraving, a page of printed matter from a

book, or some other similar subject. With expert workers, such as those having experience in the production of negatives for photo-mechanical work, this is at all times an easy matter of accomplishment, for, as a rule, they being conversant with the working of collodion (a process especially suitable for this class of photography), the work offers no difficulty; but among the great army of non-expert workers, even including professionals, collodion work has been discarded long ago, the aroma of which is now but seldom felt even in studios. It is the dry plate, the dry plate on all hands, for all purposes, no matter how little such be suited for many of the commissions a professional may have to execute. Many have been the attempts, therefore, on the part even of experienced workers, to utilise gelatino-bromide for black and white work, as against the undoubted claims of collodion when properly understood. Nor have plate-makers been slow to recognise the importance of catering specially for this class of work, the outcome of which has been that at least one firm has for a considerable time placed on the market a very excellent plate for photo-mechanical purposes. . There is, however, a very wide range of work outside that of photo-mechanical in which it is desirable that black-and-white negatives of special features be produced, such as the copying of black-and-white subjects for the purpose of producing lantern slides for lecture sets or the reproduction of such subjects by printing on bromide or platinotype, the latter in either paper or textile fabric, whereby an amateur may experience much pleasure in prosecuting such work by means of a gelatino-bromide dry plate, provided certain well-defined lines are followed in their manipulation. In making these remarks, I do not wish any one to imagine that I in any way advocate the use of gelatino-bromide for this branch of photography in preference to collodion. I am a true lover of my silver bath, and with me such is always kept in a working condition (and a very handy thing it is to fall back upon on many an occasion); but there is no use blinking the fact that not one amateur in 500 knows anything about collodion work, and until such time as we have schools of photography, or the heads of our large amateur associations arrange for regular courses of instruction in this and many other almost forgotten branches of our science, it is not likely they will know much about it; for I fear professionals are fast "keeping much up their sleeves," as the saying goes.

To such workers, therefore, as are desirous of producing black and white negatives by means of gelatino-bromide, I offer the following suggestions, and they are the result of much close study on my part, and, I believe, point out, as good if not the best, lines to follow when it is desired to copy black and white subjects by means of gelatino-bromide.

Undoubtedly some of the first considerations, when undertaking this work are: What are the best source of illumination to employ; and, what is the best method of using such in lighting the subject it is desired to photograph? A worker having no practical experience may very likely imagine that, to obtain the best results, it is necessary to employ daylight for the exposure of the plate; but, although daylight is in many ways preferable to artificial light when following most branches of photography, experience has shown me that quite as good results are to be obtained by a well-arranged system of artificial lighting as is possible with daylight. I desire, however, to qualify such assertion to this extent —that there is undoubtedly a limit to which artificial lighting is applicable. In cases where such work as the copying of large maps, plans, and framed engravings of very large size are concerned; there is no doubt that better or more even illumination is obtained by means of daylight than is at all possible by artificial light, but it seldom happens that amateurs or non-experts have such extreme sizes to deal with. The more commonly met with sizes will run from about four inches up to fifteen, and such are perfectly capable of being dealt with by a system of artificial lighting. Having said so much may be accomplished by means of artificial light, a student would do well to give some thought to a few very important factors in the matter of what is the proper amount of light to employ, or in other words, to understand thoroughly the difference between the *intensity* and *quantity* of light he is to use.

I sometimes think that there is not sufficient notice taken by workers of the difference which exists between these two important factors when practising photography in many of its branches. Somewhat recently I happened to remark to a gentleman that as regards the quality of the resulting picture it mattered a good deal whether the exposure was made with the aid of a bright light and a small stop, or a weaker light and a larger stop, the exposures being calculated correctly for the different stops. My friend could not see that there would be any difference, say, in the case of taking two negatives of a landscape, alike in every other respect as regards colour, &c., but different in light. Suppose the first negative was made at a moment of bright illumination, and a stop of small dimensions inserted in the lens so as to give a correctly timed exposure in so many seconds; while in the case of the other plate the lighting of the view was say, four times weaker, to make up for which a stop just double the diameter was employed, so as to make equal exposures, the plates, of course, would or ought to receive equal impressions as regards the light that reaches them.

This is a very commonly accepted theory, but the fact is that the results are by no means the same as regards the quality of the picture obtained. In the one case the picture is obtained by an intense light stopped down, and in the other case by a less intense light with less cutting off. Let any worker try a few experiments in this line, and he will not be long in finding out that very different results are obtained, according to the nature of the light employed in conjunction with different stops.

With some workers the knowledge of such difference obtained by this means is taken advantage of in their style of working, and here we have just a one very important factor that must be taken into consideration when making black and white negatives, or, in other words, negatives that are strong in contrast. When, therefore, it is desired to gain the utmost amount of contrast possible, so far as the lighting of the picture is concerned in conjunction with the employment of a certain stop, the light should be of the utmost intensity in the first place, and a small stop used so as to gain contrast.

Of course, the reverse of this is the employment of a weaker light and a larger stop, the result being less contrast.

Of the different methods of lighting such subjects, numerous have been the trials made, some advocating the burning of magnesium ribbon, some paraffin lamps, others common house gas. I don't know, however, if other workers' experience in any way agree with mine. As regards magnesium, I always found it troublesome and messy in a greater or lesser degree, and by no means so easily controlled as the working by means of house gas, and therefore I discarded it entirely for a *distinctly practicable* method, the first essential of which is certainty in the results obtained, with the utmost comfort in its use. In common house gas we have all that is required, provided a proper arrangement of burners be provided, and these so fitted as to permit of their being placed easily in a desired position in front of, or to the side of, the work that is to be copied.

Of the various forms of gas burners, perhaps as yet no more useful form has been provided for good, sensible, hard knocking about than the ordinary Argand pattern, such as give a light equal to about sixteen candle power. With four of such attached conveniently to ordinary gas pipes, much may be done in the way of conducting photographic operations even on a large scale. For smaller work two of such will be found ample.

In utilising such burners, a very convenient method to follow is the attaching of them to an upright stand in such a way that the lights can be elevated or lowered at will. Any one can easily make such an arrangement themselves. The first necessity is a good baseboard to carry the burner. This is easily made by utilising a piece of board one inch thick by six inches square; to the centre of this baseboard screw an upright support eighteen inches high, having a thickness of half an inch and width of three inches. Right down the centre of this upright support cut out a slot so that the stem of the gas burner will slip up and down easily. The burner is clamped and held in position on this upright by means of two wooden collars, kept tight by a small bolt and nut. It does not take much ingenuity or trouble to rig up an arrangement of this sort. My own apparatus is home-made, and I can testify to the perfect manner and comfort with which it works.

To the end of the pipe on the burner is attached a length of rubber tubing, which brings the gas from any convenient source. The great advantage of this arrangement is that the lights can be placed in any desired position, up or down, or to the sides. I fit on to each burner a reflector made of plaster of Paris, in form similar to the opal cover of a microscope lamp. This has several advantages over every other form of reflector I have ever met in with, and works admirably.

On a future occasion I shall describe more in detail the manner in which these reflectors are made, for they are well worth the small amount of labour and trouble it takes to construct them.

T. N. Armstrong.

AMIDOL.

I note what Mr. Mansfield asks in your paper of the 20th inst., and so answer it, and give my opinion on amidol.

I stated, when I spoke on amidol at the Photographic Society of Great Britain, that I could not speak with any authority on the use of amidol for negative work, as I had not had a chance to give it a fair trial, only having used it two or three times, but that for very fast exposures I had found it work very well in the few trials I gave

it. I do not use the formulæ that are sent out by the makers, as I did not like them, and much prefer the formulæ I use; and, again, they distinctly stated that no accelerator is necessary, and I have found just the reverse, as the formula I use for amidol I find works best with carbonate potassium, carbonate soda, or ammonia, and for very fast exposures, so far, I have found that either carbonate potassium or ammonia works best.

The formulæ I use are as follows:—

No. 1.

Amidol	1 ounce.
Metabisulphite potassium	1 „

Mix and make up to 10 ounces.

To use with this, I make up the following:—

No. 2.

Carbonate potassium	1 ounce.
Water	5 ounces.

No. 3.

Carbonate soda	1 ounce.
Water	5 ounces.

No. 4.

Bromide	10 per cent.

No. 5.

Ammonia (·880)	1 ounce.
Water	2 ounces.

And use the various accelerators as required, as I, for one, am quite sure that a one-solution developer cannot give good results, as one wants to alter the strength of the developer according to exposure given.

The way I use the formulæ given is as follows:—

For instantaneous work (one-hundredth to two-hundredth of a second).

Amidol (No. 1)	1 drachm.
Carbonate potassium	40 drops.
Water	1 ounce.

The image will appear at once (if it is there), but requires some time (ten to twelve minutes) to get up the density. After image is well out I add twenty drops more of carbonate of potassium, and if *very* much under-exposed go on adding carbonate of potassium (No. 2) till the developer turns quite black; and, although developer may turn black, it will not stain the plate, but on *no* account must it be used again after potassium has been added to that strength. I have tried to fog a plate with amidol by increasing the accelerator (potassium), but have not been able to do it; if the potassium was added little by little, say, five minutes apart, but if you add an excess at once it will fog.

When using ammonia with amidol, it requires a good lot. I begin as a rule with—

Water	1 ounce,
Amidol	1 drachm,
Ammonia (No. 5)	4 to 5 drops,

and add ammonia as required. I have added up to forty drops without fogging.

I use no bromide if I think the plate is under-exposed much, but if the exposure has been over the $\frac{1}{100}$th I use a little bromide, as amidol works so much better with it.

I was hoping to be able to say for certain what I thought of amidol for negative work, but the weather has been so bad I have had no chance to get any negatives. I have found it work well, as I said before, with what few instantaneous shots I have been able to get (skating views), and studio work; but, so far, I have not managed well with it for negatives that have been over-exposed (although I knew they were so), and cannot recommend any one to give up eikonogen for amidol, although I believe it is quite as good, but being fond of eikonogen for negative work I shall not give it up in a hurry.

For slides amidol works well, but I gave my experience with it in an article elsewhere, so there is no need to repeat it.

For bromide papers I consider nothing can touch amidol, as I am astonished at the certain results one can get, not spoiling one enlargement out of a dozen with the development. The chief point one has to consider is not to over-expose if possible, as one can get as *good* results on bromide papers with amidol (formulæ I use) as with iron, and only have to give one quarter the exposure. I have now had about three weeks' steady work at enlarging and developing with amidol, and so can speak with certainty as to the results to be got, and, what is more, I can show them. When I first used amidol I worked with formulæ sent out by the makers, but found if you over-exposed you were sure to lose the picture, and so gave it up for that reason; and also the developer would not keep, but turned a dark brown in a week or ten days, which I did not like, so set to work to try amidol with metabisulphite of potassium, and can safely recommend it to every one.

The formula I use for my enlargements is the one you published as given at the Photographic Society of Great Britain, but it makes little difference if you vary it a little; but on no account make it weak, or you will get grey tints and not good blacks. For good blacks one must use a *strong* developer and a short exposure. To give an example, I have just been enlarging up to 15 × 12 from part of quarter-plate with limelight and portrait lens, working at *f*-6 on Eastman rapid bromide, with a fair negative, *not* thin, but a good silver printing negative. I only gave ten seconds' exposure, and it was fully exposed.

The formula for bromide paper is—

No. 1.

Water	3 ounces.
Amidol	3 drachms (or 2½ least).

No. 2.

Carbonate of potassium	2 drachms.
10 per cent. bromide	30 to 40 drops.

and if the image does not come up fast enough add more of No. 2.

I think these few remarks may help my brother amateurs, and I can only say I shall be glad at any time to help any of them along if able by any answers I can give to questions they may ask, and some future day I hope to be able to write with some certainty on amidol for negative work.

A. R. Dresser.

BROKEN DISHES.

Apropos of that broken dish of your correspondent "Old Collodion," and the answer to correspondent "C. Williams," to repair broken photographic earthenware dishes—if they are anything of the kind of size suggested by "Old Collodion," say for 24 × 20—is an absolute impossibility. The material of such dishes, and, indeed, all dishes of the class indicated, not being thoroughly fused, as old china, glass, or porcelain is, remains in a state of tension, and when broken it will be found that an absolutely close joint is impossible, the material itself shrinking or changing shape, and so preventing a true joint. In this case the strongest jointing material I have had experience of is the zinc white sold in tubes by artists' colourmen. Before using it try whether the edges of the break adhere to the tongue or otherwise absorb water in any degree. If so, saturate its desire for damp by coating the edges with the thinnest photographic varnish once only. After this is quite dry, plaster the edges of the broken dish with the oil zinc white, press them together as firmly as possible, and set to dry in a warm place. Clean off the surplus in about a week after, and let stand for another week. This is the strongest way I know of mending (for use) a broken dish.

W. H. Davies.

DETERMINATION OF PLATE SPEEDS.

I.

Those who remember with what a flourish of trumpets Warnerke's sensitometer came before the photographic world will probably have reason to think that history repeats itself, and very quickly too, if we may judge by current events. I have referred to the Warnerke instrument by way of reminding my readers of how exultingly we hailed this little invention as the very ideal and perfection of a speed-measuring system, for had we not at last hit upon a "standard light," and had we not got a perfectly graduated screen? The standard light was soon found to be utterly fallacious; and, as for the screens, why I have now in my possession a couple of screens which to the eye differ in densities by twenty-five per cent.! So one event in photographic history has been the complete discrediting of the results shown by the Warnerke sensitometer, and we shall probably not have long to wait before we see a similar fiasco.

Let me say here that no one would more appreciate a really reliable system for measuring the speed of plates than myself. My love of instruments of precision causes me to delight in the delicacy and beauty of such apparatus as is employed for minute and exact measurements in the kindred sciences—electricity, for example—and it has occasioned many a longing in my mind when I have seen with what exactness and nicety measurements can be made by other scientific appliances, whilst in photography we have none. Whether it will ever be so, I cannot venture to predict; but, when we consider the varying factors with which photographers have to contend, it would almost seem hopeless that our dreams could ever be realised,

because, to begin with, we are about as far off the realisation of a standard light as ever we were, and until we can hit upon a *standard that shall be equivalent to daylight in its properties* it appears to me almost wasting time to attempt to construct any system for measuring the speed of plates if reliable accuracy and incontrovertible readings are to be obtained. I hold that to submit plates to any artificial light with the object of ascertaining their speed is tantamount to arguing upon false premises. As ninety-nine per cent. of our plates are subjected to exposures (within a camera) with daylight as our illuminant, it appeals at once to our common sense as being wrong to attempt first to ascertain the speed of those plates by any standard in which an artificial light is the prime factor.

Various attempts, more or less crude, have been made to reduce daylight to a standard by the use of comparatively insensitive surfaces, which, when exposed to light, will assume a tint more or less rapidly; this tint has then to be compared or matched with some arbitrary or fixed tint, and the time occupied for the attainment of similarity is taken as a measure of the light force, and forthwith made a factor. But I am sure I need scarcely appeal to the older race of photographers, who have already seen such things come and go, to receive their confirmation of my view, that such rough and inexact appliances (in which it is at all times possible to multiply the error ten times or a hundred times) can never be seriously put forward with the hope that we could recognise them as even approaching what we seek in a standard.

When the unreliable readings of the Warnerke sensitometer became apparent, our plate-makers quickly relinquished the issue of plates bearing any actinometer or sensitometer number, and a pretty general return set in to the older nomenclature, which held good during the earlier years of gelatino-bromide photography. It is almost needless to repeat what those names were, but I may just give a few of them, viz., "Ordinary," "Medium," and "Instantaneous." With some variations, such as "Landscape," "Studio," "Rapid," "Extra Rapid," "Special Rapid," "Drop-shutter," &c., these terms have remained in vogue, it being deemed ample description to apply some one of these to the two or three rapidities of plates issued by most makers. I think the use of the terms twenty times, thirty times, or sixty times —meaning those many times the speed of wet collodion—have nearly died out, and, for all practical purposes, the relinquishment of the Warnerke sensitometer numbers has resulted in the adoption of such appellations as serve the requirements of distinguishing the use of the plates; for instance, any one who uses various rapidities of plates will feel that, when he exposes, say, "Ordinary" plates (of any good brand), he will employ them on such subjects, and give them exposures which would be likely to yield him results of a satisfactory nature, not requiring the use of quicker plates. The description given to their plates by makers of good brands is such as probably fills every present requirement; the name fairly indicates its speed, and, in the absence of any other reliable method, is actually preferable to misleading numbers.

Some few weeks ago I noticed a statement that six plate-manufacturers had adopted the Hurter & Driffield method of determining the speed of plates. Probably I need not recapitulate here what that method is; the statement, however, created some surprise, in which I share. I think I do not stand alone when I say that I do not concur with the general accuracy of the "Investigations" of Messrs. Hurter & Driffield. With the method they adopt to ascertain the speed of plates I am decidedly at issue, and for the reason I gave above, viz., that I consider it is based upon wrong premisses. However, an opportunity presented itself whereby I could devote the requisite time to carry out a series of experiments, and I was enabled to enter upon the inquiry with deliberation. I ascertained from the dealers that only two makes of plates could be had marked with the speed numbers according to the Hurter & Driffield method. I obtained plates marked 37, 80, 95, 100, 135, and 140, with which I forthwith commenced my experiments.

The basis upon which I began is as follows :—

Daylight exposures, in a twin-lens camera, on such a subject as should embrace deep shadow, and therefore require a long exposure. Each exposure checked (to verify accuracy of lenses and stops) by placing the competing plates first right and left, and then left and right.

Development effected in most instances by a normal developer, such as the maker recommends for his plates. Large quantities of normal constituents of developers were mixed (forty ounces at a time), in order to obtain uniformity as far as possible. The subject contained high lights, as well as abundance of shadows, but necessitated an exposure of from thirty to sixty seconds, at *f*-16, according to the day. In every case exposures were given that would ensure the shadows remaining clear up to the very end of development, even if that was necessarily prolonged to give the slower plate every chance. The pairs of plates were developed together in one dish, where the developer would permit, and the principle acted upon was that of allowing a slow or sluggish plate time to go on developing until such times as that function was exhausted; in other words, getting the most out of every plate.

The method of employing a twin-lens camera is probably less open to error than any other. For the purposes of this experiment Messrs. Ross & Co. furnished me with a pair of portable symmetricals, which were specially selected, and adjusted so that their foci and their stops should be identical. Before using them I carefully measured the stops, to assure myself of their accuracy, and I am prepared to speak with certainty of their exact performance. As most of the experiments were duplicated (alternating right and left), any inaccuracy would be checked.

Before I describe the nature of the experiments, I had better mention that, in competitive experiments such as these, when we come to develop pairs of plates of different makes, it is frequently found that one make of plate will start much before the other; indeed, it is not unusual to see one plate well out before the other starts. There is nothing in this disadvantageous or the contrary, as it is the final result that has to be looked for, and the condition of things, when both plates have stopped and all there is to come has been obtained, then has to be estimated. Inexperienced developers might jump at the conclusion that the plate which springs up first is the quicker plate; but this is by no means so, often it is the very reverse.

G. F. Williams.

THE HAND CAMERA AND ITS USE IN PICTURE-MAKING.

[Brixton and Clapham Camera Club.]

On this subject there seem to be the most absurd misconceptions abroad, among both the non-photographic public and a large number of those practising photography. It appears to be assumed immediately one leaves off using a tripod, the millennium has come; and no matter what the subject, conditions of time, light, or plates, &c., every exposure can satisfactorily be made in fractions of a second fearful to calculate, and the results turned out in one unbroken string of successful negatives, from which prints may be produced that, for freshness, beauty, and truthfulness to nature, will outrival, or, at any rate, hold their own, side by side with pictures produced by any of the best methods in monochrome.

This is a state of things which may hereafter be brought about, but it will be far away in that dim and distant future when, perhaps, Lord Lytton's *Coming Race* are dabbling in the black art.

The Hand Camera not a Toy.

Now, I propose to-night directing a few remarks to the *real work* to be done with a hand camera; and if any among you look upon it merely as a toy, to be taken out to shoot off a few plates with, I am going to try and convince you that just as good pictures can be done, and *are* being done with it as with cameras worked on a stand. With certain classes of work excepted, as, for instance, *interiors*, and, in fact, just those kinds of work that require a more or less prolonged exposure, when, of course, a tripod, or some arrangement for holding the camera is absolutely necessary—and I do not agree with those who claim that the hand camera is superseding the so-called ordinary camera—each method of working has its uses, and so it will remain until the *speed race* has placed in our hands a workable plate, capable of being taken into the dim, mysterious cloisters, and of such a speed as to be sufficiently exposed with a second or less. This time has not quite arrived yet, and the tripod will still remain with us. Personally, I fail to see any pressing reason to wish its early demise; there is room and work for both.

Various Classes of Hand Cameras.

I do not think we should be spending our time with profit by going through the long list of hand cameras now on the market, and considering the details of their construction or methods of working; any of the trade lists will fully describe them, and, in case further information is desired, the makers of any particular one would be certain to make every possible point in favour of his camera absolutely clear to intending purchasers, with, perhaps, some favourable points it should possess thrown in.

There are, broadly, two classes of hand cameras—one in which the plates are held in a magazine, and the other in which ordinary dark slides are used, neither being the best method, but simply one of convenience.

When one speed of plate is used, and rapidity in working desired, then the magazine form is convenient; but if plates of different speeds were taken out to be used as circumstances required, then the dark slides would undoubtedly answer better. It is a matter each worker must decide for himself which system will be most convenient, it making

absolntely no difference to the quality of the results as pictnres whether the plates are carried in a magazine or ordinary dark slide.

I will show you one example of each system, and would only observe I am claiming nothing for either of them as to their being better or worse than others of a similar character, but merely use them to show you the broad difference between the rival systems.

The Important Points.

Briefly, the important points in any camera intended for use in the hand are first and foremost (1) the lens, (2) the shutter, (3) the focussing arrangements, (4) the finders; and then you have this further question, whether plates or films are to be used. And on this I have nothing to say to-night beyond that it is a matter each must again decide for himself, there being very substantial points in favour of films both on account of their small weight and convenience in packing, and if used in a roll-holder, one cannot close one's eyes to the fact that it certainly is of enormous advantage when perhaps you have tramped ten or fifteen miles out into the country or along the coast, to have the means of making from fifty to one hundred exposures instead of being limited to twelve, or, at most, twenty, as when using plates. On the other hand, the very advantage offered by being able to make a number of exposures (in excess of those under ordinary circumstances made when using the camera and tripod), and done with so little trouble, has been one of the weakest points about hand-camera work, and is largely responsible for the mass of utter rubbish produced by it.

The Lens.

This is the most important item about the whole apparatus, if you intend, as many of us would, that one lens only should be used, and used on all classes of subjects that may have to be dealt with. Then it is of vital importance that the quality of such lens should be of the very best The question arises, Which is the very best?

The hand camera will undoubtedly be used upon subjects of varied character—marine, landscape, figure, and subjects in which buildings appear, and in which it is desirable that straight lines should be kept straight, and not appear as if they had been keeping Christmas festivities up not wisely, but too well. It is certainly an advantage, in my humble judgment, to use a good rectilinear lens.

I am aware many workers advocate the use of a single lens for general landscape work, and, although I am far from saying the rectilinear lens is absolutely necessary, I myself fail to see any quality possessed by a single lens that is not equally possessed by the rectilinear; and one does find very marked advantages possessed by the latter type—one instance among others, in dealing with architectural subjects, or anywhere straight lines appear; and hence I would prefer the rectilinear, and in my own work have, during the last eighteen months, used exclusively one of Wray's, of which I cannot speak too highly.

Whichever kind is used, there is the question of its focal length to be considered, and here I am at arm's length with those who insist upon the necessity of a lens of short focus being used in hand cameras. I fail to see any sound reason for departing from the same rule that applies when using a camera on a stand for the purpose of picture-making—that the lens should not be of so short a focus as to reproduce a view otherwise than as seen in nature by the human eye when looking at it under normal conditions.

It appears to me the best results all round will be got by using a lens on a quarter-plate, or 5×4 camera, of five to six inches focus, my own being five and a half inches, used on a quarter-plate.

Then there is the diaphragm to be considered, and here another advantage arises in using a lens of the character just named—Wray's, working up to full aperture of *f*-5·6—and, although it is not often necessary to use it at that large apertnre in my own practice, for reasons that appear later on, still it is an advantage that costs nothing to keep, and now and then is the means of allowing a picture to be obtained that could not otherwise be enccessfully done. It is needless to say the Iris form of diaphragm possesses distinct advantages over the older form, allowing, as it does, of quicker changes being made, and, what is of not less importance, by its sticking to the lens closer than a brother, prevents you finding, when too late, that the stops have preferred stopping at home.

The Shutter.

The forms of this are innumerable, but the important characteristics for it to possess are that of being easily adjusted to different speeds and working without vibration.

Whether it is in front of the lens, between, behind, or immediately in front of the plate in the form of a blind, personally I care not a jot. The Thornton-Pickard time and instantaneous shutter answers all my requirements.

The Focussing Arrangement.

This is an arrangement the need for which is by some hotly contested, but, althongh a so-called fixed-focus camera does away with any trouble and need for jndgment in this direction, and at first, in using one, allowing of alteration in focus, there are some sad mistakes made in judging distance, yet it is a difficulty that must be faced, and by care and practice overcome, like many others, when one desires to get the best possible results under all circumstances.

Whatever the arrangements be—whether by lever, as in the one present, or by rack and pinion—it should be in such a position as to be easily got at and attended to, in case, as often happens, of a change being required in a hurry. Needless to say, it should be correctly scaled, if the focussing is done to distance.

Finders.

And now there is only one more feature in connexion with the camera I need allude to, and at the commencement I do not hesitate to say a camera is, for the purposes of being used as a means of procuring pictures, practically useless unless it contains some efficient kind of finders. It is asserted by some they are needless, a great nuisance, and quite unnecessary.

With every respect I say it, anything more misleading cannot well be imagined.

That you may quickly be able to point the camera and lens so as to insure the object—say, a man or woman walking—shall be on the plate, one can understand; but, without wasting time over it, *finders are absolutely* necessary if you desire to ascertain that your main object of interest takes its proper position, and that the whole composition is properly balanced—in fact, there is no difference in arranging and composing a picture, whether to be copied with a camera held in your hand or used on a tripod, it requires the same care and constant attention.

It would be equally absurd to say that a ground glass was nseless and of no assistance in composing a picture when using a camera and tripod.

Any hand camera to be of use needs good finders (which, by the way, are, as most if not all of you are aware, simply small camera obscuras). There should be either one or two, so that you can see at once how the picture looks both upright and horizontal. They should give you just so much of the view as will be taken in by the lens taking the photograph, and no more. They should also be well sunk in so as to render it possible to see the image easily on the small ground glass.

They are better if covered with a lid, as in one shown, that can be raised partially or as desired, and forms a very effective screen.

One more thing about the finders. They should be as *large* as possible, so as to be more easily seen.

There is nothing further about the apparatus itself I can usefully occupy time in describing. I pass by swing backs, rising fronts, levels, side swings, and all the hundred and one other things you find on cameras nowadays, half of which are rarely used, and the purpose of the others as often as not misunderstood. That they are some of them useful, more especially the swing back when doing architectural work, one knows; but in the hand camera, although in theory they would be equally necessary, in practice that is not so, and, to sum up, it should be as light as possible without sacrificing strength, it ahould be compact, it should be simple in its movements, and certain in its action.

The Kind of Plate to Use.

Turning from the apparatus to its use, the first thing to settle is the kind of plate to use. At present I, for one, do not feel disposed myself to throw over the glass support for films for various reasons. Mr. Butler could suggest one or two, and I know our friend Mr. Goldby has made some wonderful discoveries with them in the shape of new stars and planets and comets, but he fails to appreciate their true value. When they in their eccentric fashion are found on his negatives starting out of mountain sides, and the comets wandering up and down the plate in an altogether unaccountable fashion peculiar to such things, he objects, and perhaps most of us would do likewise; and, although films have been very much improved of late, yet glass snpport stands the favourite, and it will be of such plates I shall say a few words, at the same time my remarks being equally applicable to films.

This question of plates is a matter in which different workers appear to follow paths widely apart. Some, and among them being names well known as successful hand-camera workers, advocate the using for general purposes plates of about the same rapidity as Ilford Ordinary. This may be all right during the short period of the year (May to August) when the light is at its best, but even then I don't find they are by any means rapid enough when used on subjects containing any great amount of shadow. Of course, if they can by any means make certain of sufficient exposure being given to all subjects as they arise, then by all

means use a comparatively slow plate, since the development is much simpler and the cost quite fifty per cent. less than that of plates of extreme rapidity; and, all things being equal, perhaps the average results obtained from slow plates would be higher than when handling more delicate ones. *But*, and here's the rub, can we get full exposure on the bulk of subjects such as I am dealing with to-night (examples of which are before you in form of prints, and later on some will be shown you through the lantern) on ordinary plates?

RAPID PLATES TO BE PREFERRED.

I think not, and from inquiries made of those with whom I have come in contact, I am certain the greater number who use the hand camera successfully wisely provide themselves with a plate rapid enough to meet all reasonable calls that may be made on them in, say, a day's work; and, after all, if you use plates a trifle quicker than are absolutely necessary for *some subjects*, yet the remedy is so simple, either to stop down a little or quicken the shutter. I used this last year mostly the Mawson plate, and some of the Lumière; and, as you will observe from the prints and negatives, the subjects are of a varied character, and were taken at times ranging from four a.m. to eight and nine p.m. You may find traces of slight under-exposure, but none of the frantic results you would expect from over-exposure, when I tell you a smaller stop than *f*-11 was rarely used, and the average exposure given about one-tenth to one-fifteenth of a second, and in developing them they were done eight or a dozen at once in a large dish, and dealt with on the assumption that if wrongly exposed it erred on the side of under rather than over-exposure, having a dish of strongly restrained pyro developer at hand to bring up density, and as each negative came fully out in detail they were, if requiring it, transferred to the second dish and left till complete, this method being a revival of the old wet-plate method—detail first and then density.

It may be taken as pretty safe advice that, as regards speed of plates to be used in May, June, July, and perhaps early part of August, good results may be looked for with a plate of similar speed as, say, Ilford Rapid. I only mention that make of plate because it is so well known and forms a good standard to judge by. During the remaining portion of the year I would strongly advise a good plate, and by that I mean one rich in silver, and just as quick as can be got; this is, I ought to say, when using a camera of the magazine form. Of course, if using one with ordinary slides, then plates of two or three speeds are available, and can be used as desirable.

That it is useless placing these very sensitive plates in the hands of beginners goes without saying, and it is equally true that, with rare exceptions, it is worse than useless to place the hand camera before them and expect any other result than failure. W. THOMAS.

(To be concluded.)

LIQUID AIR.

WRITING of Professor Dewar's recent experiments on the liquefaction of air, the *Times* says:—

"Liquid oxygen, until quite recently, was a curiosity produced in quantities of a few grammes, too small and too evanescent to admit of any exact and systematic examination of its properties. Professor Dewar produces it by the pint, and demonstrated its more obvious physical properties—its beautiful colour, the blue of the sky, its high magnetic quality, and its characteristic spectrum—with as much facility as if he had been dealing with water. But all this, simple as it perhaps looked, has only recently become possible, and that through a very beautiful discovery of Professor Dewar's, possessing equal practical and speculative value. Liquid oxygen, boiling at 182° below zero, is at ordinary temperatures [always in a state of violent ebullition, which, in the first place, means very rapid dissipation, and in the second interferes seriously, and for many purposes fatally, with the determination of its properties. The double problem, therefore, was to find some means of preventing the waste of a costly liquid and of obtaining it in a state of quiescence suitable for experiment. All the ordinary non-conducting devices proved useless; but the problem was solved by the discovery, that by surrounding the vessel containing the liquid with a very high vacuum the influx of heat from outside could be reduced to one-seventh, as was proved on Friday by actual measurement of the escaping gas, or by other refinements not shown on Friday, to a yet lower point. The result is liquid oxygen at a temperature below its boiling point, tranquilly and slowly evaporating, as water evaporates at moderate temperatures. No ordinary vacuum is of any use. It must be a high vacuum, and Professor Dewar has given a new significance to the phrase; for he has produced vacua measurable in hundred-thousand-millionths of an atmosphere, and by means which exhaust the largest vessels more quickly than the mercury pump exhausts the smallest.

"Many remarkable phenomena were shown on Friday, but none was more worthy of attention than the little bulb of liquid oxygen, something between a walnut and a golf-ball, which hung in a clip upon the lecture table. It was filled and hung up at an early period of the lecture, and it remained four-fifths full at the close. If a conjuror had made his appearance with a large vessel of boiling water and a brisk fire beneath, and if in that water he had boiled for half an hour a piece of ice as big as a golf-ball without reducing it by more than one-fifth, every one would have been vastly astonished. But the little bulb full of liquid oxygen was far more wonderful. The difference of temperature between the conjuror's ice and his boiling water is 100° Centigrade. The difference between the temperature of Professor Dewar's bulb and the air of the theatre was not less than 210° Centigrade. Yet, though that scorching blast necessarily had free access to the oxygen in one direction, the liquid was so perfectly protected by its vacuum jacket as to retain that relatively high degree of permanence.

"Not only is liquid oxygen rendered thus susceptible of complete and leisurely examination, but it becomes a valuable means for pursuing further research. It was shown that atmospheric air can be condensed into a liquid at ordinary pressure by the cold of liquid oxygen boiling under the air-pump. Liquid air, which was also shown in quantity produced by other means, enables us to effect a further reduction of temperature, and, therefore, an approach to the solution of the tremendous problem of liquefying hydrogen. A gas which occupies weight for weight nearly fifteen times the volume of air, and requires for liquefaction a temperature twenty degrees or thirty degrees lower than the lowest yet produced, obviously offers difficulties of an unusual kind. If they are ever overcome, it will be due to the great advance we have just described in the methods of storing and manipulating liquid air.

"An interesting illustration was given of the essential difference between a liquid and a gas of identical composition. Air liquefies as a whole, the liquid containing oxygen and nitrogen in the normal atmospheric proportions; but, when the liquid is allowed to boil, it follows the laws of mixed liquids, the nitrogen with its lower boiling point distilling off first, and showing no appreciable admixture of oxygen until half of the mass has evaporated. It was also shown by various experiments that liquid air behaves in the magnetic field and in the spectroscope simply as diluted oxygen. Its colour is to the beautiful blue of oxygen as the watery sky common in this country to the azure we see through breaking clouds after a storm."

COMPOSITE HELIOCHROMY.

[Journal of the Photographic Society of Philadelphia.]

THE following is an extract from the report of the Special Committee appointed by the Board of Directors of the Photographic Society of Philadelphia, September 1, 1892, to take into consideration the advisability of some form of recognition by the Society of Mr. Ives' work in connexion with composite Heliochromy:—

"Mr. Ives' system of colour photography, which he has named 'Composite Heliochromy,' consists—

"1. In the production of a triple photograph or chromogram, one image of which represents, by its light and shade, the effect of light from the object upon the fundamental red sensation, another the effect upon the fundamental green sensation, another the effect upon the fundamental blue-violet sensation, in accordance with the Young-Helmholtz theory of colour vision, and the actual measurements by Maxwell and Abney of the relative power of different spectrum rays to excite the respective fundamental colour sensations.

"2. The optical superposition of the three images of the chromogram, either by means of a triple optical lantern, or in a table instrument known as the Heliochromoscope, in which the image of the red sensation is seen by red light, the image of the green sensation by green light, and the image of the blue-violet sensation by blue-violet light, but with the three blended together to form a single image, which reproduces the light and shade, and colours of the objects photographed.

"The triple photograph is made by a single exposure, on a single sensitive plate, and from a single point of view, by means of a special camera of Mr. Ives' invention, in which the incident light is divided by the partial reflection and partial transmission of light by transparent mirrors, ingeniously arranged to secure the projection of the three images on a single plane, with identical perspective. The sensitive plates employed are sensitive to all the visible spectrum rays, which are made to act in the production of the three images in proportion to their power to excite the respective fundamental colour sensations. This result is accomplished by filtering the light which goes to each image through a selective colour screen, which has been adjusted by experiment in photographing the spectrum itself, to secure in the spectrum photograph a density curve corresponding to the graphic curve of the same sensation in Maxwell and Abney's diagrams. The adjustment of such a camera can only be made by a scientific expert, familiar with the laws of optics and the use of the photo-spectrograph and the photometer; but when the adjustment is once made the successful operation of the process is brought within reach of any skilful amateur photographer, no more operations being necessary than for the production of an ordinary negative and lantern slide.

"The Heliochromoscope is a neat table instrument, containing the

same system of reflectors as the camera. By its use the chromogram is seen as a single picture, reproducing the natural colours as readily as a stereogram is seen in the stereoscope reproducing binocular vision.

"The first suggestion of composite colour photography was made, we believe, by Henry Collen, of England, in 1865, and improved upon by Du Hauron and Cros, in France, in 1869 and after, but without recognition of certain principles of colour vision, the application of which Mr. Ives holds to be essential to success. Mr. Ives has been charged with making claims that are unfair to Du Hauron and Cros; but a careful examination of his publications upon this subject has satisfied your Committee not only that he has stated the claims of his predecessors in this intricate and not generally understood field of research, fully, clearly, and fairly, but he has repeatedly given the references to the original publications of Collen, Du Hauron, and Cros, in order that the accuracy of his statements might be readily verified, and has stated his own claims so clearly that if his predecessors had had the same ideas the facts could readily be proved. On the other hand, we have been struck by the fact that writers who have charged Mr. Ives with unfairness have, themselves, either through ignorance or with intentional unfairness, failed either to describe his process or to state his claims, and have ignored altogether points of difference which Mr. Ives has insisted upon, for reasons which he has given, as being absolutely essential to success.

"The following is a brief statement of Mr. Ives' claims, which he has communicated to this Committee:—

"1. 'A triple photograph, one image of which represents by its light and shade the effect of light from the object upon the fundamental red sensation, another the effect upon the fundamental green sensation, another the effect upon the fundamental blue-violet sensation. This claim dates from November 21, 1888 (*Journal of the Franklin Institute*, January, 1889), previous to which date no one else had made photographs answering to this description, or recognised the principles involved. Such photographs are obtained by a method of precision in accordance with actual measurements of the effect of different spectrum rays upon the separate fundamental colour sensations.' (United States Patent, No. 432,530, July 22, 1890.)

"As bearing upon the above claim, Mr. Ives points out that making photographs 'through red, green, and violet glasses,' or 'by red, green, and violet rays,' as finally recommended by Du Hauron and Cros, is either positively and fatally wrong, or else the names of colours are used in such an indefinite sense that the statements have only a vague meaning, indicating no definite principle or system of colour selection, and that nobody working with such vague ideas ever accomplished anything of value.

"2. 'A camera producing the triple photograph on a single sensitive plate, by a single exposure, from one point of view.' (United States Patent No. 475,084, May 17, 1892.)

"It is a well-known fact that many unsuccessful attempts were made to devise such a camera, and that several provisional patents were taken out for ideas that failed to accomplish the desired result.

"3. 'The Heliochromoscope, the only successful device for optically recombining the three images of the chromogram to form one image on the retina of the eye, reproducing the colours.' (United States Patent No. 475,084, May 17, 1892.)

"Mr. Ives also points out that it is important to recognise that his system makes photographs by the action of all visible spectrum rays, but shows them by means of three kinds of spectrum rays only, and that nobody else saw the necessity for such a procedure, although no other is possible in accordance with the modern theory of colour vision.

"It is further claimed that the above-mentioned improvements have—

"1. Solved the problem of reproducing the natural colours by photography.

"2. Simplified the procedure so much as to make it possible for any good photographic operator to make the photographs, when supplied with the special camera, even if he have no knowledge whatever of colour science.

"It appears to this Committee that Mr. Ives' claims are sustained, not only by argument and references, but also by his exhibition of results, which may fairly be said to be wonderful improvements upon anything obtained by his predecessors. In fact, while the results obtained by Du Hauron and others are described as crude and unsatisfactory, Mr. Ives shows, by his process in the Heliochromoscope, reproductions so perfect that it is sometimes difficult to realise that one is not looking at a reflection of the object itself, instead of a photograph.

"Mr. Ives has pointed out that the results have one defect, which exists in all photographs, as has been already indicated, although it is less noticeable in the absence of colour. This defect, as has been said, is an increase of contrast in the middle shades of the picture at the expense of both ends of the scale. Ordinary photographs are relatively too flat in the high lights and wanting in detail in deep shadows, and in the colour photographs the colours are apt to appear somewhat bleached out in the lighter shades and too dull in the shadows. This defect is not noticeable in reproductions of some subjects, but quickly attracts attention in others. For instance, a bright sky will in some instances not be as blue in the reproduction as its own reflection in a body of water, because the greater light intensity of the sky itself produces the effect of bleaching out by over-exposure. Since this is the result of a defect inherent in all photographic processes, it should not be charged against the system of colour selection.

"It is also stated that delicate shades of colour will go wrong in the high lights when the sensitive plates are unevenly coated, especially if the coating be thin. The remedy is obvious, and lies with the plate-makers.

"In conclusion, your Committee submit that, in view of the great importance of the results achieved by Mr. Ives, the Society of which he has long been an active member should use its influence to secure to him just recognition for his scientific labours. To that end we recommend the adoption of the following:—

"Resolved, That the Board of Directors recommend to the Society the adoption of the following preamble and resolutions:—

"Whereas Frederic E. Ives, of Philadelphia, has, by the application of his new principle in composite heliochromy (dating from November 21, 1888), made a practical solution of the problem of recording and reproducing by photographic means the colours of nature; and

"Whereas Mr. Ives has, not only in this connexion, but in many other ways, notably in the field of photo-mechanical printing processes, orthochromatic photography, and optical projection, made distinguished contributions to the progress of the art and science of photography; and

"Whereas the Photographic Society of Philadelphia is incorporated for the special object of increasing and diffusing 'the knowledge of those natural laws which relate to the action of light, and particularly to promote improvements in the art of photography;' it is therefore

"Resolved, That, as a special recognition of the eminent scientific labours of Frederic E. Ives, a gold medal is hereby awarded to him by the Photographic Society of Philadelphia."

RYE AND WINCHELSEA WITH THE CAMERA.

Under the auspices of the Hastings and St. Leonards Church Institute, a lecture on the above subject was delivered in Hastings on Tuesday evening, January 18, by Mr. Algernon Brooker, Hon. Secretary to the Photographic Society there. Notwithstanding the severity of the weather, there was a large audience, the hall of the Brassey Institute being quite filled. The lecture was illustrated by the exhibition of about 150 photographic lantern slides of very fine quality, both technically and pictorially. Having conducted his audience through some very charming scenes by way of the Cliff-road to Winchelsea, taking Fairlight and Pett on the way, the lecturer dived into the ancient history of the old seaports, and was able to put on the screen several slides bearing on his subject, which showed the great pains he had taken to unearth the antiquities of the ancient township. Dealing with his subject from a pictorial point of view, Mr. Brooker then showed that the locality offered great possibilities as a happy hunting-ground for the photographer, with artistic instincts. Some of his pastoral scenes were very beautiful, and, as pictures, are equal to, and in some cases surpassing, some of the most highly honoured work of our best exhibitions.

PHOTOGRAPHIC SOCIETY OF IRELAND'S EXHIBITION.

The Exhibition included, in addition to the work of the members, a large number of photographs by English and Scotch proficients in the art. The Exhibition was substantially divided into five classes:—(1) Enlargements; (2) Landscape views; (3) Lantern slides; (4) Hand-camera work; and (5) Historical or archæological subjects (exclusively confined to Ireland). In the class for enlargements the silver medal was awarded to Mr. Victor Smith for a fine enlargement from a quarter-plate print. The second place and bronze medal was won by Mr. Inglis for two excellent enlargements, 15 × 12. They were most admirable photographs of Foley's *Burke* and *Goldsmith*. Mr. L. R. Strangeways, M.A., was commended. In the section for views, Mr. George Mansfield, J.P., President of the Society, obtained the silver medal, and the bronze medal was given to Mr. John A. C. Ruthven. The centre picture of this group, *Kilchurn Castle*, is, says a local critic, one of the most faultless and exquisite photographs possible to conceive. The suggestion of atmosphere, the singularly fine gradations of light and shade, and the perfect realisation of the perspective, combine to make this little print one of the gems of the collection. In the class for lantern slides Miss White won the silver medal, second place being secured by Mr. Joseph Kelsall, of Killiney. For hand-camera work the silver medal was awarded to Mr. A. W. Geddis, and the bronze to Mr. J. White. In the archæological class, Mr. L. R. Strangeways came first for photographs taken by the aid of the magnesium light at Lough Crew, county Meath, the subject being rude stone carvings. The bronze medal was gained by Mr. A. A. Geddis for a set of photographs taken at Monasierboice and Mellafont Abbey.

There was a very good collection forming the Loan Gallery. This included some flashlight photographs by Mr. John Stuart, of Glasgow, who also sent in large portraits of Bishop Dowden and Professor Blackie. The Autotype Company sent in very large reproductions—one of Ludlow Castle and one of Durham Castle being especially good. Messrs. Morgan & Kidd contributed a large full-length portrait of Miss Mary Anderson

and a bust of Sir Edwin Arnold. Mr. Richard Keene, of Derby, also contributed some very interesting examples. The Eastman Photographic Company contributed an enlargement on their bromide paper and studies on glazed paper. Mr. Gambier Bolton showed a very good photograph of the lion in the London Zoo. Mr. Walsh, of Belfast, had a nice collection of views of Irish antiquities; and Mr. Werner, of Grafton-street, and Mr. Robinson, of Grafton-street, were also amongst the contributors. The *Freeman's Journal* and *National Press* Company exhibited the different processes of producing a zinc illustration block.

During the week lantern exhibitions were given to a large audience each evening, the lantern being ably managed by Mr. J. Carson, C.E., and very interesting slides by Messrs. Ruthven, Geddis, Inglis, Strangeways, and Smyth were thrown on the screen, the yacht series of Messrs. Inglish and Smith evoking much admiration, and Mr. Strangeways' "Ignition and Fruition" unbounded merriment.

Some fine slides lent by Messrs. Hastings and Cembrano, many of them recalling scenes in the Photographic Convention of 1892, were given, and one evening was devoted to medical and scientific work, when many medical gentlemen were present to see Mr. A. Pringle's unique collection of microscopic slides.

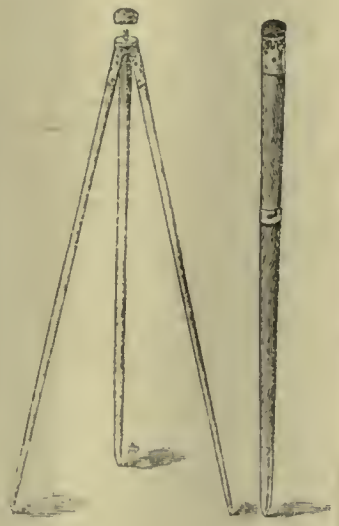
Among exhibitors of lenses and apparatus were Messrs. Ross & Co., Taylor, Taylor & Hobson, Gotz, Mayne, Robinson, Curtis, and Lonsdale Brothers.

The Exhibition Committee are to be congratulated warmly on the success of their undertaking, which, financially and otherwise, has surpassed their expectations.

THE EYE AND THE CAMERA.

Before the Dundee and East of Scotland Photographic Association on Thursday, January 19, a paper was read by Dr. M'Gillivray on *The Eye and the Camera*, in which after comparing the structure of the eye with that of the photographic lens and the mechanism for focussing in both cases, he went on to speak of colour blindness. He recommended strongly the adoption of the tests approved by the Royal Society, and urged the necessity for railway and marine officials being carefully examined with a view to discovering whether they were affected with the disease. He held that all lads entering the service of railway companies should be subjected to a rigorous test of their eyesight, and that at stated intervals they should be medically examined to discover whether their sight was becoming impaired. He pointed out the extreme danger of employing drivers, signalmen, or steersmen who were suffering from colour blindness. One of the chief symptoms of tobacco blindness was that the patient was unable to distinguish red and green, the colours used on railways and at sea. The disease might be acquired in a few weeks, and there was no class of men more given to smoking and more afflicted with colour blindness than signalmen or steersmen.

The Blackfriars Alpenstock Walking-stick Tripod. — The Blackfriars Photographic and Sensitizing Company are issuing a handy stand in the form long known as the Alpenstock. The three legs are closely jointed, and are readily opened by removing the ring at the centre which binds them, and the metal ferule at their base. The stands are extremely light, compact, and rigid, and are made in two sizes, 38½ and 49 inches.



London and Provincial Photographic Association.—February 2, *Calculation of the Angle of View*, by Mr. P. Everitt. 9, First Technical Lecture of the Series, *The Lens*. 16, *Demonstration of the Air Brush*, by Mr. W. H. Harrison.

At the Llandudno Police-court last week two respectably dressed young men, named Vincent Johnson, *alias* Brunker, and Leopold Geoffrey Harding, were committed to the assizes on a charge of obtaining money by false pretences, viz., by advertising for sale in The British Journal of Photography a camera for the sum of 5*l*.

Our Editorial Table.

The Paget Company's Frame for Printing out Opals and Lantern Slides.

The special frame which the Paget Company have provided for use with their printing-out lantern slides and opals has many points of great excellence. The negative is held in position on a glass bed by means of four adjustable screw catches, various sized negatives below that of the maximum being available. The opal, or transparency, is then placed in position in another frame, being held thereto by a revolving circular catch, contact and registration being secured by the second fitting on to four small uprights and clamped down with the usual springs, so that it may be moved, and the progress of the image watched with the certainty that on again being placed *in situ* no doubling of the image will result. The system in our hands has answered admirably.

Fallowfield's Double Glass Petroleum Lamp.

Mr. Jonathan Fallowfield has brought out a really neat and convenient dark-room lamp, the nature of which will be seen from the illustration. The burner is an Argand, and gives a bright flame by aid of a yellow chimney with contracted neck. Overtopping this is a ruby chimney, which is capable of being raised when a flood of yellow light is desired—a position shown in the cut. The lamp is well made, and cannot fail to prove useful.

The Magnesium Company, 7, Auckland-road, Battersea Rise, S.W., have submitted to us a sample of what they designate "Smokeless Magnesium Dust." On making trial of it we find that it ignites readily, gives a clear bright flame, and emits less smoky fumes than any other sample that we have tried. This latter quality will be appreciated by all flashlight men.

Messrs. Percy Lund & Co., Memorial Hall, have courteously favoured us with a neatly bound volume of their *Practical Photographer*, being all their monthly issues of last year. It contains numerous illustrations.

We are indebted to the Scovill & Adams Manufacturing Company, New York, for a handsome Office Calendar for 1893, got up in that ornate style characteristic of the calendars issued by them for several years past.

"SPIRIT" PHOTOGRAPHY.

A lecture on this subject was delivered by Mr. F. B. Chadwick before the Cardiff Amateur Photographic Society at the meeting on Friday evening last. The lecture, which was listened to with great interest, dealt with the scientific aspect of the question, and maintained that, if only one case of photographing the "Spirit" could be indisputably proved, it ought to be sufficient, however easy and numerous the counterfeits, to awaken the interest of the photographic world. It was a mistake to suppose that the various authorities that would be quoted were ignorant of the methods of imitation—quite the contrary—and that this alone should be a guarantee of their ability to guard against fraud and deception in their experiments. Illustrations were then given from experiments with various mediums, notably Mrs. Mellon, Mr. Duguid, and quotations from authorities such as Mr. Alfred Russell Wallace, Mr. William Crookes, F.R.S., and various American scientists, and concluding with quotations from several of the last numbers of current literature, expressing anticipations of a near future when the photographic art would play an important part in solving the most stupendous question of human life and existence.

One of the interesting features of the evening were the albums kindly lent by Mr. James Burns, the Editor of the *Medium and Daybreak*, containing a large number of suitable photographs illustrative of the subject.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 30	Camera Club	Charing Cross-road, W.C.
,, 30	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 30	Richmond	Greyhound Hotel, Richmond.
,, 31	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 31	Hackney	206, Mare-street, Hackney.
,, 31	Halifax Camera Club	
,, 31	Lancaster	Springfield Barracks, Lancaster.
,, 31	Leith (Annual)	165, Constitution-street, Leith.
,, 31	Paisley	9, Gauze-street, Paisley.
,, 31	Rochester	Mathematical School, Rochester.
,, 31	Warrington	Museum, Bold-street, Warrington.
February 1	Edinburgh Photo. Society	38, Castle-street, Edinburgh.
,, 1	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 1	Southport	The Studio, 15, Cambridge-arcade.
,, 1	Southsea	3, King's-road, Southsea.
,, 1	Wallasey	Egremont Institute, Egremont.
,, 2	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 2	Camera Club	Charing Cross-road, W.C.
,, 2	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 2	Glasgow Photo. Association	Philoso. Soc. Rooms, 207, Bath-st.
,, 2	Glossop Dale	
,, 2	Hull	71, Prospect-street, Hull.
,, 2	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 2	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 2	Oldham	The Lyceum, Union-st., Oldham.
,, 2	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
,, 3	Brighton and Sussex	
,, 3	Cardiff	
,, 3	Croydon Microscopical	Public Hall, George-street, Croydon
,, 3	Holborn	
,, 3	Leamington	Trinity Church Room, Morton-st.
,, 3	Maidstone	"The Palace," Maidstone.
,, 4	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

JANUARY 24,—Technical Meeting, Mr. T. Sebastian Davis (Vice-President) in the chair.

Before the formal business of the meeting commenced, the Chairman made reference to the great loss the Society had sustained by the death of Mr. William Bedford, who was a member of the Council.

PHOTO-LITHOGRAPHY.

Mr. W. E. DEBENHAM read a paper on *Photo-lithography* (this will appear in a future number), which he supplemented by a practical demonstration of the process. He showed various examples of negatives suitable for it, as well as transfers, stating that wet collodion was recognised as the best for the former.

The CHAIRMAN, in reference to the lithographic stones used, said that, forty years ago, a kind of magnesium limestone came from Germany, and it had been found that the character of the stones somewhat modified the nature of the prints, their various uses depending upon the extreme fineness of the outline to be impressed on the stone, which he presumed would apply in the ordinary practice of lithography. It occasionally happened, after printing a certain quantity of impressions from the stone, that the ink filled in the intermediate spaces between the lines, which would become clogged. He used turpentine to obtain the original fineness.

Mr. DEBENHAM had never found any difficulty with regard to the selection of the stones. In answer to Mr. Bolas, he said he obtained the roller he was then using from Albert in 1877, and it had not deteriorated. In reply to Mr. Archer Clarke, he said he did not think photo-lithography was suitable for tint subjects. It was suitable, however, for pen-and-ink subjects, which was the nature of the pictures he was then reproducing.

Mr. J. D. ENGLAND said he diluted the lithographic ink considerably with turpentine, and rubbed on with a sponge, and then afterwards with a piece of cotton wool he rubbed off as much of the ink as possible.

Mr. T. BOLAS thought Mr. Debenham had got hold of all essentials, and had emphasised the points between success and failure. People did not realise how small a quantity of ink should remain on the transfer; the image should show through the ink. One point, however, might lead to a little difficulty. Commercial transfer ink was sometimes pigmented comparatively highly, and others comparatively little, and one must allow for this. A highly pigmented surface would possibly darken all over. It was scarcely possible to rub off the ink so completely that there was not enough for the transfer. There were more failures from putting on too much ink than from all other causes.

Mr. ENGLAND showed results on gelatine plates which he considered suitable for photo-lithography.

Mr. DEBENHAM thought them fine results, but he himself recognised wet collodion as the best.

A vote of thanks was passed to Mr. Debenham for his paper and demonstration, in acknowledging which Mr. Debenham took occasion to thank Mr. G. Ruthven for the assistance he had given him in the practical work that evening.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JANUARY 18,—Mr. A. Mackie in the chair.

THE LATE MR. WILLIAM BEDFORD.

The CHAIRMAN made a brief reference to the late Mr. Bedford, who was a member of the Association, remarking that there was nobody in the photographic world so well liked.

Mr. T. E. FRESHWATER, in moving a vote of condolence with Mrs. Bedford and the family, said that the late Mr. Bedford was one of the best men for listening to anything that was said to him. In him the Photographers' Benevolent Association had lost a great friend.

Mr. W. E. DEBENHAM, in seconding the motion, said that there was no one in photography so much esteemed as the late Mr. Bedford.

A NEW JET.

Mr. R. R. BEARD, in exhibiting his new jet, said that its novelty was the improvement of the cut-off and regulating arrangement of the gases, which is effected in the following manner:—In place of the usual two taps, one tap of a special construction is substituted, the shell of which has the two supply and delivery tubes to the mixing and Y chambers respectively, to either mixed or separate burners, as usual. The plug of the tap lies horizontally, and has a projecting lever at right angles. In both ends of plug of tap are fitted screw-down valves, one for each gas, oxygen and hydrogen. With these valves the supply of gas is regulated to burner. Having regulated the gases, they can be cut off entirely by raising the lever of plug; a small adjusting screw is attached to the shell, which arrests the movement of plug, and therefore any amount of by-pass can be left on. It will be seen that this arrangement takes the place of the ordinary four-way dissolver, having a decided advantage, as the whole is constructed in the jet itself, and can be got at outside the lantern, and there being no wheels or delicate parts to get out of order, or separate pieces of tubing, making unnecessary joints. Also the gases are regulated by the fine-threaded screw-down valves. The mixing chamber is of the most modern pattern, having discs alternately perforated at edges and centre, thereby ensuring perfect mixing. The nipple is large and taper. The jet-holder is likewise improved. In place of the usual round tube, with the boss and thumbscrew—so unsatisfactory, owing to the pins of trays seldom fitting them—a pear-shaped hole is made, the thumbscrew binding, as it were, the pin into the wedge, thus forming a triangle of forces so necessary to make rigid. The position of this is adjustable to suit the various sizes of lanterns, the jet being made the maximum length. The lime-turning arrangement is fitted with screw gearing; this enables the rod to be parallel with the tubes, and any alteration in position does not interfere with working of gearing.

AN ELECTRIC RETOUCHER

Mr. H. Snowden Ward exhibited Messrs. Anthony's electric retouching pencil, in which an ordinary retouching pencil was held in suspension by a spiral spring, actuated by a small electric motor, and guided by the hand. The pencil has a slightly eccentrical motion, making a series of arcs on the negative. It had been in practical use in several studios for some time, the opinion being given that the work of retouching could be got through much more rapidly with it.

The meeting concluded with a display of lantern slides, among which were several of various electric discharges taken by Mr. A. A. Campbell Swinton by means of an induction coil, and showing most beautiful markings, also several slides of composition subjects by Mr. Benham, in which a number of skeletons were posed as boxing, taking tea, singing, &c., with very humorous effects.

North London Photographic Society.—January 17, Mr. Douglas in the chair, adjourned general meeting, held at Canonbury Tower.—The agenda paper contained only routine business. The officers and council for the year were finally agreed upon. *President:* Mr. J. T. Taylor.—*Council:* The Rev. E. Healy, and Messrs. W. Bishop, J. Brewer, J. Douglas, and E. W. Parfitt.—*Curator:* Mr. W. Few.—*Hon. Secretary:* Mr. W. T. Coventon, 59, Highbury-park. The members present were well pleased with the accommodation obtained in the above-named historical building. In addition to the rooms specially allotted to the Society, the members may use the reading-room, known as "The Compton Oak Room." This apartment is wainscoted with finely carved oak from floor to ceiling, and is a very perfect and interesting specimen of interior decoration of the age in which it was executed, viz., the latter end of the sixteenth century.

North Middlesex Photographic Society.—The first Lantern Night of the new session, was held on Tuesday, 24th inst., at Jubilee House, Hornsey-road, about ninety members and friends partaking of the fare. Slides were shown by various members. The advantages of the affiliation scheme to the Photographic Society of Great Britain was further demonstrated by the loan of a splendid collection of slides which evoked considerable applause, the flower studies of Mr. Carpenter and the cloud effects of Mr. Dore being particularly admired, and afforded the members present a standard up to which to work. The next meeting will be on February 13, when a demonstration by Mr. H. M. Smith, of the Eastman Company, on *Enlargements*, will take place.

Harringay Photographic Society.—January 19, Mr. C. Watson presided.—The following gentlemen were announced as being patrons of the Society:—Rev. W. Frith, F.R.G.S., and Messrs. Valentine Blanchard and Charles W. Hastings. A vote of thanks was passed to Mr. C. Frith for the interest he had taken in the Society since its formation.

Hackney Photographic Society.—January 17, Mr. G. Hankins in the chair.—The Treasurer gave a short account of the finances respecting the recent Exhibition. The Hon. Secretary showed some smokeless powder of the Magnesium Company, Battersea, which was tried in Messrs. Rudowsky's lamp. Comparatively, there was great advantage over ordinary magnesium powder, as it seemed to clear very much, Mr. Beckett observing that firemen were not necessary, as recently they were at London and Provincial. Mr. Paget was thanked for his attendance with the lamp, and was informed by Mr. Beckett that their retouching desk (electric), which he was requested by the Society to try and report on, did very materially save time, and gave a very fine stipple, which he thought advantageous. The Hon. Secretary showed Marion's eikonogen cartridges, and the form they were sending out cartridges of hypo and thionine. Mr. Carpenter showed Rendell's lantern-slide printing frame, and a box lid with a ground-glass plate in, to view lantern slides through. From the question box: "What would be the probable exposure at *f*-8 for snow scenes?" Mr. Grant said he would give a full exposure, and use very little pyro. Mr. Herbert Smith held the same opinion, but said judgment was required. Mr. Deane and Mr. Gosling had recently taken some snow pictures, and had given ten seconds, *f*-32 slow plate, and reported a pretty correct re-

sult. Mr. R. Beckett said the exposure would depend very much on the lighting. The Chairman then called on Mr. S. J. Beckett for his paper on *Lantern Slide Colouring*, but, as the evening was somewhat advanced, he was unable to deal very fully with the subject. He thought very little attention had been given, generally, to this interesting subject, and expressed, in a concise and lucid manner, the way to colour slides, choice of colours, materials, &c., after which, slides he had coloured were put through the lantern and commented on by him. Birds were frequently made of dust spots on the plates, and so helped to hide what sometimes would be a fatal defect to an otherwise good plate. Colours looked to the naked eye more bright than when shown through the lantern.

Richmond Camera Club.—January 16, Mr. Davis in the chair.—Mr. G. W Ramsay read a paper entitled, *A Comparison of Different Printing Processes.* After a short historical sketch of the evolution of modern printing processes, and a few remarks upon combination printing, Mr. Ramsay proceeded to notice in detail the principal makes of paper, both for printing out and for development, now in the market, showing specimen prints on every variety. He summed up his "comparison" by quoting the toper's judgment on whiskeys—"All are good; but some are better than others."

Brixton and Clapham Camera Club.—January 17, Mr. W. H. Harrison in the chair.—Mr. W. Thomas read a paper on *The Hand Camera and its Use in Picture-making* (see page 57). The Chairman said that it was an excellent paper, and that the pictures shown upon the screen were of unusual artistic merit. Cameras without rising and falling fronts might usually do in tolerably level country, but in mountainous regions, and occasionally elsewhere, rising and falling fronts were a necessity. He also advocated the use of a lens of long focus; the rule was that the focus of the lens should be of the same length as the distance at which the print would be most liable to be viewed by the eye to give a good recognisable picture of the original scene. He also advised the use of a single lens where possible, and so avoid two reflections from the surfaces of the glass. When a photographer went out with only one small camera, it should be a stand camera primarily, and a hand camera secondarily. Messrs. Butler, Coade, Dockree, Goldby, and Haward took part in the discussion, one point being the necessity for finders, upon which opinion was divided.

Croydon Microscopical and Natural History Club (Photographic Section).—January 20.—The "1893 Convention" Slides were shown. These have been brought together by the Devon and Cornwall Camera Club, in view of the fact that the next Photographic Convention of the United Kingdom is to be held at Plymouth in the summer. In addition to the general views of the town, and of the principal places of interest in the neighbourhood, to which excursions would probably be arranged, there was an interesting series of some of the prehistoric remains—stone crosses, cromlechs, cairns, &c.—so numerous in Devon and Cornwall, concerning which the several theories that have been put forward to account for their erection were lucidly explained by the President (Mr. Lovett).

Leicester and Leicestershire Photographic Society.—January 17, Annual Meeting, Mr. J. Porritt (Vice-President) in the chair.—The following gentlemen were elected as officers for the ensuing year:—*President:* Mr. J. Porritt.—*Vice-President:* Mr. A. Wilson.—*Council:* Messrs. F. Pierpoint, G. Bankart, S. Partridge, F. Jolliffe, and J. Cook. *Hon. Treasurer:* Mr. A. Wilson. *Hon. Secretary:* Mr. H. Pickering, High Cross-street. On January 20, an adjourned meeting was held, when it was decided to present the Hon. Secretary with a lantern and a pair of interchangeable lenses of long and short foci, as a small token of the appreciation of his past services and the courteous and indefatigable manner in which he has carried out the arduous duties of this office from the earliest days of the Society. It was also decided to hold a two-days' Exhibition, on March 22 and 23, in the Co-operative Hall; the Exhibition to be free, and non-competitive in its character, when we hope, in addition to the members' work, to secure the kind support of many of the ablest workers of the day. The President announced that Mr. S. B. Webber, of Bromley, Kent, had consented to read a paper on *Isochromatic Photography* at their next meeting, February 8.

FORTHCOMING EXHIBITIONS.

February 1	.....	*Cleveland Camera Club. Hon. Secretary, J. J. Hallam, 11, Amber-street, Saltburn-by-the-Sea.
,,	7, 8	Rotherham Photographic Society. Hon. Secretary, H. C. Hemingway, Rotherham.
,,	14.....	Durham City Camera Club. Hon. Secretary, R. Hauxwell, The Avenue, Durham.
,,	16-18	*Woolwich Polytechnic Photographic Society. Hon. Secretary, W. Dawes, 145, Chesnut-road, Plumstead, S.E.
,,	18.....	Holborn Camera Club. Hon. Secretary, F. J. Cobb 109 High Holborn, E.C.
March 1, 2	.....	*Fillebrook Athenæum Photographic Society. Hon. Secretary, Joseph W. Spurgeon, 1 Drayton Villas, Leytonstone, Essex.
,,	3, 4	Blackheath Camera Club. Hon. Secretary, C. W. Piper, 46, Shooter's Hill-road, Blackheath, S.E.
April	.....	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.
,,	17-29	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.

* Signifies that there are open classes.

PHOTOGRAPHIC CLUB.—February 1, *The Limelight and other Illuminants for the Lantern.* 8, Members' Open Night.

Correspondence.

BALL PROGRAMMES BY PHOTOGRAPHY.

To the EDITOR.

SIR,—We have thought it might interest yourself and your readers if we sent examples of a recent application of photography to the festivities of the season.

An artist friend or brother of the house where a dance is to be held supplies a pen-and-ink sketch about 6 × 4 to reach us on the morning of a given day, and on the following morning fifty or 100 copies reduced to programme size are in his hands for attaching to the dance list.

Though such orders are executed in so short a time, it is obviously better to allow forty-eight rather than twenty-four hours in case of postal delays.—We are, yours, &c., J. MARTIN & Co.

4 *and* 3 *Park-villas, New Southgate, London, N., January* 23, 1893.

AMIDOL FOR LANTERN SLIDES.

To the EDITOR.

SIR,—My attention has just been called to a letter in your issue of the 23rd of December, 1892, by the Rev. E. Healy, in reference to the use of amidol for lantern transparencies. I must apologise to the writer for having overlooked his query.

If he will refer to my paper in the ALMANAC, he will see that my remarks are suggestive and tentative, and give those results which in practice I have found the best. Mr. Healy can easily vary the proportions and find if his experiments prove me to be somewhat in error.—I am, yours, &c., HENRY E. DAVIS.

Camera Club, January 18, 1893.

P.S.—Metabisulphite should be six parts, not three parts as quoted by Mr. Healy.

LOUTH PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—Thinking you would like to see the progress our list of promised exhibitors is making, I have pleasure in sending it, to date. Of course, there are yet several days to send in, so it may yet be extended. It is as follows:—

Messrs. J. E. Austin, H. S. Tonkins, G. Lewis, Paul Lange, A. G. Tagliaferro, Bernard Alfieri, Lewis Meldon, Edger G. Lea, A. R. Dresser, H. P. Robinson, B. G. Wilkinson, jun., J. C. Thompson, A. Taviner, Adam Diston, Karl Greger, Ralph Robinson, S. N. Bhedwar, J. D. Pearson, H. W. Bennett, Alfred Maskell, Ernest Spencer, Thomas Mansell, A. L. Spiller, H. Symonds, Elliott & Son, G. Davison, W. B. Post, Charles Reid, Richard Keene, M. J. Harding, F. Seyton Scott, J. Chamberlain, A. Burchett, A. Horsley Hinton, Birt Acres, W. B. Cassingham, F. J. Bright, Frank Howard, Lyonel Clark, E. Calland, W. Scorer, and A. Debenham.—Yours, &c., S. FRANCIS CLARKE, L.D.S., *Hon. Sec.*

8, *Upgate, Louth, Lincolnshire, January* 20, 1893.

COATING WOODEN DISHES—REMOVING SILVER STAINS.

To the EDITOR.

SIR,—With reference to Mr. J. Pike's suggestion for using enamel paint for coating wooden dishes, mentioned in his article on "Dishes and Trays" in last week's JOURNAL, I should be glad if you or he would answer the following queries with reference to same:—1. Would it be safe to, and would the paint stand, the following solutions being used in the dishes (not in the same dish, of course): hypo, ferrous oxalate developer for bromide work, or dilute solutions of acid and water? 2. Would not the coatings of shellac varnish be likely to make the paint liable to crack, and therefore peel away? I have several wooden frame dishes, with glass bottoms, that I find it somewhat difficult to keep water-tight, and thought that, if the paint would have no deleterious effects on above solutions, it would be a good thing. If, therefore, you will insert my queries or a reply in the correspondence column, I should esteem it a favour.

With reference to "A Useful Dodge for Aristotype Printers," I have often found the method described, viz., "to immerse a negative to which paper containing silver has stuck in hypo solution direct," one of the simplest methods of removing silver stains from negatives—in fact, I think it is the only method that is desirable. The chief point to observe in this method is that the negative is not put in water before the hypo, especially where the paper has stuck, as in that case it only releases more of the silver out of the paper, which is absorbed by the gelatine films, making the stain larger than if put straight into the hypo. Like all other remedies for accidents, it is not always as efficacious as one could wish, but in practice I have found it the simplest and safest course to pursue in the circumstances.—I am, yours, &c., HARRY W. NEWTON.

Sefton House Studio, Bridge-road, East Molesey, January 23, 1893.

P.S.—Should the negative be varnished and get stained, the varnish can be removed without affecting the retouching, provided the spirit is allowed to work spontaneously, and no rubbing resorted to in the way of helping it, and the negative then placed in the hypo as described.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2, *York-street, Covent Garden, London.*

PHOTOGRAPH REGISTERED:

Graystone Bird, Bath.—*Grand transformation scene.*

EXCHANGES next week.

J. SALT.—Received. We note the contents of your letter.

P. HALL.—We have no recollection of the catalogue referred to.

S. B.—Ivory for miniature painting may be obtained of artists' colourmen.

A. WERNER.—Thanks for the enclosure, of which we have utilised a portion.

J. J. MCQUILLAN.—We do not give opinions on particular makes of cameras.

F. & A. HILL.—We have not received either of the Societies' reports to which you refer.

F. HALL.—Treat the cloth stained with bichromate of potash with a solution of sulphurous acid.

W. A.—You can register the design for the mount. It would not be the subject for a patent, which would be more costly.

J. C.—Ordinary water colour, blended to match the tone of the picture, is the only thing required for working up bromide enlargements.

SNAP-SHOT.—A lens working with an aperture of *f*-16 is not quick enough for very rapid exposures at this time of the year, even with the most sensitive plates.

S. WOOLTON.—The cause of the prints sticking in burnishing is that they were not sufficiently dry. Lubrication will not protect too damp prints from injury.

DR. H. ZERENER.—Many thanks; we do not think, however, the matter would be of sufficient interest to our readers to warrant us in accepting your kind offer.

J. THOMPSON.—The print, and not the negative, must be registered at Stationers' Hall. It is not imperative that the word "registered" should be printed on the photographs.

W. B. HARRINGTON.—*Modern Dry Plates* (by Dr. Eder), published by Piper & Carter, is the only other English work, beside Abney's, which deals with the subject exclusively.

BITUMEN.—1. The book is published by the author, at St. Louis, U.S.A. 2. Mirrora suitable for the purpose may be ordered of those who make the silvering of glass a speciality.

LIONEL HARTMAN.—We would suggest a radius of about eight inches. The lenses are correctly placed in the drawing. Fix them with an interval of two inches between the curved surfaces.

HARROLD.—Colours for spotting prints that are to be burnished have been advertised in the JOURNAL, by different makers, during the past few months. It is against our rule to recommend any particular maker's goods.

C. W. H.—The changing box strikes us as likely to work extremely well in practice, and we therefore advise you to protect it before offering it to any trade house. We cannot recommend any one particular firm.

G. PARKER.—All particulars with regard to the sending of exhibits to the Chicago Exhibition can be obtained at the offices of the Society of Arts, Adelphi. We can, however, tell you that it is now too late to apply for space.

A. COUSINS.—Ordinary shellac, whether in its natural state or bleached, when dissolved in spirit, is always turbid. The insoluble portion will, however, settle down if time be given; or it may be filtered out by the usual methods of filtration.

R. E. A.—The first patent in connexion with the platinotype process has expired, but subsequent ones were taken out. How many of these are still in force we cannot say. The register at the Patent Office is the only reliable source of information.

A. Z.—As you sent the money with the order, and cannot get the pictures after waiting a month after the time they were promised in, and no reply to your letters, enter an action in the County Court for the money paid and the value of the negatives.

ANXIOUS ONE.—Messrs. Percy Lund & Co., of Memorial Hall, E.C., publish *The Practical Ferrotyper*, which might suit you. The materials for ferrotype work may be had of Mr. Jonathan Fallowfield, Charing Cross-road, W.C., and other dealers.

R. MILLER.—In copying a painting the point to be considered, with regard to the lens, is not the size of the original, but the size of the copy. If the reproduction is to be, say, twelve by ten, a lens that will cover that size plate will suffice, no matter whether the original be thirty feet or three feet.

RADINGIE.—A sixteen-inch focus orthoscopic lens will certainly answer for a 5×4 hand camera; but care will be required in the adjustment of the focus, this being ao to a far greater extent than with the short-focus lens. We cannot advise you any farther unless we saw the orthoscope in question.

METHYL.—Messrs. Jones & Mason, Regent Wharf, Copperfield-road, Mile End, are methylators from whom you can obtain the old spirit by permit.

B. J. R.—We can suggest no improvement in the design for the studio. It might, however, be made three or four feet longer with decided advantage. Ordinary twenty-one ounce sheet glass will do quite well. "Colourless" glass would be more expensive, and very likely would become yellow by the action of light.

ESSEX.—1. So far as we can see, neither the paper nor the toning formula are at fault. It is the negative that is the source of the trouble. It is of much too feeble a character to give prints that will tone to "a strong black colour." If you require black tones from that class of negative, the only way to obtain them is to print on bromide paper. 2. The negatives are too thin for platinotype. 3. The same remark applies to carbon.

W. E. asks: "Can you give me any idea of the exposure necessary in Madeira during March and April as compared with those on the Italian lakes during the same months?"—Subject to the presence of light, fleecy clouds, which are likely to be present over the Italian lakes, you would find a shorter exposure necessary in the latter case than at Madeira, where, however, on bright days, "instantaneous" exposures, as we are aware, are practicable.

PARISIAN AMATEUR.—If the focussing telescope is adjusted for one sight, it will not do for another and different sight without separate adjustment, a the personal equation is introduced. It will then require a supplementary eyeglass through which to view the image. A suitable way to obviate all difficulty would be to make the eye tube travel in a jacket attached to the camera, and engrave thereon a few marks representing long, medium, or short-sighted, then tightening the jacket when the adjustment was made. This would meet every difficulty.

G. W. C.—The proposed studio will do quite well for working on a small scale if the new addition be carried three or four feet further out to the westward. If made according to the sketch, after four feet or so of the direct side and light are stopped off, there will only be about four feet available for the illumination of the sitter. The addition we suggest should not be glazed. No glass will be needed in the south side. Have pale blue or green curtains to draw at the sides, and blinds to pull down from the roof. Make the whole of the west end a plain background.

MUNICIPAL TECHNICAL SCHOOL, MANCHESTER.—A series of lectures on photography will be given at the Whitworth-street Branch, Room C, of this school, by Mr. W. T. Wilkinson. Course 1 is devoted to elementary photography, and commenced on Wednesday, January 25, 1893, 7 to 8.30 p.m. Course 2 embraces photo-mechanical processes of photography, and commences on Friday, January 27, 1893.

ON Wednesday evening last, January 25, the Photographic Club held its Annual Ladies' Night and Entertainment, when, in addition to the display of a large number of excellent slides by members, some capital vocal and instrumental music was discoursed by Miss Minnie Kirton, Mr. A. F. Kipps (piano), Mr. F. A. Bridge, and Mr. M. C. Gaze. A large company assembled in response to the Club's invitation, and a thoroughly enjoyable and successful evening resulted.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—A meeting of the Committee was held in the rooms of the Photographic Society of Great Britain on Friday last, Mr. Mackie in the chair. Before opening the business of the meeting the Chairman feelingly referred to the death of Mr. William Bedford, the Chairman of the Committee, which had occurred that morning. An application from a photographer who had previously been assisted by the Committee, but who had only been able to secure odd jobs during the winter, and who was again in difficulties, was considered. The sum of 2*l.* 10*s.* was granted, and the Secretary was also instructed to pay the applicant's rent for several weeks if that should be necessary. A second application was from a photographer who had been in business thirty years, but now incapacitated by blindness. Application for a grant to assist in refurnishing part of his house, so that his family might eke out a subsistance by letting furnished apartments. The sum asked for was granted, subject to the statements being verified and references satisfactory. The case of an applicant to whom a loan had been granted some time ago, and repayment of which was overdue, was discussed. From investigations made, it seems as if the defaulter was attempting to evade repayment. The Secretary was instructed to pursue the inquiries further, and, if it appeared that the defaulter was now able to pay, to take immediate legal proceedings for recovery. The report and balance-sheet were discussed, and the Secretary was instructed to call the annual meeting for February 3.

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1709. Vol. XL.—FEBRUARY 3, 1893.

STEREO-MICROGRAPHY.

There are indications that on the Continent the highly useful and attractive system of photographing microscopic objects as stereoscopic slides is likely to be once more brought to the front.

The superior attractiveness of binocular over monocular microscopes is evinced by the immense numbers of these that are now made. We do not, however, purpose here to institute any comparison between these two methods of microscopic examination, but shall at once assume the desirableness of seeing on an enlarged scale and by photographic agency these minute objects in all the solidity of nature.

Imprimis, a micro-stereograph does not by any means imply that a binocular microscope must be employed in its production, for some of the most effective of these pictures we have seen have been obtained by the usual instrument having a single barrel—nay, for most purposes it is to be preferred. Again, there are many organisms so exceedingly minute as to render it difficult to conceive of them as capable of being photographed under circumstances conducive to showing stereoscopic effect, any more than they would be amenable to direct visual binocular examination under a microscope bearing what may be termed an excessively high power.

The conditions under which a microscopic stereograph must be made are identical with those of an ordinary binocular picture, such as a portrait or view from nature, and the methods applying are similar in both cases, size of appliances alone excepted. The one, however, is an enlarging, and the other a reducing, method. Both pictures must, in either case, be taken from a slightly different point of view, with a single exception to which we shall presently allude.

One method, and a very simple one it is, for making a micro-stereograph is to place a cap over the front lens of the microscopic objective, which we may assume to be one of an inch or less in focus, one half of this cap being cut away, so as to allow the light from the object to be transmitted by either one side of the objective or the other, according to whether the cap is rotated to one side or the other. This will give dissimilar views of an object, which must be photographed by two successive operations. According to the distance of the sensitive plate from the objective, so is the magnification; but on this merely elementary topic we need not dwell, it now being well recognised by all. The pair of enlargements thus obtained, when printed and mounted side by side on a card, present true stereoscopic relief when viewed in a stereoscope.

The defining power of a microscopic objective differs altogether from its penetrative power. Take a well-mounted object possessing depth and transparence, such as the head of a crane-fly, with which, as a test-object for this special purpose, we have of late been conducting several experiments. With an inch power we see the *front* of the eye, but fail to discover the *back*. With a two-inch objective the performance is more satisfactory as regards this quality, while with a still lower power we see both front and back. By sufficiently stopping down the one-inch objective we reduce its angular aperture to such an extent as to enable us to see both front and back of the insect's eye, and this is the condition we require for a stereoscopic photograph of this object.

Observe now the image shown in a common monocular microscope, and the following anomaly will be apparent. Having noted the relative positions of the front lines of the eye with those of the back, shift the light a little from one side to the other without disturbing, even in the slightest degree, the microscope in any other respect, the relative positions of object and the lens remaining the same; when, behold, the relative positions of the front and back of the eye are changed. Taking advantage of this, pictures having a true stereoscopic effect may be most easily obtained by the very simple expedient of a slight motion from side to side of the concave mirror by which the object is illuminated, this, of course, being done previous to the making of the second exposure. This method was well known to a few of the *habitués* of the now long extinct Photographic Society of Scotland thirty years ago, but we much doubt that it has long been forgotten.

The conditions for micro-stereography with a monocular microscope are also fulfilled by a system we described in 1877, and which, together with other methods, we brought before the British Association of that year. It consists in having fitted to its main stage a super stage capable of being influenced by the mechanical adjustments of the instrument and also of oscillating from right to left within a limited sphere, for which purpose the slide-holder is pivoted in such a manner that the axis of motion nearly coincides with the object to be photographed.

A picture having been obtained of the object when in one position, the oscillating stage is tilted in the opposite direction, and a second photograph obtained. These two form a pair which, when combined in the stereoscope, show the object in all its natural solidity.

It will readily approve itself to the reader that, with regard to this latter method, the oscillating motion must be slight and the microscopic objective of very small angular aperture; else, if the object be large, its sides will be lacking in sharpness.

In another article we shall treat of methods of making stereo-micrographs by binocular projection.

RETOUCHING AND VARNISHES.

A CORRESPONDENT, whose letter we publish in another column, puts a query which, no doubt, has often required an answer during the practice of other workers. He wishes to know how to prevent the retouching from moving when the retouched negative is varnished. The question is by no means so simple a one as at first would appear, and the reply will necessarily not be devoid of complications.

First, let us take the mode adopted by the best workers in actual practice, which we believe we are safe in saying is to work upon the gelatine film itself before varnishing. Where the amount of pencilling is slight, the fine grain of the unprepared negative usually gives sufficient tooth to enable the pencil to bite without extraneous aid. Where the extent of retouching needed is beyond slight tints, it becomes requisite to prepare the surface. Some workers use a solution of gum arabic, or other similar substance, for the purpose, but by far the larger proportion use one or other of the various "mediums" that are advertised for sale, or they make their own—a terebinthinous solution of some resin being the standard formula. There are hundreds of formulæ to be found in photographers' note-books, no doubt each believed to be better than any other owing to its possessor being familiar with its working. There are also many different makes issued by dealers, and, of course, it is no part of our work to recommend one or other of them, or decide upon the merits of rival makers. We will simply present our readers with a recipe given to us in 1874 by one of the best and one of the earliest retouchers in this country. We have given copies of it to many workers, who have expressed their satisfaction with it, the prevailing opinion being that the resin should be in larger proportion; that, however, is a mere detail, which each can manage to settle for himself. The recipe is as follows:—

Gum dammar	30 grains.
Venetian turpentine	6 „
Rectified turpentine	4 ounces.

Dissolve a little to be rubbed on the negative, and the surplus wiped off with a pledget of cotton wool after a few seconds. At the date that the above was communicated to us, the gelatine plate was a thing of the future; hence it will be seen that the medium was intended to be used upon the varnish. We may say, however, that (when made stronger) it has been in frequent use for working direct upon the gelatine.

We will assume that a negative has been fully worked upon after the manner intimated, and that it is necessary then to varnish it. *En passant*, we may repeat advice often given by us, namely, that every negative from which more than one or two prints are needed should be varnished, otherwise silver stains are so very liable to make their appearance. If the above medium be used, the experimenter need have no fear whatever of the retouching shifting or becoming blurred when varnished with ordinary alcoholic varnishes and by heat. If, however, a needlessly thick and sticky medium be used, there will be danger of its being dissolved and the retouching floated out of its place. To this extent our correspondent's query is replied to. But, when the retouching is performed upon a varnished negative, troubles set in and multiply fast. Many will say, "What is the need of varnishing?" and it may be at once said that its advantage is only apparent when a large number of prints are needed, or when the negative has to be stored away for future use when required. Under other conditions we would say decidedly, "Leave varnishing alone." The drawback in printing from a retouched negative not protected by a second coating of varnish, is that the combined friction from the paper placed in the frame to print and the necessary brushing or dusting to keep the surface clean, abrades and gradually removes a portion of the work, till at last its delicacy is quite lost.

When the question of varnishing is to be faced, difficulties arise quickly. Many use liquids, with benzol as the solvent, and with a suitable resin the plan is good. But some photographers strongly object to the use of benzole in any form, from an objection, first to its smell, and secondly, to the danger of fire its presence gives rise to. As for ourselves, we have tried methods of protecting the retouching in such a way as to render possible the giving a second coat of alcoholic shellac varnish, so as to involve the smallest amount of trouble in routine work. We have tried collodion, solutions of gelatine, spraying with sundry liquids devised to protect the first varnish from being softened and dissolved, and so causing the pencilling to shift or run. We are not in a position to say that any of the methods tried have been invariably successful; for, just when we have come to the conclusion that our plans had succeeded, a number of plates having been varnished and the work left intact, we have found a fresh plate, apparently identically treated, quite spoiled, through the softening of the varnish and the running together of the pencilling. Hence, although, beyond the objectionable benzole varnishes, we have had successes, they have not been so uniform as to warrant our recommending a particular process to our readers. We have still further experiments in view, the results of which we hope to communicate at some future period. Meanwhile, no doubt, our readers would be pleased to have the experience of workers who find themselves able to revarnish a retouched negative with ease and satisfaction.

The 1893 Convention.—The date of the 1893 Convention, which is to be held this year at Plymouth, has been fixed for the week commencing July 3 next.

An Invitation.—The Hon. Secretary of the St. Louis Camera Club writes:—"If any of our English cousins should happen this way on their visit to the World's Fair at Chicago during the coming year, we trust that they will remember that our 'latch string always hangs on the outside,' and they can rest assured that we will do our best to make their stay in St. Louis a pleasant one."

Painters versus Engravers.—Photographic engravers frequently get into disagreement with artists in the reproduction of their works. Usually the work has to be done to the satisfaction of the painter, and he is often a "faddist," and has strange ideas as to how his different colours should be rendered in monochrome. Often a misconception of terms as used by the painter and the engraver exists, and this sometimes leads to unnecessary alterations, to the serious deterioration of the work, in order to conform to the painter's ideas.

Provisional Specifications.—Over 24,000 provisional specifications for patents were accepted last year, but possibly not one tithe of this number will be further proceeded with. A provisional specification only costs a pound, and many are lodged with no idea of the patent ever being completed, but merely to use the term for advertising purposes. This remark applies to photography as well as other things. When a provisional specification is lodged, which may be done for anything, no inquiry or investigation is made as to the originality or the practicability of the alleged invention for which protection is claimed. As a proof of this, it came out in evidence in the case of Wells, who stands charged with fraud, that

during the last few years he has filed no less than 192 specifications, though he only completed one patent. A patent can be obtained for almost anything in this country, unless it be opposed on the sealing. Such is not the case in most other countries.

Another Fatal Accident from Ether.—In September last, we referred to an accident that happened in Paris at the house of a photograph enameller, through the breaking of a bottle containing collodion, by which several persons lost their lives. The vapour from the ether, mixed with the atmosphere, reached a light, and then exploded. A very similar accident has occurred in London, though, fortunately, here only one life was lost, but there were some narrow escapes. The facts, as stated at the inquest last week, are these. One evening the enameller and his wife heard a hissing noise in a cupboard where a bottle of ether was kept. This was found to be the vapour from it escaping, and presently, so it was stated, the bottle exploded. A lamp on the table was at once extinguished, and the wife commenced to wipe up the spilt ether, when its vapour must have become ignited by the fire in the grate, and thus set fire to the unfortunate woman's clothing. In all cases where ether is spilt, as we pointed out when referring to the first accident, burning lights that are low down should receive attention before those above, because the vapour from ether is so very much heavier than the atmosphere. Many modern photographers and their assistants, who use collodion for enamelling prints, are not fully aware of the dangerous nature of this material when exposed to only a moderate heat. Ether boils at a temperature of 98° F., and gives off inflammable vapour at all temperatures. If a little ether, for example, be poured in the palm of a warm hand, it will boil at once. Ether and collodion for enamelling should always be kept in well-stoppered or corked bottles, and stored in the coldest place available.

Chromo-photography.—Several times during the past few years it has been our by no means pleasant duty to call attention to the general backwardness of mechanical photography in Great Britain, as compared with most other countries. It is true that considerable advance has been made here of late, yet it must be admitted we are still behind. Notably is this the case with colour work, which is now advancing rapidly abroad. It will be remembered that a couple of years ago a number of very fine examples of chromo photographs, from different parts of the Continent, were on exhibition at the rooms of the Photographic Society of Great Britain, and others at more recent shows. Now they are to be seen plentifully enough in the shop windows of London and all large provincial towns, but they are all of foreign production. It may be mentioned that chromo work has been produced here, but only in small sizes. The majority of the pictures now in the market are of large sizes—twenty inches and upwards—for framing, and we are told they command a ready sale, though their prices are high. If this be so, no better proof of the commercial value of this branch of the art is needed. Photographic copies of paintings by the best artists are in demand all over the world, but there is no question that if they were in the exact colours of the originals they would have greater value. It has been said that some of the photographic chromos in the market are too highly coloured, but it must be borne in mind that the majority of them are from modern foreign paintings, and that Continental artists, as a rule, are more lavish with brilliant colours than are English painters.

Official Photographers.—It has on several occasions been suggested that an official photographer should be attached to certain public institutions—such, for example, as the British Museum—whose business it would be to take from time to time such negatives as might be required by the authorities, or for outside purposes. Quite recently the subject has again been mooted, and, so far as departmental requirements are concerned, the thing may be highly desirable; but it may be a question if the desirability extends beyond that. The British Museum is now provided with a studio and dark rooms, which are at the service of any one desirous of making copies of any of the objects included in the Museum by making formal application to the authorities. This system, so far as we are aware, works well as regards the public. But will what has before been suggested and has again been mooted—an official photographer who will produce negatives at a fixed price for those who require them—work equally as satisfactorily? This is open to question. A negative that will be an excellent one for some purposes may be just the reverse for others. Under the present arrangement, a photographer can go and secure a negative suited to his particular requirements, although it might be considered an inferior one from some standards; but this end may not so easily be attained if there is an official photographer to do the work. Even now authorities are divided in opinion as to how an ancient manuscript should be reproduced—whether as it is in its present, and often dilapidated, condition, or as it was when in its pristine state. Paleologists say the former, while others, in the interest of historical students, say the latter. Ancient documents have been reproduced both ways, the negatives being taken specially for each purpose. If an official photographer be eventually appointed, the privileges publishers and the public now enjoy in the matter of copying the objects in the public collection should in no way be curtailed.

Coloured Lantern Slides.—A well-painted slide, of modern production, is only seldom to be met with. We mean such as those of the highest class that used to be produced some twenty or thirty years ago by skilful artists, and for which a what would now be considered high price was charged—half a guinea and upward. Photography, we know, has had much to do with this. The subject of lantern-slide colouring was, however, brought before a recent meeting of one of the suburban societies, and it proved an interesting one. Those who are in the habit of attending lantern exhibitions, at which the audience is composed more of what may be termed the general public than photographers, know quite well how slides in colour are usually received, although they may be very inferior in quality. There is no reason why the colouring of photographic slides should not receive more attention than it has hitherto done on the part of amateurs. In an ordinary slide we obtain all the fine detail and truth of photography; but when such a slide is coloured, however skilfully that may be done, it can never equal, in purity of colour, one that has no photographic basis. In a coloured photographic slide, the colour has to be seen with the photograph imposed upon it, whatever colour it may be, and this gives it a more or less muddy appearance. In fact, a coloured lantern picture is precisely equivalent to a photograph coloured from the back, such as those called "Crystoleums." This trouble might be partially met by making the photographic image exceedingly thin, and not of the usual photographic tint—say, in pale yellow, blue, green, &c., according to the subject. The carbon process lends itself to this end. Here we should secure all the truth of the photograph, and the artist a greater value in the colour he applies.

HAS PYROGALLIC ACID BEEN DISPLACED?

In the presence of numerous new developers, such as rodinal, amidol, eikonogen, &c., the question whether pyrogallic acid has been altogether displaced has been repeatedly raised.

This question has already been answered several times in favour of pyrogallic acid, as by W. J. Stillman (*Photographic Times*, November 25, 1892), and, again, in *Photographische Mittheilungen* for December (p. 283), where side by side with the mention of the newest developers, various practical workers emphasised the pyrogallic acid developer as the best.

I have often and repeatedly worked in the Imperial Technical College with the most varied developers old and new, and have unreservedly recognised the claims of the new developers—the so-called amidophenols, which give pictures without addition of carbonate of soda—in cases where instantaneous plates are to be developed, where, generally, a rapid effect is desired.

For such purposes the amidophenols will be welcome, especially to the amateur, as well as sometimes in portrait work where short exposures are desirable and no great density of the plate is necessary.

On the other hand, experience has shown that the pyrogallic acid developer possesses more universality of application. According to the amount of alkaline carbonate added, it can be made to work softly and rapidly, or slowly and hard. The density can be increased to a degree unattainable with the new rapid developers, so that, in all my colour-sensitive exposures where I developed plates with pyrogallic acid and with amidophenols for purpose of comparison, I abandoned the latter because the density progressed only to a certain degree and then remained unaltered, while I could push it to any desired extent by the use of pyrogallic acid. There can be no doubt that amidol develops more quickly, but the action of pyro can be accelerated by addition of more alkali or potassium carbonate, while with the amidophenols such additions may readily cause fog.

For the rest, slower development is in no way detrimental; as a matter of fact, it is emphasised as an advantage of hydroquinone, because the development can be more easily watched.

At the same time the pyro developer has the advantage over hydroquinone that it remains active at low temperature. In separate solutions (alkali by itself and pyro with sulphite of soda in another vessel) it keeps for weeks, and, under a layer of vaseline, even for months.

On the large scale, therefore, I use the pyro developer exclusively, and resort to the other developers only when speed is a desideratum, or a case of under-exposure is concerned, or for certain interim exposures.

My solutions are prepared as follows:—

No. 1.

Distilled water	500 ccm.
Sulphite of soda, cryst.	100 grammes.
Sulphuric acid, conc.	8 drops.
Pyrogallic acid	14 grammes.

The pyrogallic acid is added only when the other constituents have been perfectly dissolved.

No. 2.

Distilled water	1000 ccm.
Carbonate of soda, cryst.....	50 grammes.

To prepare the developer, one volume of No. 1 and two volumes of No. 2 are mixed together.

The potash developer, which works much more rapidly, I use seldom, although it is preferable for instantaneous exposures. In the case of normally exposed plates I add, as a rule, three drops of ten per cent. potassium bromide solution to each ounce of the mixed developer.

For the potash developer I take twice as much of potash as of soda for the soda developer. I prefer the latter the more because the soda keeps unchanged in well-stoppered bottles, while potash very readily deliquesces. Sulphite of soda should also be kept in tight-closing vessels, and not in paper parcels.

It has been long known that several plates can be developed one after the other with a mixed pyro developer.

I am accustomed, however, to employ a fresh quantity of the solution for each plate. The low price of pyrogallic acid justifies the slightly increased expense.

It has also been known for several years that softer negatives can be obtained by dilution of the developer with the half or an equal volume of water.

H. W. Vogel, *Prof.*

PHOTOGRAPHING PAINTINGS BY ARTIFICIAL LIGHT.

[London and Provincial Photographic Association.]

In photographing paintings by artificial as by any other light, some of the things most important to be observed are the avoidance of reflections which would dim the shadows, and, so far as possible, to avoid bringing into prominence the irregularities of surface of the picture. The general principles of lighting the subject to be copied, and particularly that of the angle at which light should fall upon the picture, in order to escape interferences from both the causes mentioned, have been dealt with in a paper (*Avoiding Reflections and Granularity in Copying**) read before this Society in 1884, and published in the journals of December 19 in that year. There are some points, however, in connexion with artificial lighting that should be particularly noticed.

* The British Journal of Photography, vol. xxxi. p. 808, and Photographic News, vol. xxvii. p. 104.

The Angle of Illumination.

When photographing a picture of moderate size by daylight in a studio of fair dimensions, the difference of angle at which the various portions of the picture receive the light falling upon them need not be great. With artificial illumination it will often be thought desirable to economise the light by bringing it near the picture, and then the various parts will receive the light at very different angles; so much so, that it may be difficult or impossible to so arrange it that some part shall not suffer from either reflections or a lighting up of the prominences caused by irregularities of surface. With oil paintings particularly, there is a great liability to the reflection from the side of each irregular elevation of surface that is inclined towards the source of light, and which has been mentioned in the former paper as the blankety texture sometimes seen near the top of a copy, or along the edge which is nearest the light. It was pointed out that reflection occurs when the angle of incidence of light falling on any part of a picture having a glossy surface, is such that the returning angle will fall upon the lens. It was shown also that the angle must not be taken merely from the general surface of the picture, but from the inclined surfaces of the irregularities existing upon it, and that this consideration involves having the source of light at a greater angle from the axis of the lens than would otherwise be necessary.

The Source of Light should be as far from the Picture as practicable.

When working with the light near any but a very small picture, two kinds of difficulty arise. In the first place, as the light must not be close to the lens, on account of the reflections that would be introduced, but must come from a considerable angular distance, it is obvious that the part of the picture nearest the light will receive more illumination than the opposite side. This difficulty may be minimised where the direction of light will not interfere with the painter's intention, by a second light from the opposite side. Another difficulty, however, is, that with a near source of light, the angle at which it falls is very different at different parts of the picture, so that, if we get a sufficient angle at the side nearest the light, the illumination will fall very obliquely indeed upon the opposite side. All this points to the desirability of having the source of light as far removed from the picture as is reasonably practicable. The two considerations which will permit of a nearer approach of the light are, first, a small size of picture to be copied, and, secondly, though not to so great an extent, a greater distance of the lens from the subject. This end is secured by using a lens of long focus compared with the size of plate, and this is also desirable for another reason—*i.e.*, that the image will be in a flatter field, and so much stopping down will not be necessary. The main objection to a distant source of artificial light is the length of exposure that would, with some illuminants and in some subjects, be necessary, and hence, no doubt, compromise will frequently be tolerated.

Various Lights.

The necessity for placing the light near the picture and the difficulty arising therefrom, only come into play (except for limitation of space where no large room is available) when the photographic activity of the light is low. Where the electric arc is obtainable, the difficulty ceases, and on various accounts with such a light available I should prefer to instal a copying establishment with that, rather than with day light, especially in London, where we are so much dependent upon weather and season. Magnesium light is also good if a chimney can be fitted to carry off the fumes. With any artificial light (except the magnesium flash) it is easy to interpose a glass to intercept the rays that should be cut off by the yellow screen in orthochromatic work, a plan which obviates any optical interference with the working of the lens, and does not necessitate specially optically ground glass of the colour required.

Paraffin Illumination as Compared with Day Light.

A source of light everywhere obtainable, and one which will suit most amateurs, and be quite sufficient for copies from small paintings, especially water colours and such oi paintings as have not much yellowed by time, is that given by paraffin or gas light. Light of this character may be used without a coloured screen, and gives about the same result as the use of a moderate yellow screen in the lens with daylight illumination.

I have here a few photographs illustrating the copying of paintings by a paraffin illumination as compared with daylight. The light used was the lamp from an ordinary three-wick lantern of the sciopticon

kind. The condenser was removed on account of the image of the flame which it gives. The distance from the flame to the picture was about forty inches. The lamp was first placed nearly in the line of the camera, and gradually removed to one side until the reflection first visible on the side nearest the lamp had disappeared. The photographs A to G, representing a female head and a quantity of flowers, are copied from a print in colours, fairly representing a water-colour drawing in photographic power, whilst those marked M and onwards are from an oil painting about twenty years old, and pretty well mellowed in tone.

The plates used were of an ordinary commercial make, and for the orthochromatic series Ilford isochromatics of the instantaneous brand. The lens used was one of Suter's extra rapid aplanatics, full aperture, equal to No. 2 on the universal system for exposures.

The exposures given were, for the female head and flower subject, three seconds by day light for both kinds of plates, sixty seconds for ordinary plate and yellow screen, and twelve seconds for the orthochromatic plate and yellow screen. For paraffin illumination the exposures were: ordinary plate, four minutes; ditto, with yellow screen, one hour; for the orthochromatic plates, thirty seconds sufficed without the screen, and four minutes with it.

For more ready comparison of the results, I have put them into a tabular form:—

		Exposures. Representation of water-colour drawing.	Oil painting, somewhat mellowed.
Day light..	Ortho. plate	3 seconds ..	20 seconds.
	Ordinary plate	3 „ ..	20 „
	Ortho. plate with yellow screen	12 „ ..	80 „
	Ordinary plate with yellow screen	1 minute ..	6 minutes.
Lamp light	Ortho. plate	30 seconds ..	30 „
	Ordinary plate	4 minutes..	4 hours.
	Ortho. plate with yellow screen	2 „ ..	30 minutes.
	Ordinary plate with yellow screen	1 hour.	

The same screen was used for day and lamp light, but in the latter case it was placed in front of the lamp; and, with day light, in front of the lens. The use of colour-sensitive plates is very strongly indicated for lamp-light exposure on account of their much greater rapidity in that case, as well as for truer rendering of the blues and yellows.

Advantage of Lamp Light over Day Light.

An advantage of lamp light (even with an ordinary plate) over day light, unless a deeply tinted screen is used, is seen in the clearness and brightness of the copies of the oil painting. In the day-light reproductions (without screen) the whole surface seems to be covered by a mistiness, which is almost absent in the lamp-light copies. The explanation is that the colours of the painting have been so yellowed by time that their photographic effect is very much less than their effect on the eye. The reflections from the surface of the picture are not affected by this yellowness, and, being disproportionately strong, disguise in the photograph the work of the painter. It is on this account that it has been justly observed that the orthochromatic methods (by which expression coloured light and coloured screens are included as well as specially sensitised plates), the cracks and surface disfigurements of old pictures, so very evident in reproductions by other means, are now no longer so obtrusive.

The figures given in the table must be taken as representing the exposures actually given, which were only approximately correct. The ordinary plates exposed to lamp light would, in several cases, have been the better for even a more lengthy exposure than was given.

Ordinary Paraffin Lamps may be used.

When a "lantern" lamp is not at hand, ordinary paraffin lamps may be used. Two of the larger kind of tin-back lamps, placed one a little higher and behind the other, may be used on one side (generally the left), and one on the other side. With a smooth surfaced water-colour or fresh painting, very fair results may be obtained in this way.

I have not thought it desirable to go into the question of many sources of illumination. The general principle is the same, but, with such lights as magnesium or the electric arc, yellow screens will have to be used as with day light; but conveniently between the illuminant and the picture, instead of in the lens. Reflectors or weaker lights may also be used on one side, or below the picture, if without them the grain or irregularities show otherwise than the artist intended.

There are, I believe, many, especially amateurs, who have paintings of which they would like to have photographs, but who cannot spare day-time for the work. For such subjects as have been indicated I hope some will find pleasure and success in working with artificial light.

W. E. Debenham.

P.S.—One point I omitted to mention until reminded by a question. The lamp-light copies of the oil painting, on plates of both kinds, came out of full intensity, and in fact, if anything, required reducing, whilst the day-light copies of the same subject without screen required a considerable amount of intensification.

DETERMINATION OF PLATE SPEEDS.

II.

The first score or so of my experiments were directed towards ascertaining whether the spectroscope would enable any clue to be obtained of slight differences in sensitiveness. As the spectroscope reveals the sensitiveness to coloured rays, and, as we know very well that any or all plates are too sensitive to violet, indigo, and blue, if our investigations are not in the direction of ascertaining sensitiveness to green, yellow, &c., the spectroscope will scarcely be as reliable as side-by-side camera exposures, especially when examining plates by different formulæ. I therefore begin at the first of the camera exposures. I will distinguish the two makes of plates examined by the letters x and z.

No.	Experiment.	Result.
18.	Pl. x, speed 135 / „ x, „ 95 } *f*-16, 30 secs.	Identical negatives as to detail; 135 gave rather more density.
18a.	Repeated.	The same in every respect as above.
26.	Pl. x, speed 100 / „ x, „ 80 } *f*-22·6, 30 secs.	The pair of negatives as exactly alike as it is possible to make them. Theoretically, the 100 plate ought to have shown 25 per cent. more exposure.
26a.	Repeated.	A similar pair of identical negatives.
27.	Pl. x, speed 135 / „ z, „ 80 } *f*-16, 60 secs.	The x plate shows about 10 per cent. more exposure than the z plate. Theoretically, the 135 plate ought to have shown 60 per cent. more rapidity.
27a.	Repeated.	The above confirmed. Error in speed, 50 per cent.
28.	Pl. x, speed 80 / „ z, „ 80 } *f*-16, 60 secs.	The x plate showed 10 per cent. in advance of the other. Theoretically, they should have come out alike.
28a.	Repeated.	The above exactly confirmed.
29.	Pl. x, spd. 37, *f*·16 / „ z, „ 80, *f*-22·6 } 60 secs.	The x 37 plate shows 10 per cent. more exposure. Theoretically, as the 37 plate had just double the exposure of the 80, it ought still to have been behind in the ratio of 74 to 80, or 7½ per cent. slower. The combined differences show an error of at least 15 per cent. in estimating speeds by two makers.
29a.	Repeated.	Exactly similar result.
30.	Pl. x, speed 100 / „ z, „ 80 } *f*-16, 60 secs.	The 100 plate has about 10 per cent. in its favour. Theoretically it should have showed a mean difference of 22½ per cent. It proves that two makers cannot agree in their determination of speed, and this remark applies also to No. 28.
30a.	Repeated.	As above. Had both plates been equally coated, probably their speed would have been alike.
32.	Pl. x, speed 140 / „ x, „ 100 } *f*-22·6, 60 secs.	A pair of identical negatives. Theoretically, there should have been 40 per cent. difference, but there is not 1 per cent. discoverable. So alike are they that they might have been out of one batch of emulsion, density and detail being exactly alike.
32a.	Repeated.	Perfect accord with above. 40 per cent. error.

No.	Experiment.	Result.
33.	Pl. x, speed 140 } *f*-22·6, 60 secs. „ x, „ 80 }	The pair of negatives differ by 10 per cent. only. Theoretically the difference ought to have been 75 per cent. in favour of the higher speed plate. Practically the error in speed determination in this case is no less that 65 per cent.
34.	Pl. x, speed 140 } *f*-22·6, 60 secs. „ x, „ 95 }	The pair differ by under 10 per cent. Seeing that the difference should have been nearly 50 per cent., it proves that here again there is an error of 40 per cent.
34a.	Repeated.	Exactly confirms above.

I might go on enumerating several other examples of these enormous discrepancies, but am sure it will suffice if I instance errors of from ten per cent. to sixty-five per cent. to convince my readers that there is something alarmingly wrong in this new-fangled method of determining the speed of plates. I refer for one moment to the experiments, and I point out Nos. 18, 26, 32, 33, and 34. These, it will be noticed, are comparisons of speed of *one make of plate*, which I have called x. What do these experiments show? That 37 is under-estimated by about twenty per cent.; that 80 and 100 only differ by ten per cent. in speed; and that between 95 and 140 there is really only about ten per cent. in favour of the 140, while 100, 135, and 140 are for all *practical* purposes alike in speed.

During my treatment of the plates in this series of experiments, of which the foregoing are a few selections, I have been much struck by the great influence the thickness of the coating has upon the final result. For aught one could tell, some of the plates might have been coated from the same batch of emulsion (although bearing different speed numbers), the real or apparent difference consisting of a thicker or thinner coating. Again, some of the plates started under the developer sooner than others, without, however, causing any distinguishable difference in result at the finish. Any one who has had much experience in emulsion-making will bear me out when I say that a difference of one or two per cent. of gelatine in two similar emulsions will account for this.

I have no space at my disposal to discuss here the rights or the wrongs of the method known as that of Hurter & Driffield for determining the speed of plates. At the moment it does not concern the purport of these remarks; all I intended to show is the utter unreliability of the system, and to prove that such speed numbers are fallacious and deceptive. I have shown that the half-dozen speed numbers of a given maker resolve themselves into two, or at most three, rapidities. For any other or rougher purpose than that of determining the speed of plates, possibly the method might be found suitable; for instance, it might tell us what were the proportions of particles of carbon in a carbon print, but it will not do for plates. Probably I shall give my reasons for this anon.

G. F. Williams.

A CHEMICAL STUDY OF MERCURIAL INTENSIFICATION.

[Photographic Society of Great Britain.]

In January, 1890, I read a paper before this Society *On Control in the Density of Negatives* (*Photographic Journal*, New Series, xiv. 40), and therein described the action of mercuric chloride upon a silver image and of ferrous oxalate upon the bleached image. The effect of sodium sulphite, instead of ferrous oxalate, was also shown, so far as the character of the resulting image is concerned. Since that time I have further studied the changes taking place during mercurial intensification, and I beg to lay before the Society those of my results that are of practical interest to photographers. I have obtained further evidence that the action of mercuric chloride upon metallic silver gives a double salt, and not a mere mixture of silver and mercurous chlorides, which, with other matters of a purely chemical interest, will probably be published elsewhere.

The action of mercuric chloride upon the silver image is perfectly definite, but in practice it is found difficult, if not impossible, to prevent the mercury salt from combining with the gelatine when it is employed in a plain solution, and to prevent this it is usual to add a little hydrochloric acid. The small amount of acid generally used—and it cannot be increased, or frilling will result—is very desirable, but it should be applied with the mercuric chloride, and not afterwards, because, in the absence of mercuric chloride, it is liable to affect the bleached image. Hydrochloric acid, when strong and hot, dissolves out all the silver and half the mercury from silver mercurous chloride, leaving half the mercury in the metallic state, thus:—

$$2AgHgCl_2 = Hg + HgCl_2 + 2AgCl.$$

If the acid is weak, the silver chloride remains almost entirely with the mercury, and the effect is practically a loss of mercury. This change, however, cannot take place in the presence of excess of mercuric chloride; therefore the acid generally added to the mercury solution employed for intensification is harmless to the image.

It has been suggested to add ammonium chloride to the mercury solution, presumably for facilitating the solution of the mercuric chloride. This addition is not to be recommended, because mercuric chloride is quite soluble enough in water alone, and ammonium chloride, if it should have opportunity to act upon the bleached image in the absence of mercuric chloride, would lead to a loss of mercury. Its final effect, when hot, is to dissolve out two-thirds of both the silver and the mercury, leaving the rest in the metallic state. There is not the same safeguard in the use of ammonium chloride that there is in the case of hydrochloric acid, because large quantities may be present without injury to the film, and, as it is unnecessary, it is better to avoid the possibility of irregularity that results from its use.

I have investigated the action of several reagents upon silver mercurous chloride to elucidate the changes that take place when the image, after bleaching it with mercuric chloride, is blackened by the various methods that have been proposed.

Action of Sodium Sulphite.

In the previous paper the action of sodium sulphite was expressed thus:—

$$4AgHgCl_2 = \underbrace{3HgCl_2 + 2AgCl}_{\text{Dissolved by the sodium sulphite.}} + Ag_2Hg.$$

To this I can now add the statement that the mercuric chloride dissolved forms mercuric sodium sulphite, thus:—

$$HgCl_2 + 2Na_2SO_3 = Hg(NaSO_3)_2 + 2NaCl.$$

The silver chloride is doubtless changed into sulphite, which is dissolved by combination with sodium sulphite, but the proportion of the sodium salt required is not so certain as in the case of mercury. One molecule of silver chloride appears to require, as a minimum, about four molecules of sodium sulphite to dissolve it, but practically more must be used to avoid secondary changes.

The action of sodium sulphite may therefore be written:—

$$4AgHgCl_2 + 7Na_2SO_3 + xNa_2SO_3 = 2Ag + Hg + 3Hg(NaSO_3)_2 + Ag_2SO_3, xNa_2SO_3 + 8NaCl.,$$

where x is equal to seven or more. The large quantity of alkaline sulphite necessary to dissolve the silver chloride doubtless leads to the leaving of silver chloride or sulphite in the image when an insufficiency of sodium sulphite is employed. This may account for the thinning action of hypo upon an image intensified with mercury and sulphite which has been observed, though I have never myself noticed this effect.

As stated in my previous paper, if the sodium sulphite solution, with the salts that it has dissolved, is allowed to remain in contact with the metals left as residue, the mercury in the residue will dissolve, and metallic silver will take its place; but, if intensification is carried out in the ordinary manner, this action is not likely to take place.

It may be remarked in passing how greatly inferior sodium sulphite is to sodium hyposulphite as a solvent of silver chloride. The figures given above indicate that, taking the two crystallised salts, the former is only about one-third as efficacious as the latter, weight for weight. But this proportion must not be relied upon too implicitly for practical purposes, because a considerable excess of the sodium salt must be taken in both cases to avoid secondary changes, and it is probable that a larger excess is needed in the case of the sulphite. Nor does this comparison include any difference in the rapidity of action of the two salts. It appears that sodium sulphite acts more slowly than the other, and that, for this reason also, a greater excess of it would be desirable if it were to be used for practical purposes as a fixing agent.

In the continuation of the investigation of the action of sodium sulphite, I have been ably assisted by my colleague, Mr. W. Kirman to whom I offer my best thanks.

Action of Sodium Hyposulphite.

Sodium hyposulphite rapidly blackens silver mercurous chloride, and, if an excess of it is used from the first, the change is of a simple, character, and may be expressed thus:—

$$3AgHgCl_2 = Hg + Ag + 2AgCl + 2HgCl_2.$$

That is, one-third of each of the metals is left in the metallic state, the two-thirds being dissolved. The silver chloride is, of course, changed into the double hyposulphite, as is well known, but there is no sufficiently definite information about the hyposulphites of mercury

to enable one to state in what form it is dissolved. If the sodium hyposulphite is not in excess from the first, then sulphides of the metals are produced, and also sulphuric acid, which causes the precipitation of sulphur from the solution. By prolonging the action of the hyposulphite, the metallic mercury dissolves precipitating silver from the solution.

Action of Potassium Cyanide.

Potassium cyanide in solution blackens silver mercurous chloride with great readiness, and gives, like sodium hyposulphite, one-third of each of the metals in the residue. Its action may be written thus:—

$$3AgHgCl_2 + 8KCy = Hg + Ag + 2KAgCy_2 + 2HgCy_2 + 6KCl.$$

But the action of the resulting solution upon the residue is different from that observed in the previous cases, for the metallic silver dissolves precipitating mercury.

Potassium cyanide is of no use as a follower to mercuric chloride in intensification, on account of the rapidity with which it attacks both silver and mercury when they are so finely divided as they are in gelatine films. It is probable that it was to avoid this solvent action that potassium cyanide was first saturated with silver cyanide, and this addition certainly does prevent the loss of image, but it also profoundly alters the reaction that takes place.

Action of Potassium Silver Cyanide.

Potassium silver cyanide is produced by adding silver cyanide (or silver nitrate) to a solution of potassium cyanide until there remains an excess of silver cyanide which the solution is unable to take up. The use of such a solution, after mercuric chloride (or bromide) has often been commended, since H. J. Burton described the process in the *Year Book* for 1873 (p. 97), and it gives a vigorous intensification of a good black colour with the minimum chance of staining, or like trouble. Mr. Burton very wisely and properly recommends this method for negatives of line subjects only, but others have since applied it to negatives of all sorts.* I have been bold enough, however, to condemn such intensification of half-tone negatives, chiefly because the prolonged application of the blackening solution thins the image. Some time ago I pointed out, and Messrs. Hurter & Driffield have subsequently confirmed my observation, that reduction of the image by such a process changes the character of its density gradation. But, even if there were no change of gradation, the reduction following the intensification leads to uncertainty, and the perfecting of technical photography demands the elimination of uncertainty. I am now in a position to condemn this method of intensification more emphatically, because also of the composition of the resulting image, and because of its want of uniformity.

The primary action of potassium silver cyanide upon silver mercurous chloride may be expressed thus:—

$$AgHgCl_2 + KAgCy_2 = Ag + AgCl + HgCy + KCl.$$

The residue contains, therefore, as metal, all the silver originally present, and to this has been added an equivalent quantity of silver in the form of chloride. This result is highly desirable, and, if only we could stop here, the method would be worthy of the highest appreciation, because it would only remain to reduce the silver chloride, and the image would be of pure metallic silver in double the quantity first present. But there are secondary reactions which appear to be inseparable, or, at least, inseparable with any degree of certainty, from the primary change.

The silver chloride, by reaction with more potassium silver cyanide, is replaced partially by a double equivalent of silver cyanide, thus:—

$$AgCl + KAgCy_2 = 2AgCy + KCl;$$

and the silver chloride that remains holds to itself some of the mercuric cyanide so tenaciously that prolonged washing only slowly removes a part, the remainder resisting, apparently, any amount of washing.

The residue, therefore, consists of the metallic silver originally present, with silver chloride, silver cyanide, and mercury cyanide. By prolonging the action of the potassium silver cyanide, the silver chloride and the mercuric cyanide will decrease, the silver cyanide will increase, and the metallic silver will tend to dissolve. By prolonging the washing, the mercuric cyanide will decrease. Thus one cannot tell what may be finally present, and the composition of the images of different negatives intensified by this process cannot be expected to be identical. The image itself is not permanent; it is affected by light. It is obvious that this method of intensification may be repeated on the same negative, but this is scarcely an advantage, because one application of the process is likely to give too much density.

Sodium hyposulphite thins the intensified image, leaving only the metallic silver, and it appears that it is possible in this way to remove all that the intensification has added to the image. But it would not be well to rely too much upon this, because finely divided silver is readily attacked by alkaline cyanides, and there might, therefore, be an accidental loss of metal.

Action of Alkalies.

Ammonia readily blackens silver mercurous chloride, and the general idea appears to be that the silver chloride is dissolved, and that mercurous ammonium chloride remains. This is not the case, for, though some silver is dissolved, the greater part remains in the residue. I have not yet completed my examination of this reaction, but my results point to the probable production of two compounds in varying proportions, namely, $NH_2AgHgCl$ and $NHAgHg_2Cl$. Almost the whole of the mercury remains in the residue.

Caustic soda immediately blackens silver mercurous chloride, replacing chlorine by oxygen, but the action is very difficult, if not impossible, to complete. It is, without doubt, the silver chloride that is so tardily affected. The residue consists of mercurous oxide, silver oxide, and silver chloride. If the alkali is allowed to absorb carbonic acid by exposure to the air, mercury will be dissolved.

Sodium carbonate acts more tardily than caustic soda, and dissolves a considerable quantity of mercury.

Practical Conclusions.

Whatever methods of intensification may suffice in occasional emergency, I submit that we should have, for regular use, a method that works in an exact and definite manner, that can be allowed to proceed to completeness without the possibility of any other change setting in to make the final result uncertain, one that does not produce too great an increase of density, and that leaves a permanent image of simple and definite composition, which can, if necessity arises, be treated for further intensification, or other effects, with the same facility as the original image. This is the more important, because it is impossible to be sure of getting the density required by simple development when various subjects have to be photographed under various conditions. It is also impossible, without falsifying the gradation, to develop too dense, and afterwards reduce to the desired condition. By the use of mercuric chloride, followed by ferrous oxalate, the conditions stated are realised, and I do not know of any other intensifier of which this can be said. Since I drew attention to this matter three years ago, the method has been varied by one and another in the replacement of the ferrous oxalate by alkaline developers. This change is not desirable, because of the uncertainty introduced as to whether or no the alkali has produced its characteristic change to a certain extent. Ammonia leave an image of a complex and variable composition, and sodium carbonate has a tendency to dissolve mercury; therefore, allowing that oxides as well as chlorides are reduced by the developer to the metallic state, the presence of any alkali makes the change uncertain.

I believe that any photographer who takes the trouble to master the few difficulties that attend the use of mercuric chloride, followed by ferrous oxalate, will be very loth to use any other method for half-tone negatives. The two chief precautions necessary are to eliminate the hypo that remains after washing before treating the negative with mercuric chloride, and to wash away the excess of mercuric chloride before using the ferrous oxalate. The first is done by a few minutes' soaking in an acidified alum solution; and by applying the ferrous oxalate in a dull light, such as is used for manipulating carbon tissue and printing-out papers in; if a little mercuric chloride is left when the ferrous oxalate is added, its only effect will be to retard the blackening of the image.

Chapman Jones, F.I.C., F.C.S.

* Since writing this paper, Mr. H. J. Burton has kindly informed me that the cyanide method of intensification was told to him twenty-four years ago by an operator working at the British Museum, who learned it from another operator. Mr. Burton adds that "the method was worked in this way. A portion of the ordinary fixing bath of cyanide of potassium was put into a glass measure, and a little of the intensifying solution added, and this was poured over the negative after treatment with mercury bichloride. Finding that, if the cyanide of potassium was in excess, the action was irregular, I prepared it in the manner published by me. For many years I have been in the habit of adding to the solution, after the whole of the cyanide of potassium has combined with the silver, a small piece of hyposulphite of soda. This addition gives the negative an intense black colour instead of an olive black." So far, therefore, as I have been able to get at the facts of the case, it appears that the cyanide method of intensification ought to be called Burton's, and not Monckhoven's, if any name is to be attached to it.

THE HAND CAMERA AND ITS USE IN PICTURE-MAKING.*

The Causes of Failures.

It needs a good photographer to use a hand camera with any proper measure of success, but this is just what you have a considerable number of among the members of this Brixton and Clapham Camera Club; and to such of you as may take up hand-camera work this year, and I trust to see some who will, and if used intelligently, I can promise you much pleasure, and, I am bound to say, some disappointments, but that will not be unexpected by those who have had any experience with the camera and tripod, as, even with this method—allowing time for consideration in all the stages up to actual exposure—yet failures are many with most of us, and when working the hand camera, it will soon dawn on any one taking it up for the first time, that the conditions are very different—requiring a quick and decisive judgment as to what to take and what to leave, the proper moment to let the shutter fly, and, what often is of equal importance, a strong self-control, in order to hold back from letting it go just too soon. All this sounds formidable, and yet it is soon acquired by practice, and expenditure of a little thought over the *pros* and *cons* of the whole thing.

I am afraid we amateurs give far too much time and attention to dashing up and down, making exposures *ad lib.*, but very little time to sitting quietly and working out in our own minds not only what have been our successes, but, what is of infinitely more importance for future advancement, what are the *causes* of our failures. Whether they be technical or pictorial failures, we might often spend a little more time over them with profit, and, if not understood at the moment, put them away, and afterwards something may turn up to explain the cause, and so enable one to guard against similar mistakes occurring.

This question of failures is looked upon with different opinions by different people. The ruler of my household entertains strong opinions on the matter, and whenever I am just getting a choice collection gathered, she makes a rapid calculation of £ *s. d.* they represent, which calculation is generally of a generous nature, no stinting about it, and is a sure sign that at their next visit the dustmen are certain of finding a richer harvest of glass than usual (it may be some of you have a guardian angel ministering over you in a similar fashion).

Find a Good Plate and Keep to it.

In leaving the question of plates, let me strongly advise all in doubt to tackle a good sound plate, and, having once found a suitable one, stick close to it. "*It is better to deal with a rogue you know than one you don't know*," so goes the old saying, and, striking out rogue and substituting plate, makes it a sound bit of photographic advice. So much for the question of plate. It must be good, and rapid as possible if only one kind is used. It might be expected something ought to be said respecting colour-sensitive plates, but, beyond what is generally known of them and their special uses, we need not trouble to-night. They are useful, and of assistance when dealing with work having much yellow or red, as landscape in autumn, and may be of assistance in dealing with skies containing much blue, in contrast to light, fleecy clouds, and where any fog is about, but for ordinary work they are by no means an absolute necessity.

Having disposed of the apparatus, how to use it is the next matter to claim attention. Any one commencing hand-camera work will, on becoming possessed of one, naturally be eager to try it; and, although it would be better to sit down and look the thing over for yourself, and arrive at a correct understanding of the purpose and working of its different parts—in fact, thoroughly make yourself master of its mechanism—yet no great harm will come from rushing off and trying it at once, beyond, perhaps, spoiling a few plates and indulging in the luxury of a few mild observations on some people's stupidity, especially hand-camera makers, and then sitting down and going through the directions and looking over the camera, and finding the fault was all your own, and which materially adds to your satisfaction *sometimes*.

Studying the Camera—Some Reminiscence.

This question of studying the camera and its working is a matter of far greater moment than at first would appear. The whole movements (if it have any) must be so understood and practised that they become a kind of second nature, and it is also necessary to work with system; for instance, it is better to change each plate immediately after the exposure, and then at once set the shutter ready for the next picture. By this means you avoid exposing twice on the same plate. After a little practice, it is done mechanically and as a matter of course, and there is no trouble on that score. I remember in my early working a hand camera going off one afternoon to Greenwich and taking the boat to Blackfriars for the purpose of getting barges sailing. Well, it was a day in the week when even barges seem to go on strike, and the result was only one was met the whole way; but it was a beauty, and, after getting everything ready while she was in the distance, I fixed myself in the bow of the steamer and waited. It is exciting work sometimes this waiting. You cannot tell which side you will pass her on, and the element of uncertainty makes it enjoyable enough when things come right. On this occasion I had judged matters correctly; the distance between us was rapidly narrowed; one look at shutter and focussing lever, to see both were set right, and then the camera was held up, the picture composed on the finder a second, and the barge was near enough. And what a picture! The sun shining brilliantly behind the top sail, throwing masses of dark reflections in the water, relieved by touches of glittering light. The moment had arrived! Shutter released, and much joy reigned in the breast of yours truly.

The safety shutter inside camera was next to do its duty while setting shutter again, and on tenderly proceeding to carry out the necessary movement, I found it had faithfully been doing it all along. Never having been opened, and not having been coated with a sensitive film outside, but a good coat of black varnish, the picture had passed away, and its shadow also, instead of remaining on the trusty plate eagerly waiting behind that blackened door to receive it. I studied that camera in the evening in a desperate mood, *but to some purpose—that mistake never has happened again.*

Work with System.

Study the mechanical arrangements of your hand camera and work them with system, always doing the necessary movements immediately after each exposure, and rid yourself of one trouble—*uncertainty*—and leave your mind free when called upon to arrange and take a picture. You will find, if aiming at the best results, you require every atom of undivided attention devoted at the moment to securing the picture desired, whether it be animals (human or otherwise), marine, or pure landscape.

The knowledge of, and command over, your instrument is a matter of grave importance, and cannot be neglected without paying the penalty of frequent and needless failures. Hand-camera work is difficult enough, and to obtain good technical results is not the simplest thing in the world; it behoves one to do everything possible to minimise the chances of failure.

Well, we have got it all off by heart, and after putting some plates in, out we go into the park or lane, and, behold, some sheep are being driven along. A good light, suitable surroundings—everything promises well. We choose our standpoint, all being ready, shutter being set, &c., we wait until they are getting near enough, and then the question is, Where shall we hold the camera?

Where shall we Hold the Camera?

There are two things we must be certain of. First, holding it without movement during exposure; and, secondly, so that we can see the finders plainly. Now, where is the position most likely to succeed in both these points? After trying all methods, I prefer holding it to one's chest (like this); it enables you to see the finders perhaps better than in any other position; you are able to get a firm hold of the apparatus, and by holding your breath during the short time taken up with the exposure, run little or no risk of movement.

There are other ways advocated—under one's arm by the side. This method, personally, I do not like, as I cannot get so clear and convenient a view of the finders. You may now understand my reason in advising that finders should be as large as possible; it is a matter you will find have a serious effect on your results if not attended to. One last word. Great and unremitting care is needed in holding the camera steady, movement of a slight character being sufficient to spoil what otherwise might be a perfect production. It is almost entirely a question of practice and care.

We will assume, please, you saw the composition on your finders satisfactorily, and made the exposure, and probably repeating the operation on other subjects. And, now we are back at home, and, naturally enough, desirous of seeing the wonderful results this new method of working is to give us, so for the the dark room and the developer. What is this to be?

The Developer.

Personally I must confess at present to sticking to the dirty but useful old friends, pyro, ammonia, and bromide, and the use of a little common sense. I should not presume to talk to you about development, many of of you having, no doubt, forgotten more than I ever knew upon the subject; but this, and this alone, I may say respecting development of

* Continued from page 59.

hand-camera plates. Go for the detail, and keep back density—that can always, and at any time, be obtained. Having got out such detail as may be desirable, then go for density.

I have tried within the last few days flashing out the detail by using amidol stock solution diluted to six times its bulk with water, and one drachm of ten per cent. ammonia added as accelerator—getting density by using stock solution full strength afterwards. This promised so well that I shall experiment further with it, trying other alkalies, and redeveloping with pyro and ammonia for density.

Whatever developer is used, the method should be the same—detail first and then density, and thus produce negatives worthy of platinum or carbon printing. On this question of printing, the thanks of all amateurs are due to Mr. Willis for placing in our hands such a delightful process as his new cold-bath platinum paper, which is simplicity itself to use, both in printing and developing, and the results obtainable charming. I can strongly recommend any and all of you who may not have done so yet to try it.

The notion entertained by many that negatives produced when working rapid exposures are only suitable for gelatino-chloride emulsion, and that class of paper, is quite erroneous. Use a rapid plate, develop for detail and then density, get a good cold-bath platinum print, and you have something to look at with pleasure now and in after years if you are lucky enough to be able to keep it.

(To be concluded.)

A VISIT TO MESSRS. MORGAN & KIDD'S COLLOTYPE WORKS AT RICHMOND.

On January 30 a large number of members of the London and Provincial Photographic Association accepted the invitation of Mr. F. de P. Cembrano, the President of the Richmond Camera Club, to witness a practical demonstration, to the members of the latter Club, of collotype, under the superintendence of Mr. R. L. Kidd and his manager, Mr. Berghaff. After a very courteous welcome by Mr. and Mrs Kidd, and inspection of many fine examples of the work as exhibited in the showrooms, all adjourned to the large new building adjoining, the aspect of which (filled as it was with a magnificent plant and machinery, comprising all the latest improvements, and all the machines at work, under the guidance of a large staff of busy workers) went far to prove the assertions of some of the gentlemen present that Messrs. Morgan & Kidd, by their business enterprise, had placed themselves well abreast of anything of the kind in existence in this country.

In introducing the subject to the gathering, Mr. Kidd gave the following description of the working of the process:—

"An ordinary quarter-inch plate glass is ground on one side with the finest emery powder. It is then thoroughly cleaned, and well washed with water to get rid of the emery powder. When dried, it is coated with a substratum composed of solution of beer and silicate of soda: some prefer sugar and water instead of beer, but our experience is that beer is preferable. The beer should be slightly warmed before mixing it with the silicate of soda. Without the substratum the printing composition would not adhere to the plate glass.

"After the plate is carefully coated with the substratum it is then placed on a plate-rack, and allowed to dry spontaneously. When thoroughly dry, it is washed in clean water for a quarter of an hour, and then placed again to dry as before.

"It is then put into the drying oven, perfectly levelled, and heated up to about 120° Fahr. It is then coated with a bichromated solution of gelatine and water, which must be of the same temperature, viz., 120 Fahr. This must be done with the greatest care to avoid dust particles, and secure a perfect and even coating. It is now left to dry for about two hours in a uniform temperature, which should not exceed 125° Fahr., care being taken to avoid draught or any unevenness of the drying, which would cause markings to appear in the printing of the plate. There are some workers who dry them in a temperature of 150 Fahr., but our experience is that this temperature is too high, and the results are inferior; the higher the temperature the coarser the reticulation or grain will be, and this would interfere with the delicacy of detail.

"We may point out that the printing from a coarse-grained plate is much easier than from a fine-grained plate, though the results are inferior. The coarse-grained plates are more used for commercial printing, as a much greater number of prints can be pulled from the plate. The finer-grained plates are adapted for high-class illustrations.

"There are many formulæ, and every collotyper has his own pet formula; there are a great number published in the various photographic papers.

"A formula which will give good results by carefully working is as follows:—

Middle hard gelatine	100 parts.
Water (distilled)	1000 ,,
Bichromate of potassium	22 ,,

"Some workers prefer bichromate of ammonium instead of the potassium salt; in this case only twenty parts of bichromate of ammonium should be taken.

"When the plates are thoroughly dry they are allowed to cool down gradually and are now ready for exposure in contact with the negative, which must be reversed, except where the reversal of the image is of no consequence.

"The negative is placed in an ordinary printing frame. The collotype plate is then brought into contact face to face with the negative under heavy pressure, and exposed by day or electric light in the ordinary way. The right exposure is known by examining the image through the back of the plate glass until all details show in a light brown tint.

"After the exposure is completed the plate is washed in clean water until all the bichromate has disappeared. This is known by the absence of the well-known yellow tint of the bichromate salt.

"It is then allowed to dry spontaneously at an ordinary temperature. When dry it is ready for the power machine or hand press, but it is advisable, if possible, to keep the plate about two or three days; the gradation and half tone would be found more perfect.

"After placing it in the printing press it is necessary to moisten the printing surface with a solution of glycerine and water, which is generally called the etching solution. The parts where the light has not acted the gelatine will absorb more moisture; where the light has acted the gelatine has more or less hardened, and will resist the etching solution. It is kept on the plate about fifteen minutes, and then taken off with a sponge and blotting-paper. The plate is then inked up with a gelatine or leather roller charged with stiff, greasy ink, similar to the lithographic process. The parts where the gelatine has absorbed the etching solution now refuse to take greasy ink, whereas in the parts upon which the light has acted the gelatine surface has hardened, and made them more or less insoluble. They will not absorb the etching solution, and will readily take the greasy ink; in fact, the greasy ink is repelled more or less in exact ratio to the amount of light acted on the plate, hence we obtain an image in all the graduations true to nature.

"A considerable number of impressions can then be taken off the plate, but after each print the plate must be inked up again; and from time to time a fresh application of the etching solution is needed, otherwise the plate would gradually lose its power of repelling the ink. The printing part of the process requires a great amount of skill and experience to secure the finest results."

At the conclusion of Mr. Kidd's address the various details of the process were all gone through in a thoroughly practical manner, from grinding the plate glass with emery to coating the plates with substratum, the drying of same in the large, accurately levelled drying chambers, the coating with the bichromated gelatine, and the printing by means of negative films stripped from the glass. The films having been previously coated with a solution of three ounces Coignet's gelatine to twenty ounces water, with ten drops glycerine added, stripped very readily from the glass plates (especially prepared for stripping by Messrs. Morgan & Kidd). The electric light was used for printing, after which the etching process was gone through and various wrinkles explained.

Great stress was laid on the necessity for proper inking, Mr. Kidd stating that very many proofs were taken sometimes before a perfect result was obtained, but when the right effect was gained a very large number of impressions could be pulled without any variation in quality. He pointed out that, for specially fine work, the hand machine was most suitable; but, when using thoroughly good negatives, best results could be obtained by the larger machines, and as many as 100 impressions per hour could be produced when everything was in good working order. The leather rollers were used for inking the plates, and the gelatine roller for working the ink well over the impression.

At the conclusion of the demonstration Mr. Cembrano called on every one present to testify their thanks to Mr. Kidd for his hearty reception of them that evening, and for the large amount of instruction every one had received.

Mr. W. E. Debenham, on behalf of the visitors from the London and Provincial, endorsed Mr. Cembrano's remarks as to Mr. Kidd's kindness, and remarked on the public spirit shown by Mr. Kidd in making everything appear so clear and straightforward. Nothing at all appertaining to the process seemed to have been withheld, thus strongly contrasting with other so-called demonstrations, where an inquirer, seeking for real information, often had to go away no wiser than he was before.

Mr Kidd, in reply, said how pleased he was to have imparted any information that evening, and how gratified he was to observe the attention that had been paid to the various details by all present. He would, however, venture to remind gentlemen that, with all the instruction they had received that evening, perfection in the process could not be attained without a considerable amount of practice.

A NEW EXPOSURE TABLE.

Messrs. Elliott & Sons, of Barnet, are issuing a system of exposure tables for use with their plates, of which they say: "One of the leading features is, that we give four small illustrations of typical views, lettered respectively A, B, C, and D. A is a distant view without dark objects in foreground; B is also a view with distance, but there is heavy foliage in foreground; C is a near architectural subject; whilst D represents a moderately well-lighted interior. Portraits out of doors would require the same exposure as C, whilst portraits in ordinary rooms would require about the same exposure as D. The tables are calculated for stop *f*-32,

but an additional table is given showing at a glance comparative exposure for any other sized stop. To use these tables, all that is necessary is to compare the subject to be photographed with the illustration, note the letter marked on picture that appears to correspond with view, also note time of day and year; then, referring to Table 1, under group of columns headed with corresponding time of day, follow down the column headed with letter on illustration similar to view, until the line marked with required month is reached, when the approximate exposure will be found."

TABLE No. 1.

Showing approximate exposure for any given time of day and year for "Barnet" ordinary plates, with stop *f*-32, in bright sunlight. To find exposure for any other size of stop, see Table 2. A, Distant view without dark objects in foreground; B, Distant view with heavy foliage or dark objects in foreground; C, Near architectural subjects, or portraits out of doors; D, Well-lighted interiors or portraits in ordinary rooms.

Morn. / After.	6 o'clock. 6 ,,				7 o'clock. 5 ,,				8 o'clock. 4 ,,				9 o'clock. 3 ,,				10 o'clock. 2 ,,				11 o'clock. to 1 ,,				
	Sec. A	Sec. B	Sec. C	Min. D	Sec. A	Sec. B	Sec. C	Min. D	Sec. A	Sec. B	Sec. C	Min. D	Sec. A	Sec. B	Sec. C	Min. D	Sec. A	Sec. B	Sec. C	Min. D	Sec. A	Sec. B	Sec. C	Min. D	
Jan.	...	...	...	...	...	...	...	...	...	...	...	...	3	6	12	...	1½	3	6	25	1	2	4	10	Jan.
Feb.	...	...	...	...	...	...	...	...	3	6	12	...	1¾	3½	7	25	1¼	2¼	5	15	¾	1½	3	6	Feb.
Mar.	...	...	...	...	2½	5	10	...	1¼	2½	5	25	¾	1½	3	10	⅝	1¼	2½	5	½	1	2	2½	Mar.
Apr.	2½	5	10	...	1¼	2½	5	25	¾	1½	3	10	½	1	2	5	⅜	¾	1½	2½	⅜	¾	1½	1½	Apr.
May	1½	3	6	25	1	1½	3	9	½	1	2	4	⅜	¾	1½	2½	¼	½	1	1¼	¼	½	1	1	May
June	1	2	4	15	⅝	1¼	2½	6	½	1	2	2	⅜	¾	1½	1½	¼	½	1	1	¼	½	1	1	June
July	1¼	2½	5	25	¾	1½	3	9	½	1	2	5	⅜	¾	1½	2	¼	½	1	1¼	¼	½	1	1	July
Aug.	2½	5	10	...	1¼	2½	5	25	⅞	1¾	3½	12	⅝	1¼	2½	5	⅜	¾	1½	2½	⅜	¾	1½	2	Aug.
Sept.	...	...	...	...	2½	5	10	...	1¼	2½	5	30	1⅛	2¼	4½	15	¾	1½	3	8	⅝	1¼	2½	4	Sept.
Oct.	...	...	...	...	...	...	...	...	2½	5	10	...	2	4	8	30	1	2	4	20	1	2	4	8	Oct.
Nov.	...	...	...	...	...	...	...	...	...	...	...	...	3	6	2	...	1¾	3½	7	30	1¼	2½	5	12	Nov.
Dec.	...	...	...	...	...	...	...	...	...	...	...	...	4	8	16	...	2¼	4½	9	...	1½	2¾	5½	15	Dec.

Sun obscured, give double these exposures; dull, 3 times; very dull, 4 to 6 times. Figures in columns A, B, and C, denote seconds; figures in column D denote minutes.

TABLE No. 2.

Showing comparative exposures for any size stop. The exposures in preceding tables being calculated for medium-size stop *f*-32.

F-6.	F-8.	F-11.	F-22.	F-32.	F-44	F-64.
1/125	1/64	1/32	1/16	⅛	¼	½
1/64	1/32	1/16	⅛	¼	½	1
1/32	1/16	⅛	¼	½	1	2
1/16	1/16	⅙	⅜	¾	1½	3
1/16	⅛	¼	½	1	2	4
1/13	⅙	⅓	⅝	1¼	2½	5
1/10	⅙	⅜	¾	1½	3	6
⅛	¼	½	⅞	1¾	3½	7
⅛	¼	½	1	2	4	8
⅐	¼	⅝	1⅛	2¼	4½	9
⅙	⅓	⅝	1¼	2½	5	10
⅕	⅓	¾	1⅜	2¾	5½	11
⅕	⅜	¾	1½	3	6	12
¼	⅜	⅞	1¾	3½	7	14
¼	½	1	2	4	8	16
⅓	½	1⅛	2¼	4½	9	18
⅓	⅝	1¼	2½	5	10	20
⅜	¾	1½	3	6	12	24
⅜	⅞	1¾	3½	7	14	28
½	1	2	4	8	16	32
½	1⅛	2¼	4½	9	18	36
⅝	1¼	2½	5	10	20	40

Directions.—Compare subject to be photographed with illustrations, note time of day and month, refer to Table 1 under group of columns headed with corresponding time of day, follow down the column headed with the letter on illustration similar to view, until the line marked with required month is reached, when the approximate exposure will be found.

PLATINOTYPE UP TO DATE.

BEFORE the Bristol and West of England Photographic Association, on January 27, Mr. Ed. Brightman in the chair, Mr. Buchanan Wollaston, of the Platinotype Company, gave a demonstration of the working of the new cold bath paper, showing the great advances on the old hot bath process. The old paper could only be kept a few months, while the new cold process paper in proper calcium tubes will keep for a year, and the Company had some which had kept perfect for twenty-three months, being longer than any other printing paper.

A great advantage is the wide latitude in printing, so long as the paper is not under-printed, as even in a very much over-printed proof the result is quite under control by the help of glycerine in the developer. Moreover, a print can be artistically developed from a poor negative, by local manipulation. A complete black-and-white print (for copies of maps or plans) is obtained by the addition of a few drops of oxalic acid in the strong normal developer. Printing is carried out until the details in the highest lights are just visible in well-gradated negatives, and consequently printing is deeper than with the old hot bath paper. As long as any curl remains in the undeveloped print, after removal from the calcium tube, the paper is dry. The development with normal exposures of prints and normal solution takes thirty to forty seconds, but by adding glycerine and diluting solution with water, development can be much slower if desired. However long the print may be left in the developer, the image will not be damaged, but the acid clearing must be more thorough. No means of destroying the image except hot *aqua regia* has yet been discovered, and this proves permanency. The prints can be developed by immersion, by brushing developer on, and even by one's fingers rubbing the solutions on, as touching any part of a print prematurely with developer leaves no mark on finish of development. With plain strong oxalate developer, inky blacks and cold tones are obtained. By diluting developer with two parts of water, slightly warmer tones. By taking one part of oxalate solution, one part of glycerine, and two parts of water, and brushing solution on, much warmer tones. While by rubbing glycerine all over print first, and still further diluting the oxalate glycerine solution and using brush, the richest and warmest tones are obtained.

To keep print flat during development, pour glycerine on a vulcanite slab or sheet of glass, rub all over, and place print face upwards on slab, smooth down, and it will stop there. Should the sky print through with a thin negative, rub the sky and other high lights in print with glycerine, brush on developer as usual, and the whites will be pure after clearing in acid baths. Hydrochloric acid (which must not be "commercial," but water-white) is better than citric acid, as the latter is hard to wash out of the paper. Platinotypes print three times as fast as albumen in summer time, and twice as fast in winter. Thin negatives should be printed under pale-blue glass, and this produces bright, plucky prints. To get brilliancy, keep solution in motion with brush on print, and blot off after clearing and washing. To secure breadth in a flat print, brush foreground over with strong solution, middle distance with weaker, and far distance with still weaker solutions. To get soft effects from a hard negative, take one part water, and nineteen parts glycerine, paint over print, which will absorb water, and develop as usual. In this way half-tone can be secured from a negative which has none. The glycerine must be free from an admixture of citric acid, as sometimes what is sold as pure glycerine by chemists has as much as thirty per cent. of citric acid in it. The acid wipes out the image as the clearing bath would if print were placed in it before development. Pictures dry a little darker than they appear when wet, and this should be allowed for at the end of development.

LOUTH AND DISTRICT PHOTOGRAPHIC SOCIETY'S EXHIBITION.

THE Louth and District Photographic Society's Exhibition was opened on Thursday afternoon, January 26, to the invited guests of the Society, when there was a large attendance. The arrangements were carried out by the Hon. Secretaries, Mr. S. F. Clarke and Mr. Herbert C. Bentley, who were materially helped in their arduous duties by several members of the committee. The pictures represented all departments of photographic skill. In addition to a large non-competitive exhibition, to which most of the best-known photographers of the day contributed, there was a members' competition for which Mr. S. F. Clarke announced that thirteen members had entered. The Judge's awards were as follows:—Silver medal (given by Mr. Mark Smith), Mr. H. S. Forman; 2nd prize, Mr. E. H. Forman; 1st certificate, Mr. Herbert C. Bentley; 2nd certificate, Mrs. Fawssett. Mr. E. J. Wall, the editor of the *Amateur Photographer*, who acted as Judge, added the following to his award:—"The average quality of the work was decidedly high, and if the other two prints by 'Ominon' (Mr. O. Burdett) had been equal to *A Rift in the Clouds* (another of Mr. Burdett's) the set would have been very near the first best."

The Exhibition is said to have been a great social and photographic success, the chief credit therefor being due to Mr. and Mrs. S. F. Clarke, whose efforts on its behalf were unremitting.

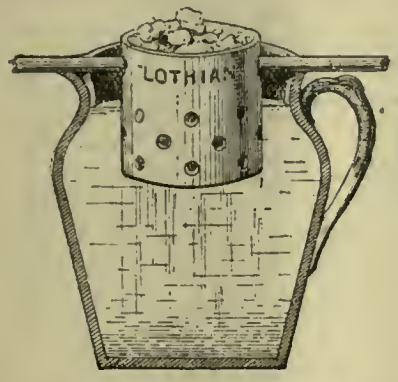
Our Editorial Table.

The "Reliable" Ventilator.

Mr. Henry Jones, 11, Albion-street, Coventry, has sent us a sample of a ventilator he has introduced for fixing in photographic dark rooms for keeping up a supply of fresh air, much needed in some of the little stuffy places in which many photographers are compelled to work. It consists of a mill-board oblong case about a foot in length, an inch in thickness, and three and a half inches in width, with a row of holes on the two opposite sides permitting free ingress and egress of air without the possibility of light being transmitted, this being ensured by a longitudinal division piece inside. It is attached to the door or a partition in the dark room by flanges at each end, a space being cut in such to correspond with the holes in the ventilator. He recommends that one should be fixed near the ceiling and another near the floor.

The "Lothian" Rapid Solution Jar.

Mr. A. H. Baird, 15, Lothian-street, Edinburgh, sends us a new rapid solution jar he is making. Its principle is similar to that brought before the London and Provincial Association some time since by Mr. W. M. Ayres, who, as a practical man, advocated it strongly



Mr. Baird's jar is of white porcelain, perforated with holes in sides and bottom, and is of such dimensions as to be easily suspended in the mouth of a jug or jar of water, as shown in the diagram. To use it, all that is necessary is to place therein the crystals, such as hyposulphite of soda, that are to be dissolved, and lower it into the water. One cannot speak in too high terms of the utility of this simple piece of apparatus.

Messrs. Thomas Illingworth & Co., the enlargers, who have lately removed from West Hampstead to more commodious premises at Willesden, have sent us a view of their new house. The picture is a good example of Messrs. Illingworth's technical skill.

Messrs. C. & W. Wimpey, of Goldhawk-road, of whose artistic floral and landscape backgrounds for enlargements we have previously spoken in a favourable sense, have submitted to us a specimen of their work in water-colour painting on ivory from photographs. The results are charming and artistic.

RECENT PATENTS.

APPLICATIONS FOR PATENTS

No. 963.—"Improved means for Colouring and Tinting Photographic Prints. E. Hooker.—*Dated January* 16, 1893.

No. 989.—"Improvements in regard to Washing and Draioing Racks for Photographic and other purposes." F. T. Parsons.—*Dated January* 17, 1893.

No. 1000.—"A Photographic Hand Camera." H. Gamwell and C. Gamwell —*Dated January* 17, 1893.

No. 1065.—"Improvements in Coin-operated Photograph Machines." P. van W. Welsh and W. F. Freeman.—*Dated January* 17, 1893.

No. 1151.—"An improved Photographic Camera." G. I. Spalding and R. L. Hawkins.—*Dated January* 18, 1893.

No. 1192.—"Improvements in the production of Photographic Images." H. K. Tompkins.—*Dated January* 19, 1893.

No. 1195.—"Improvements in Grooved Metallic Strips for Boxes for Carrying and Storing or Packing Photographic Plates and other Plates, and for other like purposes, and in the method of, and tools for, making the said Grooved Metallic Strips." W. H. Dugard and G. H. Dugard.—*Dated January* 19, 1893.

No. 1581.—"Improvements in and relating to Photographic Cameras." W. Watson.—*Dated January* 24, 1893.

No. 1684.—"Improved Coin-freed Apparatus for Exhibiting Photographs, Pictures, Advertisements, and the like." F. J. Cocks.—*Dated January* 25, 1893.

No. 1696.—"Printing Photographic Plates." E. A. Basebe.—*Dated January* 25, 1893.

No. 1965.—"Improvements in and relating to Frames for Holding Plates or Films in Photographic Apparatus." E. A. Veltch.—*Dated January* 28, 1893.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 6	Camera Club	Charing Cross-road, W.C.
,, 6	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 6	Peterborough	Museum, Minster Precincts.
,, 6	Richmond	Greyhound Hotel, Richmond.
,, 6	South London	Hanover Hall, Hanover-park, S.E.
,, 6	Stereoscopic Club	Brooklands Hotel, Brooklands.
,, 7	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 7	Bolton Photo. Society	10, Rushton-street, Bolton.
,, 7	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 7	Exeter	City Chambers, Gandy-st., Exeter.
,, 7	Hackney	206, Mare-street, Hackney.
,, 7	Herefordshire	Mansion House, Hereford.
,, 7	Keighley and District	Mechanics' Institute, North-street.
,, 7	Lewes	Fitzroy Library, High-st., Lewes.
,, 7	North London	Canonbury Tower, Islington, N.
,, 7	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 7	Paisley	9, Ganze-street, Paisley.
,, 7	Rotherham	5, Frederick-street, Rotherham.
,, 7	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 7	York	Victoria Hall, Goodramgate, York.
,, 8	Ipswich	Art Gallery, Ipswich.
,, 8	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
,, 8	Munster	School of Art, Nelson-place, Cork.
,, 9	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 8	Southport	The Studio, 15, Cambridge-arcade.
,, 8	Stockport	Mechanics' Institute, Stockport.
,, 9	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
,, 9	Camera Club	Charing Cross-road, W.C.
,, 9	Cheltenham	
,, 9	Glossop Dale	
,, 9	Hull	71, Prospect-street, Hull.
,, 9	London and Provincial	Champion Hotel, 15, Aldersgate-st
,, 9	North Kent	Gravesend.
,, 9	Oldham	The Lyceum, Union-street, Oldham.
,, 10	Bristol and West of England	Rooms, 28, Berkeley-sq., Bristol.
,, 10	Cardiff	
,, 10	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 10	Halifax Camera Club	
,, 10	Holborn	
,, 10	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 10	Maidstone	"The Palace," Maidstone.
,, 10	West London	Chiswick School of Art, Chiswick.
,, 11	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

January 26,—Mr. Walter D. Welford in the chair.

The Hon. Secretary read a letter from Mrs. Bedford thanking the members for their expression of sympathy with her and her family in the death of Mr. W. Bedford.

Platinum Toning on Ilford "P.O.P."

Mr. Lorrimer drew attention to the following remarks in the January number of *Photographic Scraps*:—"We have frequently expressed an opinion that P.O.P. prints toned by this method were not satisfactory in result. There was an absence of purity in the whites, and a general degradation over the whole print that we did not admire, and which seemed to us to indicate a general stain rather than a deposit of platinum on or in substitution for the silver. We tested prints made by every formula which has been given for platinum toning, and found *that absolutely no platinum was deposited on the image*. Prints made by others were tested in the same way with the same result." Mr. Lorrimer went on to say that he had exposed some pieces of the Ilford printing-out paper to light until they were thoroughly bronzed, and, having washed them, placed them in a platinum toning bath, and subsequently treating the print with nitro-hydrochloric acid, obtained a precipitate of platinic chloride, which showed that platinum must have been on the image.

Mr. A. Haddon inquired whether there was a possibility of the platinum being substituted for the silver. The Platinotype Company were not able to use gelatine for sizing their paper in consequence of the combination of platinum with the gelatine, one-fiftieth of a grain being sufficient to give a deep shadow over a square inch. Most probably there was not half that amount deposited on the whole of the print. It was extremely difficult to substitute platinum for silver. In boiling down residues, they might have a certain combination of potassium chloride and platinic chloride which might escape detection.

"Photographing Paintings by Artificial Light."

Mr. W. E. Debenham read a paper on this subject (see page 68), showing

several prints from negatives made by the light or an ordinary petroleum amp.

In the course of the discussion which followed,

Mr. W. H. BARNES said that for copying paintings it was sometimes advantageous to use a medium isochromatic plate in preference to the rapid, the question of time being not of much importance.

In reply to a question, Mr. DEBENHAM said he did not advise taking old oil paintings from a different point of view to what they were painted, unless one could have sufficiently powerful light to get a great distance from them.

Mr. BARNES said the colour of the yellow plate used was most important, as it made the light so much slower. He would recommend a plate of a selected yellow-red tint.

Mr. P. EVERITT observed that some samples of yellow glass acted in different proportions compared with gas and artificial light.

Mr. R. BECKETT asked whether different glasses should be used with different paintings?

Mr. DEBENHAM thought the same glass was required throughout. As to the disadvantage of two lamps for lighting the picture, a painter painted so that his picture looked all right from the side in which he had painted. He had often used two or three ordinary tin-backed lamps, and the common oil obtained from the oil shops at sixpence a gallon. He did not recommend having more light on one side than on the other of the painting, but he would get such a distance off as to obtain even illumination all over. Many people got better results by artificial light than by daylight.

Mr. ARCHER CLARKE said he had found a tendency to under-expose oil paintings by daylight, and thought that with some pictures the lumps of paints would show as black shadows in the print, and therefore he considered a light both sides advisable.

Mr. J. S. TEAPE asked Mr. Debenham whether he obtained proper density by development alone?

Mr. DEBENHAM replied that he did not at all require to intensify negatives made by artificial light.

After further discussion the meeting terminated.

Hackney Photographic Society.—January 24, Mr. Charles W. Hastings in the chair.—Mr. Carpenter presented a number of his lantern slides to the Society. Mr. Reynolds presented the Society with an album. Both gentlemen were thanked. Mr. LEWIS MEDLAND then gave a lantern lecture on the Zoo. The lecturer explained that the slides were nearly all from hand-camera negatives, here and there supplemented by drawings of animals by Buffon, which (latter) caused great amusement. A composite picture of a lion in Epping Forest was funny. All kinds of animals were spoken of by Mr. Medland, who has travelled a great deal, and consequently the lecture was the better rendered. When at the Zoo, Mr. Medland was especially favoured, and has been successful in obtaining some capital negatives of the animals there and of some now dead and gone; such as Jumbo and Sally were shown. The lantern was manipulated by Mr. A. S. Newman, assisted by the Hon. Secretary. From the question box—1: "Can Alpha paper be toned after fixing and drying?" It was said that Mr. Howson, at a previous meeting, said, "Yes, it could be." Question 2: "Is it necessary to varnish a negative previous to retouching?" Mr. R. BECKETT said, "Do all the retouching, and varnish after, then mend any defect on the varnish."

West London Photographic Society.—January 24. The evening was devoted to Mr. H. N. King's paper on the *Royal Palaces of England*, illustrated by over 100 lantern slides, the quality of which evoked great admiration. Owing to the greatly increased pressure of business on the time of the Hon. Secretary (Mr. Bennett) he has been obliged reluctantly to resign office and Mr. W. S. Rogers (Assistant Secretary) has taken over his post, Mr. J. Stein filling the post of Assistant Secretary. Mr. Rogers' address is 13, Addison-road, Bedford Park.

Bath Photographic Society.—January 25, Mr. Austin King (President) in the chair.—Mr. W. PUMPHREY gave an illustrated lecture on the Channel Islands. By way of preface he said his photographic slides were all reduced in the camera (wet collodion) from half-plate gelatine films. Only by the means adopted he thought it possible to secure some of the pictures to be shown. He then proceeded in his well-known felicitous style to display and explain a number of pictures representing views on four of the principal islands, some of which were obtained with difficulty and some personal risk.

Liverpool Amateur Photographic Association.—January 26, Mr. A. J. Cleaver (President) in the chair.—Fifteen new members were elected. The President announced that a series of lectures and demonstrations had been arranged, which would take place every Thursday until the middle of April. Two prints were exhibited by Mr. Rogers, a member of the Association, showing the great difference obtainable from the same standpoint following out the principle of tele-photographic lenses. Messrs. Ross's twin-lens hand camera was exhibited and fully explained by Messrs. Sharp and Hitchmough. The prizes gained at the 1892 annual competition were presented to the successful members.

Newcastle Photographic Association.—January 24, Annual Meeting, Mr. Alexander S. Stevenson, J.P. (President of the Association), presiding.—Mr. Thompson, in the absence of the Treasurer, submitted the financial statement, which showed that the balance in hand at the beginning of the year was 3*l.* 18*s.* 9*d.*, and, after paying out during the year 31*l.* 16*s.* 6*d.*, there is a present balance in hand of 5*l.* 9*s.* 6*d.* The report was adopted. The Hon. Secretary (Mr. Edgar G. Lee) read the annual report, which stated that the Council again had pleasure in being able to congratulate the members on the continued and increasing prosperity of the Association, the membership now standing at 168, being an increase of forty as compared with the previous year. The meetings, both outdoor and indoor, had been much more numerously attended. The acquiring of new premises at the Art Gallery undoubtedly constituted one of the most important events in the history of the Association, and the Council hoped that, with the increased facilities for useful work which it now possessed, the Association would continue to progress in the future. Outdoor meetings had been held at Stocksfield, down the Tyne, and Naworth and district, and on the whole were well attended. The Council, in conclusion, expressed their extreme regret, in which the members would join, at the loss the Association would sustain by the removal of the President (Mr. Stevenson) from the district. The report was adopted. The result of the election of officers was then announced as follows:—*President:* Mr. J. Pattison Gibson.—*Vice-Presidents:* Messrs. Alexander S. Stevenson, J.P., L. Sawyer, M. Anty, and H. G. Ridgway.—*Council:* Messrs. W. Parry, W. P. Brewis, J. Watson, J. H. Robinson, G. L. Snowball, T. O. Mawson, J. Kirkwood, L. Williamson, W. E. Cowan, and G. Hall.—*Treasurer:* Mr. Frederick Park.—*Secretary:* Mr. Edgar G. Lee.—*Assistant Secretary:* Mr. James Brown.

Tunbridge Wells Amateur Photographic Association.—January 26, Annual Meeting, Mr. E. R. Ashton in the chair.—The Treasurer presented the accounts, and the Hon. Secretary read the report, both of which were satisfactory. The following gentlemen were elected officers for the ensuing year:—*President:* Mr. F. G. Smart.—*Vice-Presidents:* Rev. A. T. Scott, Messrs. E. R. Ashton, and George Lewis.—*Committee:* Messrs. J. W. Morgan, A. W. Pearson, and E. Catchpole.—*Auditor:* Mr. W. E. Brampton.—*Treasurer:* Mr. B. Whitrow.—*Secretary:* Mr. Joseph Chamberlain. The CHAIRMAN then said he had a pleasant duty to perform. They were all agreed that the time had arrived when they should recognise the valuable services the Secretary (Mr. Joseph Chamberlain) had rendered the Association, and he had much pleasure in handing him a gold watch on behalf of the members as a mark of esteem for the indefatigable way he had conducted the arduous duties of the office. The SECRETARY said he wished to thank them all for their handsome present, and for all the kind things the Chairman had been good enough to say about him. He was very proud to feel that anything he had done for the Association should meet with such unanimous approbation. The watch in years to come would remind him of the kindness and consideration he had met with from all the members, and he thought there were few Societies so fortunate in having a patron like Sir David Salomons and a President like Mr. F. G. Smart, who took so much interest in the actual working of the Association, and which was one of the main secrets of its success, coupled with the great cordiality that existed between himself and the other officers, to whom he tendered his best thanks for their kind co-operation in the work which had been carried out, and he again thanked them for their kind present, which he should always value. It was a gold keyless watch, having the recipient's monogram on the back, and on the dome was engraved, "Presented to Joseph Chamberlain by the members of the Tunbridge Wells Amateur Photographic Association in recognition of his valuable services as Hon. Secretary, 1893," and it had a Kew certificate, having been tested there. Letters had been received from Sir David Salomons, regretting his inability to be present, and from the President, and all regretted the cause of his absence, and wished him a speedy recovery to convalescence.

Edinburgh University Photographic Society.—A meeting was held in the Secretary's room, Bristo-street, on the evening of January 20, at which Dr. LOGAN TURNER delivered a technical lecture, illustrated by slides and the lantern. The subjects were: Series 1, comprising surgical cases from the patients; 2, microscopic slides; and, 3, naked-eye specimens. At the close he was awarded a hearty vote of thanks.

FORTHCOMING EXHIBITIONS.

February 7, 8	.....	Rotherham Photographic Society. Hon. Secretary, H. C. Hemingway, Rotherham.
,, 14	.....	Durham City Camera Club. Hon. Secretary, R. Haux-well, The Avenue, Durham.
,, 16–18	.....	*Woolwich Polytechnic Photographic Society. Hon. Secretary, W. Dawes, 145, Chesnut-road, Plumstead, S.E.
,, 18	.....	Holborn Camera Club. Hon. Secretary, F. J. Cobb 100 High Holborn, E.C.
March 1, 2	.....	*Fillebrook Athenæum Photographic Society. Hon. Secretary, Joseph W. Spurgeon, 1 Drayton Villas, Leytoustone, Essex.
,, 3, 4	.....	Blackheath Camera Club. Hon. Secretary, C. W. Piper, 46, Shooter's Hill-road, Blackheath, S.E.
April	.....	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.
,, 17–29	.....	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

FOX TALBOT'S PHOTOGLYPHIC PROCESS.

To the EDITOR.

SIR,—My attention has been called to a notice of my father's photoglyphic process at page 506 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for the present year, from which it would appear that a fact which I published in 1878 has failed to become generally known. This was the latest and best method which he devised for producing a grain, or, as he termed it, "an aquatint ground." The earliest method was by the use of crape, as described at page 513 of the ALMANAC, which I think he termed a photographic veil. The powdered resin was an improvement on the crape. There were other methods tried, but the one to which I

refer was within my knowledge, though not published by him. He must have devised it after taking out his last patent, and would not allow me to divulge it, under the impression, I suppose, that it might possibly be included in some future patent. I took the earliest possible opportunity of making it known after his death, which opportunity arose in my having to complete for Messrs. Low & Co. the Appendix A of the second edition of the translation of Tissandier's *Handbook of Photography*. At page 372 of that Appendix, after noticing the powdered copal or resin method, I said, "This method of producing a ground, however, was uncertain and troublesome, and was superseded by a much better and very ingenious method, discovered since the enrolment of the specification in 1858, and never yet published. Common resin and camphor are dissolved in chloroform in proportions which may be varied. At the same stage of the process as before, namely, when the plate bearing the photographic image is removed from the copying plate, some of this solution is poured upon it. The chloroform immediately evaporates, leaving a film of resin and camphor on the surface of the gelatine. The plate is then warmed over a spirit lamp, which causes the camphor to evaporate, leaving the resin in minute particles adhering to the surface of the gelatine. This method ensures a much more even distribution of the resin than the former."

According to the greater or less proportion of resin to camphor, the ground was, I believe, coarser or finer. There were occasional small explosions of the camphor vapour during the plate-warming. You have yourself seen the best results of the photoglyphic process of date 1866, and I doubt if those results could have been obtained without the employment of the above method. Also, my father's latest practice was to employ, not steel, but copper plates, and to have them afterwards coated with steel. I am not sufficiently familiar with the present use of photographic words to know whether a *cliché* would be understood to mean a positive transparency in contradistinction to a negative. It is, of course, essential in the photoglyphic process that the exposure should be under a *positive* transparency.—I am, yours, &c., C. H. Talbot.

Lacock Abbey, Chippenham, January 29, 1893.

DETERMINATION OF PLATE SPEEDS.

To the Editor.

Sir,—Mr. G. F. Williams, in his article on this subject last week, goes out of his way to attack the accuracy of actinometers similar to the one associated with my name.

Allow me to point out that, as far as I am aware, such actinometers *never have been* "seriously put forward with the hope that we could recognise them as even approaching what we seek in a standard," the standard referred to being an exact light standard for a standard speed system.

The purpose for which such actinometers have been so extensively and successfully used for the past three years is to estimate the value of daylight falling on the subject as a guide to the length of exposure to give a plate. For this purpose hundreds of practical photographers, including some well-known names among the "older race of photographers," have found the use of a bromide of silver actinometer far more reliable than the old rough and inexact method of estimating light by the eye, aided with experience.

A very small amount of investigation shows that sunlight, as it reaches the earth, varies in its properties from time to time quite as much as many artificial lights vary from average sunlight. It is plain to me that an artificial light will have to be used if a standard system of speed determination is desirable, and I should be the last to advocate the use of an actinometer in this connexion. With a reliable standard light the amount of light received by the plate should certainly be judged by the standard of time, and not by the readings of an actinometer, which, however accurate, would be a useless complication.

Of course, this artificial light should be as alike as possible in its spectrum to average sunlight.

Mr. Williams' statement with regard to supposed errors caused by the use of actinometers, that "it is at all times possible to multiply the error ten times or a hundred times," is absolutely untrue.

If an actinometer is used as a guide, either for time of exposure or for speed of plate, and there is an error in the estimation of light of, say, 25 %, the resulting error in the time of exposure, or in numerical speed of plate, will be 25 %, no more and no less, unless error from some other source is introduced.

Surely it is unnecessary to point out that an error of one second in a four-second exposure, is identical in value with an error of ten seconds in a forty-second exposure, and the same thing applies to speed numbers.

I do not think Mr. Williams does justice to the importance of Messrs. Hurter & Driffield's investigations. It is very easy to pick out the weak parts in their method as now applied (I have done it several times), but it is only right to recognise that they were the first to point out the way in which the graduation sensitiveness of a plate could be ascertained, and their method, although perhaps in some other form, is certain to be utilised in the standard method of the future.

It will, in my opinion, be necessary to recognise that the quality which we sum up in the word "sensitiveness" is a complex one, and cannot be accurately expressed by one numerical value.

Just as Warnerke's system made the mistake of presuming that the *density-giving* speed of a plate is all we want to estimate, so Hurter & Driffield wrongly presume that the photographer only wants to know the *graduation* speed of a plate.—I am, yours, &c., Alfred Watkins.

Hereford, January 28.

THE PHOTOGRAPHIC SOCIETY'S LATE EXHIBITION.

To the Editor.

Sir,—Permit me to register a complaint as to the management of the late Exhibition of the Photographic Society of Great Britain of your city. The circular sent out promised that wall space for foreign exhibits would not be charged, but that the Society would *frame* and *hang* such exhibits free, and then return them after the Exhibition closed. My own experience will be, doubtless, concurred in by the many whose photographs were treated in a manner similar to that accorded mine. On arriving in your city, I naturally called at the Exhibition to see the display, and draw my shortcomings by comparison with the work of better photographers than myself. Imagine my feelings to find, after searching a long time in company with a friend, my pictures thrown loosely in a so-called portfolio with numerous other foreign contributions, and the whole lot so fingered and thumbed over as to be a disgrace to any collection. To add insult to injury, instead of returning my contribution in the wooden case in which they were sent well packed with tissue separators, I received them from the Express Company roughly tied together with a piece of cord, and the edges of the cards all broken and cut, thus finishing the ruin so well in hand when I left them in London. Performances of this kind are not apt to induce foreign contributions, particularly on the part of those who, like myself, attended the Exhibition and witnessed the manner of "*framing* and *hanging*" the Society performed.—I am, yours, &c., Robert E. M. Bain.

515, *Pine-street, St Louis, January* 16, 1893.

EXHIBITION RULES.

To the Editor.

Sir,—Recent events and discussions have conclusively demonstrated the great need which exists for reform in the rules of photographic exhibitions. Photographers of all schools are agreed that the system of classes, and the distinction between amateur and professional, are arrangements both undesirable and unnecessary. Yet each new prospectus which comes to hand reveals the same antiquated rules; only one exception has come under my notice, viz., the rules of the Fillebrook Athenæum Exhibition, with which I have the honour to be connected. We are, therefore, so to speak, pioneers in this direction, but I am convinced that it will not be long before our example is generally followed. The encouraging letters which have come to us, quite spontaneously, from several well-known workers, and the numerous applications for entry-forms, show that the new principles meet with general approval, and prophesy for us a most successful show. This being the case, one is inclined to wonder why other exhibition committees have not adopted similar conditions. It would certainly be interesting to know the reasons for their reluctance to relinquish the old traditions.—I am, yours, &c.,

Leytonstone, Essex, January 30, 1893. Joseph W. Spurgeon.

WOODEN TRAYS AND PORCELAIN DISHES.

To the Editor.

Sir,—In reply to Harry W. Newton, I have used all the solutions named without any "peeling off." I may add, the preliminary varnish coating should be more to satisfy the absorbent qualities of the wood used—*not* to leave a bright surface—*one* coat of enamel might do if this could be laid on evenly. The way to make the trays of *permanent* use is, however, to see them properly rinsed out every night after use, being put away *dry*.

With regard to the *glass* bottom trays, my experience is limited, but shellac varnish mixed into a thin paste with prepared chalk and run well round the edges might answer; melted paraffin wax may be used with advantage.—Yours, J. Pike.

Leicester, January 30, 1893.

To the Editor.

Sir,—Mr. H. W. Newton will find paraffin wax ironed well into the wood, using a heated smoothing iron for the purpose, much better than varnish or paint.

Large trays can also be lined with ordinary oil cloth of the white marble kind. Glue with the woolly side next the wood, fold the corners, and don't cut the cloth. Let the edges of the cloth lap over the outside of the ends and sides, fastening them with a row of tacks.—I am yours, &c., Williams Kennan.

35, *Dame-street, Dublin, January* 30, 1893.

To the EDITOR.

SIR,—As I have for years gleaned much useful information from the JOURNAL and THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, let me explain for the benefit of your readers how I repaired a valuable porcelain dish. These dishes are only lightly glazed, and are not hard baked, and may be drilled with the tang of a three-square file; and the way to commence to mend such a dish is to first make up a good fire, let the dish lay in front until it gets quite warm, then smear the edges with Prout's elastic glue, get all as hot as possible, and bring the parts together, and keep them so until quite cold and set. Now make the tang end of a file in the form of a drill, harden this, do not temper, press the point into the dish, and it will be found to cut easily through the enamel; use a little water. Work this drill gently until a hole is bored quite through the dish. The boring is sooner done than one would think. Now make another hole at the other side of the crack, then take a bit of copper wire, soften by getting it red hot in the fire, and pass this through the two holes, and gently make a twist on the under side of the dish. Do this wherever it is needful. This having been accomplished, take a hot poker, not hot enough to burn the elastic glue, but to melt it into the holes and cracks. Having made it waterproof and wired the parts together, let all get quite cold, then gently scrape off the surplus elastic glue, and your dish will, if it has been mended with judgment, last, as mine has done, for years. Elastic glue may be bought at ironmongers, leather dealers, &c., and is known as Prout's Elastic Glue, 1*d.* and 2*d.* per stick.—I am, yours, &c.,

J. H. AINLEY.

426, *London-road, Lowfields, Sheffield, January* 30, 1893.

THE BENEVOLENT.

To the EDITOR.

SIR,—Will you allow me space to state that, although the Committee of the Benevolent arranged at the last meeting reported to hold the Annual Meeting on February 3, it has been found impracticable to do so? The Annual Meeting will therefore not be held till Monday, February 20. The usual notices will be sent to all subscribers.—I am, yours, &c.,

Memorial Hall, E.C. H. SNOWDEN WARD, *Hon. Secretary.*

AMIDOL.

To the EDITOR.

SIR,—I have had my attention drawn to a mistake in the amido formula I gave at the meeting on January 10, at the Photographic Society of Great Britain. I do not see how I managed to miss it, as it was very careless on my part not to notice it, as the formula as given would not work, so I want you to please publish what I say. On page 95 of the Society's *Transactions* it says carbonate potassium (5 per cent. solution), but what I said, or, anyway, intended to say, was potash solution, 1 to 5, viz.:—

Potash carbonate	1 ounce,
Water	5 ounces,

which is very different, being a 20 per cent. solution. I can only say I am sorry I did not see the mistake, as it has led those trying the formulæ all wrong, for which I am to blame for not speaking plain.—I am, yours, &c.,

A. R. DRESSER.

Springfield, Bexley Heath, Kent, January 31, 1893.

ELECTRIC LIGHTING FOR RETOUCHING.

To the EDITOR.

SIR,—I, and no doubt many other readers of THE BRITISH JOURNAL OF PHOTOGRAPHY, was very much interested in the article by Mr. R. W. Harrison, on "Retouching with the Incandescent Light," on p. 826 of your issue for December 23, 1892. Can any reader inform me what the cost of a thirty-two candle-power lamp, complete with suitable battery, &c., for working it? also how many hours the battery would be likely to keep the above light going; the cost of having it recharged; also how long the lamp would last if used for, say, four hours a day?

I should also like to know if Messrs. Anthony's electric retouching pencil can be bought in this country, and what is its price; also where is it to be obtained, for, from what is stated upon p. 62 of THE BRITISH JOURNAL OF PHOTOGRAPHY for January 27, 1893, it appears to be much appreciated in several studios.—I am, yours, &c., J. T. HACKETT.

The Victoria Studio, Albert-street, Fleet, Hants, January 31, 1893.

THE NEW METHYLATED SPIRIT AND SILVER PRINTS.

To the EDITOR.

SIR,—After having used for a great many years ready sensitised albumen paper without any trouble, I have been blessed since about one year with the now universal trouble, I think, blisters. As different cures appeared in your esteemed JOURNAL I have tried them, but without any certain results up to date except with one, and that is alcohol. I have tried hot water without any good. I did not try boiling water, as, however an amateur can use it, it is rather out of the question for a toning of over 100 10×8 or 12×10 prints. I have tried borax in hypo with some fair results for some short time, but then found it only a cure for very small blisters, but not for large ones.

I was told a few drops of ammonia in hypo would cure; but no. The only good result was obtained with the new methylated spirit. 1. Now what I want to ask you is, Do you not think that this methylated spirit may in time act injuriously to the print? The smell remains even after the print is mounted, and then another trouble sets in. When dry there appears on *some parts* of the print some very dirty marks, a kind of skim (or scum) as if touched with very dirty hands. These marks disappear almost altogether when rubbed off very hard with the hand. 2. What is it? 3. Will it injure the print?—I am, yours, &c., A. LEVY.

4, *Avenue Pinel, Asnières* (*Seine*), *January* 29, 1893.

PHOTOGRAPHING AT THE CHICAGO EXHIBITION.

To the EDITOR.

SIR,—As a good many inquiries have been made as to the regulations under which photographs can be taken of the grounds and buildings of the Chicago Exhibition, I should be much obliged to you if you would give publicity to the enclosed communication, which has been forwarded to me by the Chief of the Foreign Affairs Department of the Exhibition.—I am, yours, &c., H. T. WOOD, *Secretary.*

Society of Arts, John-street, Adelphi, London, W.C., January 30, 1893.

[Copy.]

"WORLD'S COLUMBIAN EXPOSITION, DEPARTMENT OF FOREIGN AFFAIRS,
WALKER FEARN, CHIEF.

"*Chicago, U.S.A., January* 14, 1893.

"*Sir Henry Trueman Wood,*
"*Royal Commission of Great Britain for the World's Columbian Exposition.*

"DEAR SIR HENRY,

"Replying to your letter of November 23, receipt of which was acknowledged December 12, I have now to enclose a copy of a communication, dated January 11, which I have just received from the Secretary of the Ways and Means Committee, and which gives the information you desire.

"Faithfully yours,
(Signed) "WALKER FEARN."

[Copy.]

"OFFICE OF THE WAYS AND MEANS COMMITTEE.

"(*R.*) *Chicago, January* 11, 1893.

"*To the Honored Walker Fearn,*
"*Chief, Foreign Affairs.*

"DEAR SIR,

"In reply to your communication of December 12, will say that same has been considered by the Ways and Means Committee, and I am instructed to inform you that at present no one is permitted upon the grounds to take photographs except the Official Photographer of the Exposition, and such persons as may care to use hand cameras which are fitted with single lens, and take pictures upon a plate not to exceed 4×5, and provided that they shall pay to the Exposition the sum of $2·00 per day for said privileges.

"The Exposition proposes to operate under this organization until the 1st of May, and it is not likely that it may be continued during the Exposition.

"The Official Photographer will be very glad to take pictures of such views as he may be requested by outside parties. These parties, of course, to pay for same at uniform rates, which have been established.

"Very respectfully,
(Signed) "S. A. CRAWFORD, *Secretary.*"

VARNISHING RETOUCHED NEGATIVES.

To the EDITOR.

SIR,—Can you tell me the best way of preventing the retouching from moving when it is varnished?—I am, yours, &c., IN A FIX.

[This subject is referred to in a leading article.—ED.]

A DEVELOPER QUESTION.

To the EDITOR.

SIR,—Mr. F. Miall gives, in the 1893 ALMANAC, a formula for a soda developer, thus:—

Anhydrous sodium carbonate	1 ounce.
Sodium sulphite	1 ,,
Water	20 ounces.

And ½ to 1 grain pyro to each ounce of above.

Surely the carbonate should not be *anhydrous*, one ounce of which is equivalent to 2·70 ounces of soda crystals! The usual soda developers—such as that recommended by the Ilford people, for instance—contain one ounce of *soda crystals* in twenty ounces of developer, whereas Mr. Miall uses, apparently, nearly three times that proportion of the accelerator,

i.e., he uses the equivalent of 2·70 ounces soda crystals against the usual one ounce.—I am, yours, &c.,

JOHN H. HIELD.

54, Dartmouth Park-road, N.W., January 25, 1893.

ANOTHER VALUATION.

To the EDITOR.

SIR,—The given particulars are 70,000 negatives in eighteen years, or about 4000 negatives a year. Expenses are about:—

			£
400 dozen dry plates, say,	... ...		45
£375 Cabinet at 15*s.*	5000 cabinet mounts	)	30
£475 Cartes at 7*s.* 6*d.*	15,000 carte ,,	)	
£850 (as given)			
35 quires sensitised paper	... ...		22
Six cheap workers, viz..	*s.*		
1 Negative Retoucher	30		
1 Printer	15		
1 Lady for waiting-room	15		
1 Lady Spotter ...	15		
1 Assistant Operator...	30		
1 Boy	5		
52 weeks wages at	£5 10	... ...	286
Rent and taxes (cheap) ...	... ...		40
Small expenses 1*l.* per week	... ...		52
Chemicals: gold, hypo, pyro, &c.	... ...		30
Paper, books, cardboards, &c.	.. ..		20
Yearly refurnishing	... ...		40
Coal, gas, water, &c.	... ...		20
Expenditure	... ...		585
Alleged business done	... ...		850
			265
Worth given by "R.S.V.P." = 1100*l.* at 4 per cent....			44
Real goodwill	... ...		221
Leasehold ...	... ...		?
Negative value, two years reorders, about		... ...	100
Valuation of fittings, stock, and furniture		... ...	?
Real value ...	... ...		?

Or, a business that does not pay is not worth a goodwill.—I am, yours, &c.,

OPERATOR.

January 23, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange 800 *carte-de-visite* mounts for a eight or nine-inch condenser.—Address L. WARD, 2, Station-road, West Croydon.

Will exchange eight-inch gas burnisher as good as new for whole-plate camera.—Address, J. BENNETT, 38, James-street, Swansea.

Wanted to exchange two microscopes (Dollond's) for 12×10 outfit.—Address, J. G. PAGE, 8, Richmond-gardens, Shepherds Bush, W.

Exchange 10×8 burnisher by Rock, Sheffield, for 5×4 rapid rectilinear.—Address, J. TAYLOR, 19, Castle-street, Dufftown, Banffshire.

Will exchange BRITISH JOURNAL OF PHOTOGRAPHY, over seven years, for half-plate or larger camera.—Address, T. MUIR, 43, Nethergate, Dundee.

Harlwich's *Photographic Chemistry* in exchange for Taylor's *Photographic Optics*.—Address, J. A. C. MURRAY, 3, Nightingale-terrace, Sutton, Surrey.

Wanted first-class lantern or hand camera for Halse's ten-guinea medical electric battery.—Address, ARTHUR PEARCE, 11, Waterloo-crescent, Dover.

Biunial (four-inch condensers), portrait lenses, dissolver, and jets, gas bag, &c., exchange for camera or lenses.—Address, H. ALLBRIGHT, 135, London-road, Croydon.

Stove, powerful and handsome, suit studio or public building, cost £20*s.*, exchange for half-plate camera, or photo sundries.—Address, H. ALLBRIGHT, 135, London-road, Croydon.

Will exchange burnisher, nine-inch roller, for a rolling press, or will make enlargements and finish in oil or black and white for same.—Address, A. HAMILTON, Artist, Kingsdown, Bristol.

I will exchange a 5×4 quick-acting portrait lens by Ross for a 7×5 optimus eurryscope, iris diaphragm.—Address, WILLIAMSON EMSLEY, Whitelands, Little London, Rawden, near Leeds.

Will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY from April 1890 to end of 1892 (141 numbers) for plain background or burnisher.—Address, C. GODFREY, 23, Lucas-road, Penge, S.E.

Will exchange an eight-keyed flute (by Monzani), silver keys and fittings, for a cabinet portrait lens by good maker.—Address, H. & A. FLOATE, Photographers, 330, High-street, Stratford.

Exchange for a 4D Dallmeyer lens equivalent value of the following lenses:—2B Dallmeyer; 1A Dallmeyer wide-angle lens, patent; a Grubb patent landscape lens.—Address, McISAAC & RIDDLE, Studio, Oban.

Will exchange large rapid 10×8 portrait lens for 9×7 Optimus Euryscope lens with Waterhouse stops, or 7×5 as as above with Iris diaphragms. Specimen of work sent.—Address, J. R. SMITH, Photographer, Little London, Rawdon, near Leeds, Yorks.

Wanted, instantaneous shutter to fit hood one and a half inches, pneumatic, Thornton-Pickard preferred, sound, in exchange for THE BRITISH JOURNAL OF PHOTOGRAPHY, 1892, unbound.—Address, B. BURSLEM, 2, Windsor-road, Kingston-on-Thames.

Will exchange a nearly new Russian iron magic lantern, with travelling case, fittings for oil or limelight; also French cabinet portrait lens, good for large heads, for Lancaster's half-plate 1892 or 1893 instantograph set.—Address, W. BOND, Bank Plain, Norwich.

Will exchange Harrison's patent head and body rest, and Scholzig's graduated bust vignette background and stand, both new, for half-plate Instantograph, or other outdoor set. Good pocket revolver taken.—Address, J. MAGEE, 30, Parma-crescent, Lavender Hill, S.W.

Camera 15×12, conical leather bellows, reversing swing front, three double dark slides, book form; exchange for first-class 10×8 camera, all movements, long extension, and three or four double dark slides.—Address, J. T. PICKLES, Hebden Bridge, *vid* Manchester.

Will exchange THE BRITISH JOURNAL PHOTOGRAPHIC ALMANACS for 1869, 1870, 1875, and from 1877 to 1891; *Carbon Printing*; and Burrows & Colton's *Retouching*, for *Materia Photographica* and Burnbank's *Photographic Printing Methods*.—Address, R. MCF. MURE, 35, Underwood, Paisley, N.B.

Wanted, whole-plate Ross's or Dallmeyer's Universal rapid-symmetrical or rapid-rectilinear lens, in exchange for first-class whole-plate camera, square bellows, long extension, as new, three double slides, and tripod, total worth 5*l.* 10*s.* or 6*l.*—Address, J. T. PICKLES, Hebden Bridge, *vid* Manchester.

Wanted, safety bicycle, in exchange for magic lantern (four-inch condenser), balustrade and pedestal, four plate-glass shelves and brackets (brass), cork flower stand, cabinet burnisher, oak specimen frame, and three volumes of THE BRITISH JOURNAL OF PHOTOGRAPHY, 1890-91-92.—Address, H. MANISTRE, 5, Ithyl-street, Kentish Town, N.W.

Cabinet lens, by Derogy, two and three quarter inches in diameter, seven inch focus, exchange for Dallmeyer's 1e long; interior background, new, for another interior or good plush curtain; Ross's 10×10 camera, long focussing screw, for posing chair, two or more backs; traveller's Multum in Parvo walking-stick, patent, for pedestal or balustrade.—Address, J. HORTON, Central Studio, Caroline-street, Cardiff.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

PHOTOGRAPH REGISTERED:

T. S. Hicks, Sheffield.—Photograph entitled, *John Bull and his Pal.*

G. S. D.—A single lens can be used in the manner and for the purpose you describe.

E. M.—The electric retouching desk can be obtained of Mr. C. A. Rudowsky, of Guildhall-chambers, E.C.

QUX.—We have had no experience in that class of business. Better consult some one conversant with the practical working of the system.

J. H. BOWMAN.—Mr. E. Dunmore has an article on "Lantern-slide Colouring" in this JOURNAL for November 4 last (see Supplement, page 10).

WM. FENTON JONES.—Metol is not, so far as we are aware, on sale in this country. Possibly Messrs. Fuerst Bros. would procure you a small quantity from Germany.

T. MOLTEN.—The most rapid lens for lantern-slide negatives is what is known as the instantaneous stereograph. It is a modification of the Petzval lens, and has an aperture of about *f*-3½.

MAY (Ayr) writes: "Would you kindly tell me in your learned correspondence the first day of spring in England?"—According to the almanacs, the first day of spring in England is March 21.

PRINTER.—Possibly Mr. Buchanan Wollaston's remarks on the subject in the present number of the JOURNAL will assist you. We have not heard of any previous complaints of granularity with the new paper.

SANDOWN.—Any view that is taken direct from nature can be made copyright, notwithstanding that it may have been photographed scores of times from the same spot and each of the photographs made copyright.

A. PEARCE.—We cannot account for your failure. We do not think there is any advantage in the use of recrystallised carbonate. Give us fuller details of your method of working, and we may be able to assist you.

A. J.—1. The addition of Venice turpentine to starch used for mounting is not likely to act injuriously on the photograph. 2. The frames can probably be had from Marion & Co., or any of the other dealers in photographic goods.

E. GOODFELLOW.—If, upon the addition of a little permanganate of potash to the water, the red colour of the permanganate is converted to one of brownish hue, then is the water contaminated with organic matter, and not fit for drinking purposes.

A. BEN asks: "Can you tell me how to put the gilt line on the outside of cut mounts, usually about a half an inch from the opening?"—The gold is put in with a ruling pen charged with gold paint. Gold paint ready for use is supplied by all artists' colourmen.

G. W. ANDREWS.—You had better get a manual of the carbon process, such as that issued by the Autotype Company. That will give you the information required. Having got a general idea of the principles of the process, you will then have no difficulty in producing carbon pictures.

ANXIOUS.—By no means go to South Australia, where we have reason to believe things are in a bad way. Possibly you would find South Africa a better locality in which to secure photographic or picture-frame-making employment. Ask your doctor if the climate would be suitable.

O. OSBORNE.—As cochineal colours, such as crimson lake, &c., are fugitive by exposure to light, and they were used in matching up the tint for spotting the prints and working up the enlargement, the fading, or changing of colour, after six months' exposure in the show-case, is fully accounted for.

J. H. G.—Eighteen or twenty inches will be a suitable focus for such a lens as you need. Not knowing the focus of your 9×7 lens, we cannot give you the measurements desired. With reference to the electric queries, Whittaker & Co. publish several cheap works devoted to this topic. Write for a list.

C. H.—One of the best papers to be had for the purpose—that is, the best an amateur can obtain in small quantities—is Whatman's or Hollingworth's rough drawing-paper. They have not exactly the surface of the sample enclosed, but the papers themselves are otherwise better suited for photography.

E. GREGSON writes: "Could you inform me of a recipe for imitation of ground glass for studio top and sides—one that can easily be cleared off in winter? I am very much troubled with the sun."—Make a mixture of starch paste and whiting, and stipple over the glass with that. It can easily be removed with water at any time.

RALPH.—1. What you say is perfectly correct. Every one knows that a clear white sky in a lantern slide is better than badly put-in clouds, hence there is no necessity to insert your letter. 2. Enlarged portraits, if they exceed life size, are very unsatisfactory. 3. Make an enlarged negative, and print either in carbon or platinotype.

CARPATHIAN.—We think that either of the cameras mentioned would suit your purpose quite well; but if we recollect aright, "A" is not adapted for a roll holder. Your supply of lenses is quite sufficient for every purpose. These is no difficulty in producing enlargements from films, any more than from glass negatives. We have always used No. 2.

LEGAL.—So far as we are aware, there is no special law relating to photographic studios. If premises are taken on a repairing lease, and a photographic studio is part of them, of course that is included, the same as the others, unless there is any special agreement to the contrary. If there is any dispute in the matter, better submit the agreement to a solicitor, as all is dependent upon its wording.

H. A.—1. If you will refer to page 776 of this JOURNAL for December 2 last, you will see we have an article dealing with cresco-flyma. 2. Hydrofluoric acid may be obtained of operative chemists; it is a common-enough article. 3. A saturated solution of hypo cannot be expressed in definite proportions, as the amount of salt the water takes up varies with the temperature. When the water will dissolve no more salt, then is the solution saturated.

D. MCKENZIE asks what amateurs usually charge their friends for portraits? He says he often takes the portraits of his friends, and they ask him for copies, and wants to know how much to charge so as to make a little profit on the work for his trouble.—In reply, amateurs make no charge whatever to their friends; if they did they would cease to be amateurs and become professionals in disguise, such as is our correspondent. In arranging his charges, he should be guided by the price lists of *bonâ-fide* professionals of his neighbourhood, with whom he appears to be competing.

P. SMITH says: "I am an old amateur, and am tolerably familiar with wet collodion, with which I was able to take very fair negatives. I have recently gone back to that process for lantern slides, though I never made any by it before. I get on very well, but the slides, when dry—they look all right while wet—are more or less opalescent in appearance. It is not fog. Can you suggest a remedy?"—This appearance is by no means uncommon. It can entirely be got rid of by varnishing the slides with ordinary negative varnish. They will then be the same as they appeared while wet.

A. W. NEAME says: "I am only an amateur, and was called from home for three weeks the day after making up a new acetate toning bath. When I went to use it a few days ago, the sides of the bottle were covered with a dirty, bronze-like coating, and there was a muddy deposit at the bottom of the bottle, and the prints will not tone with an hour's immersion. No prints had been toned in the solution, so the paper could not have injured it. Why is it in this condition?"—The reason is that the gold has, by some means or other, become reduced to the metallic state. Impure water, an imperfectly cleansed bottle, &c., may be the cause. A long exposure to light will also bring about a reduction of the gold.

COUNTRYMAN writes: "I have been consulted about supplying a dozen enlargements, 15×12, of a deceased person, one of a group on a little glass positive. They will require a great deal of working up by an artist to make them at all good, and this, I fear, will make them too costly for me to secure the order. I can make the enlargements myself, but it is the finishing that troubles me. Can you give me the benefit of your advice?"—We should suggest that an enlargement be made, say, twenty or twenty-four inches, and this be well finished by an artist. From this a negative should be made the size required, then the prints would require no work upon them. It is quite possible that some of the friends of the deceased would purchase the finished enlargement.

THOS. LAMBELL writes as follows: "Can you give me any information with regard to the enclosed print, and how I can restore it and about a dozen others like it to its original condition, which was that of an ordinary albumen print? The facts are these. A customer of mine, who has been travelling on the Continent, brought home a number of views mounted on cabinet cards, and I undertook to take them off and remount them in a scrap album. Three or four dozen came off all right as usual, but about a dozen, after soaking with the others, became opalescent in appearance like the enclosed, and, as you see, this hides the detail. These particular prints I noticed before I put them into water seemed to have a more artificial gloss than albumenised prints usually have. Any hints you can give will be appreciated, as I fear I shall get into trouble with my customer."—The print in question is not a silver one, but a collotype on "surfaced paper" that has been glazed with an aqueous solution of lac. The only treatment we can suggest is to remove the old glazing by soaking the prints in spirit, and re-glazing or varnishing them.

WEST LONDON PHOTOGRAPHIC SOCIETY.—February 7, Technical Social Meeting.

PHOTOGRAPHIC CLUB.—February 8, Members' Open Night. 15, *Home-made Apparatus.*

MR. WILLIAM TYLAR has removed to new premises at 41, High-street, Aston, Birmingham.

MESSRS. O. SICHEL & CO. have removed to new West End show-rooms at 47, Oxford-street, W.

WE also announce the death of Mr. Henry Dixon, the well-known photographer of Albany-street, in his seventy-third year.

WE are sorry to learn of the death of Mr. John Harmer, of Littlehampton, who for many years past was a frequent contributor to this JOURNAL and its ALMANAC.

HACKNEY PHOTOGRAPHIC SOCIETY.—February 7, Ladies' Night; *Amidol demonstration and Prize Slides.* 14, *Photographic Chemicals*, by W. H. Sodeau. 21, *Lantern-slide Colouring* (adjourned), by S. J. Beckett. 28 *Prize Slides.*

LEYTONSTONE CAMERA CLUB. — February 8, Lecturette, *The Optical Lantern: its structure and its uses*, by Mr. A. P. Wire. 15, Demonstration, *Lantern Slides and how to make them*, by Mr. H. E. Farmer. 22, Members' Lantern Evening.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—February 9, First Technical Lecture, *The Lens.* 16, *Demonstration of the Air Brush*, by Mr. W. H. Harrison. 23, Annual Musical and Lantern Entertainment. Ladies' night. Mr. J. Traill Taylor in the chair.

THE premises at Kingston-on-Thames, lately occupied by the Fry Manufacturing Company, will be sold by auction at the Southampton Hotel, Surbiton Station, by Messrs. Maddox & Son, at four for five o'clock on Wednesday, February 15.

MESSRS. ARTHUR SCHWARZ & CO. inform us that from this date they are the sole agents for the products of the photographic department of the Actien-Gesellschaft für Anilin Fabrication, Berlin, who are the manufacturers of Dr. M. Andresen's developers—eikonogen, rodinal, and diamidophenol.

ON Friday evening last, January 27, the Photographic Club gave an entertainment to the children of members and friends, which was numerously attended by the small people invited. The bill of fare included slides humourous and otherwise, singing, pianoforte-playing, ventriloquism, conjuring, &c. all of which gave unmitigated delight to the audience, each member of which, on departing, was presented with a parcel of sweets contained in a box having the form of a hand camera.

THE LONDON COUNTY COUNCIL AND BILL-POSTING.—The action taken by the London County Council in reducing the height of posting hoardings to twelve feet has had a widespread and disastrous result, and at a recent meeting of the Manchester branch of the Amalgamated Society of Lithographic Artists, Designers, and Writers, and Copperplate and Wood Engravers, it was resolved "That this meeting is of opinion that the restriction made by the London County Council is calculated to do a serious injury to business not only in London, but in many large establishments outside London."

WE are informed that the National Association of Professional Photographers will hold their second annual meeting at the Grosvenor Hotel, Manchester, Thursday, February 9. Chair to be taken at 7 p.m. by the President for the year, Mr. Thomas Fall of London. The Council will meet at 2 p.m. same day, and same place. Only members whose subscriptions are paid up are privileged to attend and take part in the proceedings. Important matters will be laid before the meeting, which it is hoped in the interests of the profession will be a large and influential one. Communications to be addressed to the Secretary, D. J. O'Neill, 47, Charlotte-road, Birmingham.

THE annual *conversazione* of the *employés* and friends of Messrs. George Mason & Co. took place in the Assembly Rooms, Glasgow, on the evening of Wednesday, 25th ult. With Mr. Mason as chairman, whose ability in a social function of this kind is well known, with Mrs. Mason's kind help and the aid of an energetic Committee, the success of the reunion was assured. "All went merry as a marriage bell." The music was excellent, the floor in magnificent order, and the forty couples who tripped the light fantastic till well on in the morning left with a decided sorry-to-part-happy-to-meet-again feeling. Songs were given during the evening by several ladies and gentlemen, Mr. J. L. Cox excelling himself in the delivery of "True till death" and "A warrior bold."

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1710. Vol. XL.—FEBRUARY 10, 1893.

VALUE OF GOODWILL IN PHOTOGRAPHIC BUSINESSES.

An inquiry appeared in our correspondence columns a few weeks ago as to the value of the goodwill in a business at the seaside. In reply thereto one correspondent, on the data given, values it at from one thousand to eleven hundred pounds —or equivalent to about the stated profits for three years. Another correspondent estimates its value, practically, at *nil*. The discrepancy is great. Three years' purchase certainly seems a very high estimate for the goodwill of any photographic business at the present time, and we have little doubt that many photographers would be only too glad to dispose of their businesses on much easier terms than these.

The correspondent who gave the low estimate, last week, quotes figures, in a businesslike way, to substantiate his idea of the profits on a return, as stated, of 850*l*., and it must be admitted that he has not been over-liberal in the matter of expenses—wages in particular. The salaries of a lady for the reception-room and a printer, for instance, are only put down at fifteen shillings a week each, and a boy at five shillings. The computation leaves about 220*l*. only as profit—about the salary of a really good operator. If this return be accepted, it shows that the goodwill is not worth buying, as the profits do not exceed the salary a purchaser would receive as an *employé*.

Since the query first appeared we have made some inquiries amongst those we consider competent to give an opinion on the subject, and we find a great diversity of ideas amongst them. One and all, however, agree that, for an ordinary portrait business, anything like a three years' purchase would be quite out of the question, and that one year's profits, in the present depressed state of the profession, would, in some cases, be too much, and in others the stock, plant, furniture, &c., at a valuation, would be quite sufficient. One gentleman went so far as to say that there was really no marketable goodwill in a portrait business, as it depended entirely upon the artist himself. He asked where is the goodwill in the business of an R. A., although he may derive a large income from portraiture? The same might be said with regard to a medical practice. That is entirely dependent upon the doctor himself. Still there is a goodwill in a doctor's practice, but it is always estimated much lower than many other businesses—if a medical practice may be styled a business. With a business in marketable commodities, say a grocer's, for example, its success depends as much upon the *employés* as the principal, hence the goodwill in it is of a somewhat more substantial character than it is either in a medical or a photographic one. In estimating the value of a medical practice, we believe it is generally taken to be equal to from a year to a year and a half's receipts, but then it is usually arranged that the seller still continues nominally as a partner for a considerable time, to introduce the purchaser to the connexion. This system of transfer has also, in some instances, been followed in photographic businesses, though it is by no means general; but, where it is done, a far more liberal sum may well be paid for the goodwill than where it is not done.

As regards the value of photographic businesses, there is no actual standard to go by, and what businesses have realised in the past cannot be taken as a criterion, for it must be admitted that they are not, proportionately to the returns, worth now so much as they were some few years ago. Competion is keen, and prices are lower, while labour and material remain much as before. Hence more business has to be done to make a corresponding profit, and this involves a larger working capital. In calculating the worth of an old-established business, an average of the profits for the previous three or five years is usually taken; the last year is, however, really the most important for the purchaser's consideration. If its gross returns and profits are less than the preceding ones, it indicates that the trade has fallen off. If, on the other hand, it shows an increase, then it has greater value than in the other case. It is obvious that a declining business is proportionately less valuable than an increasing one, be the returns what they may.

In buying a business, the way it has been conducted should always be considered. It often happens that an enterprising business man starts a concern in a small provincial town, and, during two or three years, does an excellent trade and makes a *bonâ fide* good profit, as the books prove; but during the time he has by his energy, so to speak, exhausted the business —the inhabitants of the place have become so well stocked with portraits that only a limited number more will be required for years to come, particularly if the so-called club system has been a feature. This some purchasers have found out to their cost. Some businesses in pleasure resorts are largely dependent upon extreme energy for their existence, such as intercepting visitors and excursion parties in waggonettes and like conveyances on their way to neighbouring places of interest, photographing them, and then submitting proofs of the picture on the return journey, and thus obtaining orders for copies at a low price. A business of this kind, worked on what we have heard termed the "high pressure system," is not equal in value to one the returns of which are secured solely from sitters visiting the studio. Neither are the negatives so obtained so valuable as regards their demand for future copies.

Here is another point for purchasers' consideration. In

some country businesses, particularly branch ones, their management has largely devolved on the operator. Now, if such a business be disposed of, and, say, the operator opens one on his own account in the same town—not an unknown circumstance—the value of the original one will be greatly depreciated. A photographer when selling a business is usually bound by agreement not to be engaged in another within a certain radius; but that does not, of course, apply to any of his *employés*, and some of those may be better known amongst the customers than the principal himself.

In former times the stock of negatives was always an important item in a valuation, but we are told that they, except in the case of publication pictures, are not proportionately of the same value now, as photography has become so much more general and less costly. Therefore people, ladies especially, instead of ordering from old stock negatives, now prefer to have fresh sittings in more modern costumes. In the case of deceased sitters, too, it is usually the last-taken portrait that is preferred. All this tends to depreciate the value of stock negatives. Except in the case of celebrities, an old photographer remarked to us that a stock of negatives which had been taken over about two or three years may now almost be considered a white elephant, as they were scarcely worth the storage, and the glass they were on is worthless. A business in a quiet country town, which is entirely dependent upon the residents, is, of course, on a different footing from one at a fashionable watering-place, where its main support is derived from visitors.

In the foregoing remarks no attempt is made to fix a standard for the goodwill of photographic businesses; neither has allusion been made to what will be obvious to all as to the continued success or otherwise of a transferred business, namely, the relative merits of the vendor and buyer as artists, photographers, and last, though not least, as business men. The object has been to point out a number of collateral circumstances that should be taken into consideration in estimating the value of a photographic business in which portraiture is the principal feature. Our columns are open for further discussion on the subject.

STEREO-MICROGRAPHY.—II.

In the previous article on this subject last week we confined ourselves to the production of micro-stereographs by successive operations, and, without anticipating what we have yet to say, we may observe that the system is much simpler than can be adopted by any binocular means, although the latter possesses the advantage of simultaneous exposure. As, in viewing an object in a binocular microscope, only one-half of the light transmitted through the objective reaches each eye of the observer, so, in the simultaneous methods now to be described, no more than half of the light will reach the sensitive plate.

Probably the least complex of the various systems to be noted is one which, on an exceedingly minute and totally inverted scale, is analogous to the Wheatstone stereoscope. It is a method by which the two photographs may be taken either simultaneously or successively. It consists in mounting two small mirrors at a right angle to each other, and placing their point of junction in as close proximity to the posterior element of the object-glass as the mounting will permit. The light from the object on the stage, instead of passing on in direct lines, is deflected—one half to the right and the other half to the left, where the focus is received on the sensitive plate. The adjoining cut shows the principle of the arrangement.

We have not thought it necessary to draw the camera itself, or the stages; suffice it to say the former is merely a long, square, wooden box, to the centre of which is affixed the object-

glass, a quarter-plate dark slide fitting each end. We had the frame which carries the mirrors made so as to be capable of being withdrawn, for the twofold purpose of cleaning the polished faces of the mirrors when dusty and also of examining and placing the object by direct vision from above. To this end we had a hole cut in the top of the box in which to insert the tube of the microscope with its eyepiece. This was for facilitating the arranging and lighting of the object; the focussing was, of course, effected on the obscured glass of the cameras.

Although the arrangement here described permits of the simultaneous photographing of an object, this is really not at all necessary, as the subject will remain still *in perpetuo*, while with a good lamp a considerable period must elapse ere there is any change in the lighting.

Respecting the construction of the mirrors, which need not each exceed the dimensions of a postage-stamp, we have made them in three different ways—first, of speculum metal, which we cannot recommend on account of the time involved in giving them an absolutely flat and polished surface. However, if any one chooses to do so, let him in using this metal make allowance for grinding away a more or less considerable portion around the edges to allow for marginal error, for unless one is familiar with such optical work as involves the grinding and polishing of prisms, or with the polishing of flat steel in connexion with the watchmaker's art, in both of which the marginal rounding of a flat surface is avoided, errors arising from such rounding, although not readily detected by the eye, will seriously affect the accuracy of the enlarged image.

We succeeded better by silvering the surfaces of a small rectangular prism of exquisite flatness, and using this as the reflectors, but eventually decided upon forming an obtuse wedge by cementing two plates of flat glass and silvering them. This is what we recommend in preference to other reflectors for this purpose, and it does not require the services of a skilled optician in its construction.

Pieces of optically worked glass can be obtained at the philosophical instrument makers or through any firm who supplies that trade. It is not necessary that the glass be thin, but it must be flat. One edge of each piece must be bevelled by rough grinding, so that when the two are placed in V-fashion, and cemented together, the junction shall present a fine edge. The silvering of this is effected in the way so often described in the Almanacs of this *Journal*.

We have tried other methods for producing stereoscopic photographs, including the employment of the prisms and systems of Nachet, Wenham, and Stephenson, but have so far found the balance of advantages to lie with those now described.

"Given away with a Pound of Tea."—The *Birmingham Daily Mail* of Saturday last contains the following paragraph:—"The system of present-giving has been in operation in Birmingham tea shops for a long period, and various improvements in the system have been tried by enterprising proprietors. Quite the most original variation, however, is the one recently introduced by the manager of a large shop in the centre of the city. In lieu of the stereotyped vase or cradle, this original individual places his customers before a camera, and in due course well-finished vignettes are forwarded to them."

A New Bunsen Burner for Alcohol.—Herr G. Barshell has devised a new burner as above, which gives a higher temperature than that given by the gas-burner of this pattern. It is supplied through a tube from a reservoir placed about a yard higher than the burner, the supply being regulated by a screw-tap just below the air holes. It consists of a thick-walled tube fitted into an iron foot, the tube being divided horizontally into two parts. The lower part is filled with a metal network, and serves to vapourise the spirit. Just above the division are air holes similar to those in an ordinary Bunsen. A piece of wire gauze in the upper part of the tube assists in the production of a steady flame.

Strength of Acetic Acid.—Although this chemical does not occupy in many studios the important position it held in the old wet-collodion days, it is still of the greatest value in photographic work, and a ready means of estimating the strength of a particular sample would be useful. It is customary with the glacial acid to state its specific gravity; but we must point out that this is an entirely misleading method, for the specific gravity of solutions of the acid increases with the strength only up to eighty per cent. With still greater concentration the gravity begins to fall instead of rising. To overcome this difficulty, Herr E. Nickel takes the specific gravity as usual, then dilutes with water, and retakes the specific gravity. If it rises, the higher value must be assumed to be correct, but, if it falls, the lower.

Photographic Atmospheric Absorption.—Professor Schaeberle has been making investigations on the very important question as to the extent to which our atmosphere absorbs the sun's rays at various heights of the sun. His memoir on the subject is being published by the University of California, but meanwhile, has issued a table, which we append, giving the final results. The absorption is expressed in photographic magnitudes, and must be added to the unknown atmospheric absorption at the zenith.

Zenith Distance.	Photo. Absorption.	Zenith Distance.	Photo. Absorption
5°	0·00	50°	0·44
10°	0·01	55°	0·56
15°	0·04	60°	0·71
20°	0·07	65°	0·89
25°	0·11	70°	1·12
30°	0·16	75°	1·45
35°	0·21	80°	1·94
40°	0·28	85°	2·68
45°	0·35	90°	5·00

How to Use a Bunsen.—It is singular to notice how few of the many experimenters in the habit of using this popular burner are acquainted with the proper mode of using it. In the first place, we may say that the cheapest form in which it is sold is of very limited use, for the great value of the burner is in its economy; but it cannot be economically employed unless there is power to lower the flame when needed. This lowering cannot be done beyond a certain point unless the air holes are supplied with an adjustment for cutting off a portion of the air supply. The secret of use is to reduce the air supply as the gas is lowered; then, if there be insufficient air, the flame will be white; if the air is in excess, the flame will "blow down"—that is to say, ignite inside the tube at the point where the gas issues—under which circumstances it is useless. It should then be extinguished for a moment, the air supply lessened by the regulating band that encircles the air holes, and relighted. This is a simple thing, but by no means generally known.

Photographic Drolleries.—Some of our older readers will remember the rage there was some quarter of a century ago for depicting such subjects as a man shaking hands with himself, carrying his head on a plate, and suchlike apparently superhuman appearances, the effects being obtained by making two exposures on one plate by means of a pair of hinged shutters meeting in front of the plate. Our ever-lively contemporary, *La Nature*, published a year or two ago engravings from photographs of similar effects produced by other means, and a week ago had two pages of illustrations from still other photographic vagaries of the kind. We have a man wiping a sword, and just in front of him a decapitated criminal, whose head lies on a block; next is a headless body, with knife in hand, surveying, if it were possible, a table bearing a head on a plate; in another we find a man wheeling a barrow holding the head only of a giant; still another has a full-length representation of a gentleman in outdoor costume bottled up in a huge glass bottle, and so on. The chief difference between the old and the new mode of producing these effects lies in the use of a black background for the most important portion of the subject, which thus permits of an exposure being made a second time without fogging the first impression, though the sitter may have moved away entirely, and perhaps reseated himself opposite the place occupied by his first pose. For the rest, the writer states that the system employed is that of a deep natural black obtained by the open door of a darkened space, combined with screens cleverly arranged within the camera between the lens and the plate. This, he says, is the surest means of obtaining the desired effects with the greatest sharpness and without the junctions being visible. The screens should be placed from about an inch and a quarter to an inch and a half from the ground glass in the last folds of the camera bellows.

A "WELL" DEVELOPING DISH.

In these days of "one-solution" developers used over and over again for a succession of plates, there are many ways in which we may with advantage modify the old system of development, and one of the first is in the style of dish employed. The old form of dipping bath has been recommended in place of the dish; but, while almost its only advantage is the smaller surface of liquid it offers to the atmosphere, it is clumsy, and, owing to the necessity of a dipper is inconvenient in actual use. The "well" dish or bath, sometimes used in the old wet-plate days in place of the dipping bath for sensitising large plates, possesses numerous advantages over the ordinary dish at present used, while it is free from the faults already mentioned, being little bulkier than the vessel it is intended to supersede, and requiring no dipper.

There were two forms of the dish or bath in question, in one of which the "well" portion stood at a considerable angle with the rest of the vessel, the dish proper; and this, though it may possess some points of advantage as a sensitising bath, is, like the dipping bath, a clumsy contrivance for developing. The other form, which is to be preferred, consists of a flat dish somewhat longer than the plate it is intended for, and having the lengthened portion at one end covered in, so that, when the dish stands upon one end, a well is formed, in which the solution rests.

The advantages of this form of dish are numerous, and a few may be briefly enumerated. In the first place, if the same quantity of solution has to be used for several plates as is now the fashion, it is surprising how rapidly it decreases in bulk in pouring backwards and forwards into the measure from an ordinary dish, whether after development is complete or in order to examine the negative. With the "well" dish it is not necessary to pour the solution out at all, the dish is simply placed on end in the sink or other convenient position, where it may rest until required for another plate, and the negative lifted out to be washed and fixed. If constructed with a glass bottom, the negative may be examined for density by simply turning the dish up to the light, the motions required in examining the image and

recovering it with the solution being so quickly performed that there is far less chance of fogging the plate from exposure to the atmosphere and oxidation than when the solution is poured off into a measure, and there is no loss.

And then advantage in the rapidity of motion will be found in other than the one-solution system of development when it becomes necessary in cases of over-exposure or the reverse to modify the developer; the dish is tilted, the necessary quantity of bromide or alkali, as the case may be, is dropped into the well and the solution returned in a wave over the plate almost in less time than it could safely be poured into the measure in the ordinary way. Many similar points might be urged in favour of the well if it were necessary, but these seem sufficient to recommend it.

The fact alone of there being no diminution in the quantity of solution used, except to the extent of what clings to the surface of each plate, must add considerably to the uniform character of the results obtained. It would be idle to attempt to argue that the action of the solution is identical in the case of successive plates, since the very process of development reduces its energy, and adds to the quantity of restrainer it contains after each plate. Starting with a quantity of solution little more than sufficient to cover the plate, the loss of bulk when using an ordinary dish renders it necessary to augment the quantity with fresh solution after each development, and in this manner each operation is performed with a mixture of utterly unknown proportions. But where there is no loss, and consequently no necessity for fresh additions, the action of the solution may be expected to change in a regular manner; that is to say, it may be anticipated that each successive plate, supposing the exposures to have been equal, will take a little longer time to appear, to show its detail, and to gain density, than its predecessor. This being so, the operator knows perfectly well what to do, without any feeling of uncertainty as to whether the plate is under or over-exposed. With the well dish, and a fairly liberal volume of solution to commence with, the best possible chance is afforded of successfully developing half a dozen, or even a dozen negatives, with the least expenditure of material.

Until this dish becomes an article of commerce, for so far as I am aware it is not so at present, it will remain with those who wish to adopt it to use the home-made article, and fortunately it is not a thing that will severely task the skill of any ordinary amateur mechanic. Many photographers I know, both amateur and professional, already construct their own dishes from a variety of materials, including paper, cardboard, metal, glass, and wood, but for present purposes a combination of the two last seems the most suitable.

The sides of the dish should be of quarter-inch baywood or mahogany, dovetailed at the corners; the bottom of glass, and the covered portion forming the well, may be of any sort of thin wood prepared for fretwork. The corners should be preferably dovetailed, or, if that be beyond the skill of the amateur joiner, the ends may be let into a rebate in the sides and secured by means of screws. A deep rebate should be made to receive the glass bottom, deep enough for the glass itself, as well as a fillet of wood a quarter of an inch deep to secure it in place, and to allow the glass to stand clear of the table when in use. The cover of the well is simply laid on and fixed with small screws.

The woodwork if dovetailed should, of course, be put together with glue; but, if the rebate joint is made, it will be better to use white lead mixed with a little dry red lead, the whole thinned down with turps to the consistency of cream. The same may be used for putting in the bottom, and also for rendering the joints of the well cover water-tight. If the framework be put together first so as to find the proper places for the screw holes, it can be taken to pieces, the joints cemented and screwed together again, at once forming a perfectly water-tight junction.

Before, however, finally screwing together, the wood should be thoroughly impregnated with paraffin wax by repeatedly rubbing it in, holding the wood to a hot fire in order that the wax may be absorbed, or the paraffin may be cut in shreds and rubbed in with a hot flat iron. After the dish has been put together, the whole of the inside woodwork, and especially the joints, should receive one or o coatings of thick shellac varnish, the first being allowed to dry thoroughly before applying the second; or two or three coatings of good Brunswick black slightly thinned with turpentine may be applied in the same manner, and to the outside as well.

As regards dimensions, much will depend upon taste, but for convenience and symmetry combined, if the well be about one-fifth the total length of the plate and the depth of the dish be arranged so that it will hold the requisite quantity of solution comfortably, the conditions will be fulfilled. For instance, for $7\frac{1}{2} \times 5$ plate the dimensions I adopt are length nine inches, width six inches, depth one and three-eighths of an inch, the well cover extending one and a quarter of an inch all inside measurement. It is an additional convenience if a strip of glass is cemented across the bottom, inside, to form a rest for the negative and prevent its slipping into the well when the dish is raised.

W. B. Bolton.

CONTINENTAL NOTES AND NEWS.

Avoiding Reflections on Polished Surfaces.—A foreign contemporary remarks that the photographer who wishes to photograph objects of polished metal, porcelain, glass, &c., is generally troubled with surface reflections, which solarise parts of the negative and also reproduce images of surrounding objects, including sometimes the camera and the photographer himself. The best remedy given to obviate these reflections is the old one of smearing the object with suet or fat, a little of which placed on a piece of linen should be applied to the surfaces.

Blue-stained Negatives for Winter Printing.—In a recent number of his journal, M. Liesegang points out that, owing to the yellow stain of some negatives, printing through them in winter is often a matter of great difficulty, and he recommends the conversion of the yellow stain into the more actinic one of a blue violet. This may be effected, he says, by immersing the plate for a few minutes in an old combined toning and fixing bath, as used for aristotype paper.

Some Properties of Metol.—In the *Wochenblatt* Herr Lavroff, of St. Petersburg, says that metol hardens the gelatine film to such an extent that it requires longer than with other developers for fixing and washing. Notwithstanding the clearness of the solution, plates therein may be exposed to a candle light at a distance of fifty centimetres without fear of fog when the image has appeared and before development is complete. He tried the experiment with hydroquinone, but the plate was badly fogged. With metol and sulphite (without alkali) he covered up half of a thin image which had taken ten minutes to appear, for twenty minutes, exposing the uncovered half the while to candle light, without fog supervening, the latter holding good although the plate was left in the developer all night.

Another Method of Preparing Platinotype Paper.—We have from time to time indicated several formulæ for this purpose as published by foreign experimentalists, the latest addition being that provided by Herr Watzeck in a recent number of the *Rundschau*. Paper is coated with a solution of

Arrowroot	1 gramme,
Cold saturated solution of sodium oxalate	50 c.c.,

the solution being boiled until the sediment dissolves, and, according to the degree of porosity of the paper, being applied to the latter two or three times. For black tones the dried paper is sensitised in

Saturated solution potassium chloroplatinite	5 c.c.
„ double oxalate of soda and iron	8 „
„ potassium chlorate	3 drops.

For sepia tones the following quantities of saturated solutions are taken:—

Potassium chloroplatinite	5 c.c.
Double oxalate of soda and iron	4 „
Neutral oxalate of soda	3 „
Mercuric chloride	1 „
Potash chlorate	3 drops.

More chlorate increases contrasts and a smaller quantity of mercury

gives darker tones. The solution of double oxalate of iron and soda being sensitive to light, it should be preserved accordingly. Both solutions given above suffice for coating a sheet of paper 40 × 56 centimetres. For the best results the paper should be dried at a temperature of 35° C.

A Neglected Property of Gelatino-bromide of Silver.—At the meeting of the Société Française de Photographie on January 6 last, the following letter from M. Balagny was read:—"In THE BRITISH JOURNAL OF PHOTOGRAPHY for November 18 there appears an article on 'A Neglected Property of Gelatino-bromide of silver.' At the previous meeting of the Photographic Society of Great Britain, the President, Captain Abney, remarked that, 'if the gelatine film was more experimented with, there were no end of possibilities which would open up in photographic printing. It was sufficient for them to consider the behaviour of a bichromatised gelatine film when submitted to the action of light.' This is a remark which I submitted to the Société Française de Photographie nearly three years ago, and it is on that idea that I based a method of collographic printing which I use daily. When a film of gelatine containing a silver haloid is bichromatised, two great advantages are obtained over the old process of collography—greater rapidity and better facilities for inking. Since the English journal (THE BRITISH JOURNAL OF PHOTOGRAPHY) speaks of the matter, permit me to state that I brought the matter before this Society in the year 1890.'

Austrian Copyright Laws.—The Austrian photographers are up in arms against a movement to limit the time of protection to pictures produced by means of photography to a period of five years, and in a recent number of the *Photographische Correspondenz* Dr. Eder states that, having at different times been approached by photographers as to his views on the subject, he regards five years an insufficient time. He is, and always has been, of opinion that not only photo-mechanical positives, but all other kinds of photographs, should enjoy a longer period of protection, and he denies that he has ever expressed a contrary opinion.

Photo-micrography and Industrial Hygiene.—The Imperial High School of Photography in Vienna has, it is said, completed some photo-micrographic work of great importance to the hygiene of industry. It has been sought to study and determine the influence of metallic dust, &c., on the health of workmen. Microscopic examination was made of the several kinds of dust to be found daily in factories and workshops, and the High School, at the request of the authorities, took photo-micrographs of all the samples examined. The pictures, with explanatory text, have been published by the authorities. The negatives were taken by Herr Valenta, and comprised forty-eight photo-micrographs, which were reproduced in phototypy and are said to be of great interest to those studying the diseases of workmen contracted in their labours.

Common Salt in Mercurial Intensification.—Before the Société Française, MM. Torres Frères, of Mexico, lately brought an intensification process which allows the plate to be bleached with mercury without having been submitted to perfect washing after fixing. It consists in the avoidance of the yellow stain, which would thereby be produced, by placing the fixed plate slightly washed in a solution of common salt 1 : 100 for about half a minute. Intensification then proceeds as usual.

STATUARY PORTRAITURE—HOW MR. C. W. MOTES OF ATLANTA, GEORGIA, WORKS.

I RECEIVED to-day your JOURNAL of the 6th inst., in which I find your leading article describing the illustration in *Wilson's Magazine*, "Sisters of Bethany." I desire to thank you for your excellent notice and for your high endorsement of my effort to produce something out of the "threadworn paths" of photography. I assure you I appreciate your opinions of my humble effort, and will place a higher estimate on the picture than heretofore, and it stimulates me to make stronger efforts to advance. I have mailed to you an unmounted print from the original negative, which I trust will reach you safely.

In regard to your criticisms you are right, but I desire to say we cannot always control our subjects as to styles. If bangs are in style, they cannot be induced to pose without *bangs*, as was the case in this picture. The style of the dress I had to leave with them, and they insisted on short sleeves, and the one standing, on plenty of underskirts. I tried to persuade her to remove her skirts so as to get rid of the bungling drapery behind, and show her form by having the drapery cling, but she would not, so I had to do the best that could be done under the circumstances. The one sitting obeyed my suggestions, and I think did her part well.

I do not claim the grouping to be entirely original. I had frequently seen and studied an engraving similarly posed, and had it in my mind when I made this. I mention this, fearing some one might accuse me of claiming originality in the composition.

Now, a word as to my methods in making this class of work. For background I prefer black velveteen; it is important to have the nap run upwards, so that the reflection of light is prevented. Incline the ground from the light, and the result (if not over-exposed) will be almost clear glass. I have three widths in my ground, seams running up, and am never troubled with seams showing if, as stated, the ground is inclined slightly from the light. In order to produce satisfactory results, it is absolutely necessary to use a black ground; and, if by unavoidable circumstances there is reflection on the ground, it can be removed by the method you describe without giving the cut-out appearance, which will invariably be the case if made on an ordinary background, especially around the head. Again, when made on black ground, I have frequently removed all the ground with a knife cutting around the figure. Frequently parts of the drapery that may be objectionable can be cut away, and made to conform to the taste of the operator. In this case I use a very sharp knife to bevel the edges of the film, to prevent it printing too *sharp*. For the pedestal I use wooden boxes covered with muslin. Coat with glue, and, while wet, sprinkle with sawdust; when set, knock off excess, and paint with colour to suit taste to represent granite. I then paint name or title on box, and *shade* so as to represent the letters cut out.

In my exposure I work for the shadows with a strong diffused light. Time with great accuracy—too much time will sure to produce flatness; too little black shadows are very objectionable in this style and lose the effect of marble. I have taken the liberty to be rather lengthy, as there seems to be some misunderstanding as to the methods I use; so, in the event you have occasion to refer to the matter, you can condense such as suit your purpose.

Atlanta, Ga., U.S.A., January 27, 1893. C. W. MOTES.

[We have received the unmounted print of the group, which is excellent. From the number of communications we are having, we are warranted in surmising that statuary portraiture is a subject of considerable interest to professional photographers—in England, at any rate—and doubtless the practical details of working, with which Mr. Motes supplements our article of January 6 last, will be highly appreciated by them.—ED.]

JOTTINGS.

ON January 27 I remarked that I had often wondered whether the phenomenon of shearing stress could be turned to practical account, and I added that the same thought had occurred to me on the recent publication of Mr. Carey Lea's experiment proving that great mechanical pressure alone was sufficient to darken the silver salt. A writer in a contemporary publication says that on October 12 last *he* said, "the experiments pointed to new possibilities in the way of printing. A slightly photo-engraved plate may give a developable image by simple pressure." Now, any one having the least photographic knowledge can see that these quotations are not at all parallel; but, as the writer appears, from the context of his remarks, to be deluding himself with the grotesque belief that his pages are the source of my inspiration, and, notwithstanding that I studied and wrote on the phenomena of shearing stress shortly after Captain Abney published his experiments some years ago, I hereby make over to the writer in question the full, absolute, irrefragable, undiminishable honour of antedating me by three months in the suggestion that shearing stress or darkening by pressure might be useful for reproduction purposes. At the same time I regret that, having no time to dispose of in the habitual perusal of the periodical upon which his

literary and scientific acumen confers a distinction that requires to be much more widely known to be appreciated at its proper value, I had no means of discovering that modern knowledge had received this epoch-marking addition on October 12, a date which henceforth should be printed in red letters in every scientific calendar and almanac.

"It signifies nothing," plaintively proceeds the gentle scribe, "this perhaps unconscious assimilation of our matter, unless one has regard to the fact that an affected ignorance of even the existence of other photographic (*sic*) journals is a flattering unction much indulged in by our aged contemporary," &c., &c., and so on. I am unacquainted with the peculiarities of the process by which a journal, youthful or aged, "indulges" in "a flattering unction;" but it is quite plain where the shoe pinches. You "affect" ignorance of "other photographic journals," his amongst them, and so, because like a sensible Editor you do not give free advertisements to all or any of the obscure hangers-on to the coat-tails of photographic journalism, the dictionary is ransacked for such laboriously manufactured epithets as "unconscious assimilation," and a whole column of the valuable space of this self-styled "vanguard of technical progress and invention" is taken up with a laughably hysterical denunciation of you and all your works. "Well, well," as the burly farmer said when his wife and mother-in-law, as was their custom sometimes, gave him a good drubbing, "what matters? It amuses them and doesn't hurt me." And so you may say! But, alas! that the world should "know nothing of its greatest" journals, and that the "vanguard of technical progress and invention" is condemned to make the welkin ring with lamentations, because its more aged contemporaries will not fold it to their manly bosoms!

It is fortunately a curiosity of journalism that mud should be cast at the forty years editorial reputation of a paper simply because the jottings of an occasional contributor do not gain the approval of the editor of another journal, and I should not have ventured upon this rejoinder had I not been the unwitting cause of the screaming and foaming at the mouth in which your contemporary has indulged at your expense. But, besides this, I have another object in view, and that is to discover the actual writer and the cause of his animus. He commences some twenty lines of unprovoked and clumsy Billingsgate with this remark: "But, *of our own knowledge*" (these are my italics), "we have not the slightest hesitation in comparing the accumulated tomes of the above quoted journal" (that is, THE BRITISH JOURNAL OF PHOTOGRAPHY) "to a waste-paper basket of antique and ample build—the repository of an unequalled weight of cameristic verbiage," &c. I wish to direct the attention of the reader to the italicised passage. Such a degree of knowledge, especially when it is read by the light of subsequent remarks by the writer, implies an acquaintance with the "accumulated tomes" of this JOURNAL such as cannot be possessed by anybody save its Editor, or somebody who has been compelled to make a close study of those volumes for, let us say, bibliographical purposes. Again, the writer dubs himself "an energetic inquirer into photographic facts." What kind of facts, I should like to know; scientific or historical? I can scarcely believe that the deplorably immoderate language I have quoted is the utterance of any self-respecting editor, or that he could have been aware of the nature of the copy he was passing. It could only be the work of somebody who nourishes some private resentment against this JOURNAL and its staff; some disappointed would-be contributor; some lurking bandit, like the "English" journalist who was recently exposed in these pages for a series of underhanded attacks in an American paper on English photographic men and things; some "Talbot Archer," in fact, of whom I wish your contemporary every possible joy.

I am glad to see that Mr. W. Thomas, in his able and practical paper on *The Hand Camera and its Use in Picture-making*, emphatically challenges the contention of many writers that a finder with a hand camera is unnecessary and useless. Some users of a hand camera are, I know, fond of airing their cleverness by saying that they can tell or guess when the object, moving or otherwise, they are pointing the camera at is in the field of view; but in the former case a great deal of skilful judgment is required to ensure anything like reasonable certainty that the picture has not "passed the plate." As Mr. Thomas says, "finders are necessary if you desire to ascertain that your main object of interest takes its proper position." In hand-camera work all uncertainties should, as far as possible, be eliminated, and therefore I endorse all that he says on the subject. As well do away with a focussing scale in a camera of variable focus as a finder.

Mr. Chapman Jones, at the conclusion of his paper on mercurial intensification, points out that the success of his process of intensification with mercury and ferrous oxalate depends upon the removal of the hypo that may remain in the plate after washing, which he says can be done by soaking in an acidified alum solution. On the assumption that hypo alone is present, has it been demonstrated by experiment that the solvent powers of water are insufficient to effect its removal, or is the acidified alum necessary for taking out the silver hyposulphite, which is possibly present wherever the hypo is? Would Mr. Jones recommend acid alum in preference to peroxide of hydrogen as a hypo eliminator? In connexion with the stain caused by intensifying a film from which the hypo had not been thoroughly removed, it would be interesting to know whether the hypo *per se*, or sodium hypo and silver hypo, are the cause of the stain. If the presence of the latter is essential to the production of the stain, then imperfect fixation is at the bottom of the trouble, and a fresh bath and hypo is necessary, unless silver hyposulphite is soluble in acidified alum. It seems to me that our information on these points is very meagre.

COSMOS.

NOTES UPON THE USE OF AMIDOL FOR BROMIDE WORK.

WHILST it may be said of the use of pyrogallic acid for negative work that not one of its competitors has ousted it from the foremost position, it is still more true of ferrous oxalate that up to the moment no other reagent produces finer results for bromide work, or produces them more easily. The use of an acid fixing bath in place of a simple solution of hyposulphite of soda does indeed enable good results to follow the development of bromide paper by hydroquinone or eikonogen, but it only substitutes one great difficulty—the use of an acid clearing bath previous to fixing—for another, viz., the doubt as to the stability of prints made by its aid.

The use of an ante-fixing acid clearing bath has always appeared to me the weakest point of bromide work. I have never been able to see my way to advocate its use, although I am quite ready to admit the excellent results attained by its aid, and even tempted by the fatal facility of the means to resort to its aid at times. But, notwithstanding this inconsistency on my part, I regard as a distinct evil the practical necessity of its use to prevent an iron deposit and stain on the paper when the oxalate developer is used, for it is indispensable that this acid solution should be entirely removed from the pores of the paper and film before the picture is placed in the fixing bath. This complete removal seldom obtains in practice. It is true that by careful working a considerable degree of purity of colour may be secured without the ante-fixing clearing bath, but the results are more difficult to obtain, and hence I assume that it is largely used. My point—a strong objection to the use of an acid clearing solution before fixing—is admirably enforced by the printed instructions issued with a popular make of bromide paper: "All the acid must be removed, or fading of prints will result."

It seems reasonable, then, to welcome the advent of any developer which offers a chance of escape from this inherent weakness of the process of development by ferrous oxalate, and I tried a sample of amidol with which the agents in this country had supplied me. I must say that doubt possessed me on the ground of the somewhat fulsome praise bestowed upon the last new thing, which for negative work I feared less useful than pyro. Besides this, a one-solution developer always raises one's prejudices. Following a custom more honoured in the breach than the observance, I made up a quantity of solution strictly in accordance with the maker's instructions, and using a sample of sulphite of soda which they supply for use with their developer. This is an excellent idea, as considerable variations occur in different samples of sulphites, and if a caution were added to the instructions to use the maker's own sulphite, it would be better still. I did not meet with success with the solutions so weak as the makers recommend. The pictures were flat, and always appeared to be over-exposed. Temporarily, therefore, I abandoned making pictures, and, instead, exposed several pieces of paper behind a Spurge's sensito-

meter, a useful little instrument, which enables one to save much time in experimental work when it is doubtful in which direction success or failure lies. It was now quickly apparent that the scale of gradation was not marked enough. Intensity of deposit was lacking in the long exposures, and there seemed some indications of the action of light right up the scale, as if the developer were extremely active to the least-exposed parts—as, indeed, I think it is—and insufficiently so to the others. My experiments were interrupted at this point, and, as the bottle of amidol developer was accidentally left without a cork, I was able to observe that the action of the air for twenty-four hours was to slightly colour the solution, a state of things which might be expected with a one-solution slightly alkaline developer. It did not appear, however, to have lessened its developing powers, or to have rendered it liable to stain the paper—points which I noted with surprise.

Taking up the experiment again, I now tried the maker's formula undiluted. This stands as follows:—

Sulphite of soda	800 grains.
Amidol	80 „
Water	8 ounces.

Allowing for the increase in bulk by the addition of the solid constituents to the water, this approximates to an eight-grain solution of amidol.

In my earlier attempts this had been diluted with three times its bulk of water, in accordance with the printed instruction. With the stronger solution I obtained much better results. The deep shadows were richer, the high lights purer. But development was too quick; in fact, the picture rushed up and was over-developed "in a hurry." Compared with pictures developed with ferrous oxalate, I found the gradations of the negative rather steeper, by which I mean the print was more brilliant with the amidol than with iron. This I considered a very satisfactory feature, as a flat (over-exposed) negative had purposely been chosen to test this point. By slightly diluting the amidol solution, the gradation could be lessened, but one soon gets to a greyness of colour (which is to be avoided) by adopting this expedient.

With a correct exposure, which I have not found to *vary from that for iron developer*, the results now compared favourably with others from a ferrous-oxalate developer working in conjunction with an acid clearing bath. But development was too hurried and under little control, which the addition of bromide hardly improved. The results were, however, exceedingly brilliant and very pure and white.

Encouraged by the promising nature of the results, I made a series of experiments with the idea of making the developer more permanent in character before use, of rendering its action more deliberate (whilst still speedy), and last, and not least, of giving some control over the development. The result is as follows:—Divided into two solutions, for convenience in preparation and for storage, the acid sulphite and amidol makes a bright and clear solution, without deposit, and which I find keeps well. The colour of the deposit (in the picture) is at least as good as when the solution is prepared with sulphite of soda, I think better, and compares favourably with iron. The bromide does not seem to increase the exposure, and only makes development slow enough to be under reasonable observation and control, whilst it is still quicker than it is with oxalate, which is itself a quick-acting developer. The carbonate of soda solution is to be added *quantum suff.*, and should be used with discretion, but the amount of bromide restrainer removes all tendency to fog or veil, to which defect this developer, however, seems little subject.

Amidol Solution.

Acid bisulphite of soda	8 grains.
Bromide potassium	1 grain.
Amidol	8 grains.
Water to make	1 ounce.

Accelerator.

Carbonate soda	48 grains.
Water to	1 ounce.

For use, add a few minims (four or five) of the carbonate to each ounce of the amidol solution. The completed developer may be used several times, especially if the bulk of the solution be maintained by additions of newly mixed, fresh solution. This is a noteworthy feature of amidol. The general experience with other developers, and for all purposes, is that, for successful and certain working, a developer can only be used once. This is not my present experience with amidol. To sum up, amidol, in my opinion, is the most dangerous competitor of the iron developer for bromide work, and is well worth a trial. It promises to remove the necessity, and even the advantages, of an ante-fixing acid clearing bath. By increasing the strength of solution, much greater contrast can be obtained upon occasion than has hitherto been possible, and *vice versâ*. Of the comparative cost, I cannot yet speak. It does not reduce the exposure and it is not a dirty developer.

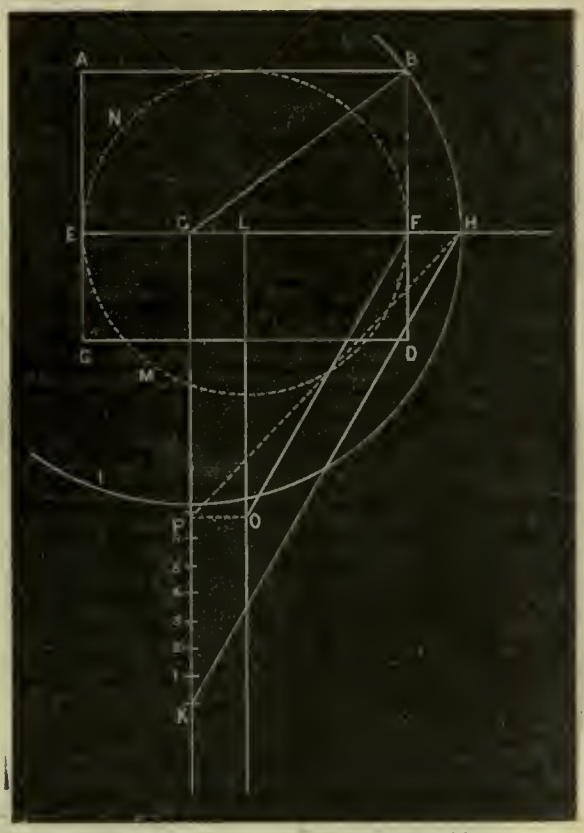
S. Herbert Fry.

CALCULATION OF THE ANGLE OF VIEW.

[London and Provincial Photographic Association.]

In the British Journal Photographic Almanac for this year there is to be found, for the first time, a table of natural tangents by Mr. A. Haddon, by which the photographer may calculate the angle of view included on a given plate by a given lens, or, conversely, the focus of a lens to include a given angle on a given plate. Unfortunately, the rules formulated by the author of the article accompanying the table are incorrect. As they may lead into error those who accept them without question, I offer this criticism and correction in the hope that the tables may thereby be made of value.

According to the first rule: for calculating the angle, half the length of the plate must be divided by the focus of the lens; the nearest natural tangent to the quotient should then be sought in the table, and the arc opposite it, multiplied by two, will give the angle.



A B C D. Picture plane.
E F. Horizontal line.
G. Centre of vision.
B H I. Base of cone of rays 60°.

By Mr. Haddon's rule:—
L. Centre of vision.
F M N. Base of cone of rays 60°.
H. Correct station point, or focus.
O. Incorrect station point, or focus.
P K. Difference, inches 6·93 about.

Angle G K H=30°.	30°×2=60°
„ G P H=44.	44×2=88
	Error 28

The error is, the direction to take half the length of the plate. To demonstrate this in a simple way, compare the procedure with that of a draughtsman, who wishes to make a drawing, in perspective, of a room twelve feet wide by ten feet high, to scale of one inch to the foot. In the diagram, E F is the horizontal line, which must be at the height of the spectator's eye—say, four feet above the floor. Suppose the centre of vision removed two feet to the left of the middle of the horizon. Next describe a circle to represent the base of a cone of rays including the picture plane A B C D, no more and no less. This

is done by taking the centre of vision G as centre, and the line to the farthest corner as radius. It is a rule in perspective that the line of direction shall be at right angles with the horizontal line, and terminate in the centre of vision. Assume the cone of rays to include 60°. The base of this cone is the circle B H I. The draughtsman could now determine the exact position of the spectator. From G, at right angles with the horizontal line, draw G K, the line of direction. By means of a protractor, connect H with K, so that the angle G K H includes 30°. G K is now the principal ray of a cone of 60°, and represents on the plan the distance of the spectator from the picture plane. This line is seventeen one-third inches long, very nearly. As the picture formed by a rectilinear lens is in true perspective, and conforms to the same conditions, it can be said that a 12 × 10 plate, with the centre of vision removed two inches to the left of the centre of the horizon, at a height of four inches, will include an angle of 60° at about seventeeen one-third inches focus.

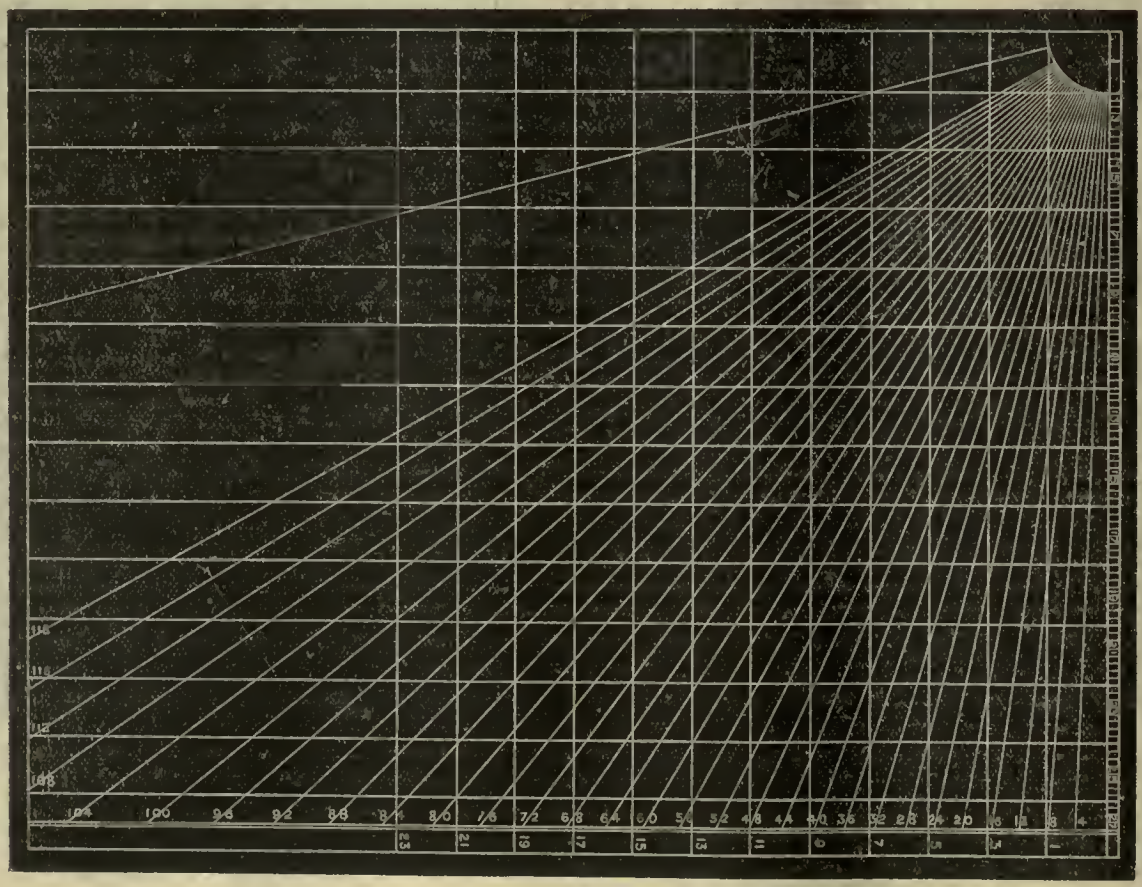
Next work the problem by the method of the article in the ALMANAC. Divide the horizontal line E F in half at L. With L as centre and L F as radius, describe the circle F M N. From L at right angles with F E, draw the line L O. With a protractor connect F with L O at an angle of 30°. The circle F M N is then the base of a cone of rays of 60°, and O is the station point. But the circle F M N does not include the whole picture, and the point O transferred to the line G K shows a minus distance of about 6·93 inches. The photographer consequently would have used a lens of about 10⅜ inches instead of 17⅓ inches focus. Connect P with H and measure the angle. It will be found that from this station point nearly 88° have been included instead of 60°.

book on *Pictorial Effect in Photography*, also warns the reader against the use of the centre of the picture as the centre of vision.

The worthlessness of the rule becomes more apparent when we apply it to pictures of equal length, but different height.

Take the series 12 × 4, 12 × 6, 12 × 8, 12 × 10. The rule would give all these different pictures as taken under the same angle, regardless also of the fact that the centre of vision might be different in each case, an assertion which is obviously incorrect. Take a twelve-inch line at ten inches focus. With the centre of vision midway, the angle included is 62°, but, removed four inches to the right or left, it is reduced to less than 57°. A line of given length may, therefore, include more or less angle, according to its position on the picture plane, as may be proved by the scale produced. This scale is divided longitudinally and latitudinally into spaces representing inches. From one corner, as centre, radii are drawn, representing the ninety degrees of a quadrant. The numbers from right to left represent inches focus, and those from top to bottom inches distance from centre of vision to extreme limit of picture, or farthest corner of plate. By means of this scale the angle of view, or focus of lens for a given angle, may be found without calculation for any picture, which method some photographers may prefer.

Having demonstrated the error in the rule, it will be seen the following correction must be made. The rule to find the angle of view should be:—Ascertain the position of the centre of vision; from this measure the distance to the farthest corner of the plate, and divide it by the focus. Seek the nearest natural tangent to this number in the table, and read off the corresponding arc. Twice this arc is the angle required.



The nature of the error will be found in the assumption of a fixed centre of vision, at the centre of the horizontal line, with the horizon as diameter of the base of the cone of rays. In the example given, the centre of vision was removed two inches to the left, therefore the radius L F was from the wrong centre and much too short. Artists rarely use the middle of the horizontal line as the centre of vision. They prefer to avoid it, because the centre of a picture is its weakest point. This may be proved by examining the pictures in our galleries, or, to come nearer home, consult the lecture before this Society by the late Mr. Norman Macbeth, printed in THE BRITISH JOURNAL OF PHOTOGRAPHY for January 6, 1888. Mr. H. P. Robinson, in his

To find the focus the rule should be:—Divide the angle we wish to include by two, which will give the arc. Find the natural tangent opposite this arc in the table; measure the distance between the centre of vision and the farthest corner of the plate, and divide it by the natural tangent found. The quotient is the focus.

One word of caution in conclusion. Should it be necessary to photograph on a plate of given dimensions under a given angle, first ascertain the length of the principal ray, and then select the lens which will give the image at that focus. In most cases this will be difficult, as the lens stock will rarely be found to include one which is suitable. It is preferable to photograph the subject approximately to

size, using a plate of somewhat larger size, and a lens of rather shorter focus, to allow for the necessary adjustment for objects in the foreground. Place the camera in position to include the correct angle for lens and subject, and trim the print. PHILIP EVERITT.

THE HAND CAMERA AND ITS USE IN PICTURE-MAKING.*

Experiences in Cattle Stalking.

Of the various kinds of work eminently suitable to the hand camera, I may mention pictures composed of animals—cows, horses, sheep, and so on.

If any here have had experience in trying to secure this class of picture, we shall be at one when I say, to obtain a well-composed picture, with the idea (if there is one) fully carried out, is a matter of difficulty when working in the ordinary manner with tripod; especially is it so if one is out alone. Cattle have, under such circumstances, a *beastly* desire to see the picture on your ground glass for themselves.

My first experience in cattle stalking was my last for some years. Being out on the prowl, seeking what I might devour, photographically, I came across a fine herd of young bullocks in a field, and in my innocence and usual good nature, undertook to immortalise them. Over the fence I went, quickly got into position, and, everything in readiness, focussing done, and dark slide ready for taking its place—but, what on earth had happened? Everything possessed of four legs was as fuzzy as fuzzy could be, and over it all had to be done again, this time being more troublesome; the vain things evidently each desiring to obtain a better position for showing themselves off, and were constantly on the move to the front, so much so, that I thought it desirable to go further away, and begin over again. They unanimously agreed to the former part of my programme, but disagreed *in toto* with the latter portion, and whether it was they shrewdly guessed I was only a new beginner, and not likely to do them justice or not I never knew, but one thing was certain, they had a preference for my room rather than to my company—and meant having it, for it was simply from that point a question of going out, or being put out, of the field. I fancied the former, and they the latter.

I went, and how camera first, and then myself, got on the opposite side of the iron fence I never knew. There was a shortness of time about the whole affair that was bewildering; but this is certain, on looking round I noticed several of these new-found friends offering their services through the fence in a very energetic fashion. Photography and art were at a sad discount for the rest of that day.

I was down in the same part of Yorkshire this last summer, and passing the same field, turned the tables on my old friends, and got one good cattle picture and another of a more amusing character, when one was trying to stimulate his memory with a good scratch, very likely having heard of my last visit from his great-grandfather; however, there was no difficulty this time, everything was changed, and the operations over in a very few minutes.

Then, again, with sheep, no bother after getting stand, &c., ready, and picture arranged and focussed, to find they have had enough of it and are off. Now the other method is to decide on position, quietly walk to within required distance, just be ready, and when they are kind enough to line up as you desire, off goes the shutter, and so do you; everybody pleased—they at your departure, and you at the medals already secured in imagination, that is if you go in for such wicked deeds as trying for medals.

The Pleasures of Hand-camera Work.

Then, again, it is undoubtedly capable of being used with satisfaction on the sea amongst the shipping, and along the shore for real picture-making. Hardly any subject, whether storm effects, cliff studies, or, in fact, anything you desire to deal with on the coast, comes amiss, when using a good rapid plate and a lens such as I described; these and all the odds-and-ends met with can just as well be done with the hand camera as with one used on a tripod, with a heavy balance in its favour on score of convenience in carriage and working. A goodly proportion of landscape work comes well within its scope, and, in fact, as I have said before, anything requiring an exposure of not more than one second can be got with certainty, and none of the trouble connected with the use of the ordinary camera and its numerous accessories.

It would be possible to continue the list of advantages it possesses, and the pleasures derived from its use, for a considerable time, but I do not propose doing so, except to say it is a real godsend when out *skying*, being ready at the instant, and be the changes ever so rapid none need be allowed to escape this friend; and this is, as I hope to show you, one of the strongest aids to picture-making. If it was of no other use than that of getting sky negatives, it would be deserving of our careful attention; as it is, you will find it a good friend and faithful servant if you first understand it and use it properly and with care, not expecting the impossible, or calling upon it to do that which in our present state of advancement is within the province of the camera and tripod and protracted exposure.

* Concluded from page 73.

Blue Spectacles a Useful Aid.

There is one small but useful aid in outdoor work.

You may often have found a scene that carried you away with its beauty, and a plate or more having been carefully exposed and developed, only to find the resulting negative bring disappointment and disgust.

Now this has been perhaps a scene full of variety and contrast, but variety and contrast of *colour*, and this, when reduced to monochrome by photography, has disappeared.

Here you will find a pair of blue spectacles of immense use by giving you a better idea of how the scene is apart from its colour, and so often save both your pocket and temper; they are also of use and comfort in watching a sky effect, with the sun glaring at you. Without them you are quickly blinded, but with them on you can stare away at the sun, moon, and stars without inconvenience, and so see just the effect you are waiting for at the precise moment most suitable for your purpose, and thus add one more good sky negative to your stock.

You will see a few slides kindly lent me by my friend Mr. Bright, of the Camera Club, and I use them to show some of the varied kinds of work to be done with a hand camera. After they have been shown I shall be glad to answer any questions as far as possible, and still more glad to hear the opinions and experiences of members who may have devoted themselves to this branch. We have not at our disposal to-night sufficient time to go into and deal fully with the matters more intimately connected with the making of pictures—composition, light and shade, and so forth, but I hope to take up this subject again on some future occasion, if you care to devote another night to it. W. THOMAS.

ELECTRIC LIGHTING AS APPLIED TO PHOTOGRAPHY.

An example of the way in which the electric light can be adapted to photographic purposes has recently been brought to our notice. The installation was fixed for Messrs. André & Co., of Bushey, by Mr. Henry J. Rogers, M.I.M.E., electrical engineer of Watford, and consists of an Elwell Parker dynamo of 105 volts and 28 ampères, driving 1–2000 c.p., and 1–4000 c.p. Brockie-Pell Arc Lamps. The peculiarity of the installation is, however, in the method in which the arc lamps are arranged for convenience in focussing the light on the "study." The lamps are hung on brass rollers running on copper rails fixed in grooves in wooden frames, the positive and negative cables being attached to the ends of the copper rails, and the circuit being closed from one rail to the other through the carrying wheels of the lamps. The lamps thus have a travel of about six feet longitudinally without any movement of the cables. The frames on which the lamps are suspended can also be raised and lowered by shifting counter balance weights hanging from cords passing over a series of pulleys, and, as the framework upon which the lamps hang is also suspended on pulleys running on transverse tee irons, the whole of the lighting apparatus can thus be moved on one side out of the way of the operator. It will be seen from the above description that the lamps can be moved vertically, longitudinally, or transversely; thus every requisite for successful photography has been attained in this installation.

The dynamo is driven by a four h.p. Otto gas engine, with two fly-wheels, and there are the usual resistance coils, switch board, cut-outs, and volt meter.

Mr. Rogers is about to fit up an incandescent installation on the same circuit as the arc lamp circuit for lighting Messrs. André's studios.

NOTES FROM SCOTLAND.

Photography and School Boards.

The Edinburgh School Board, which has spared nothing in its desire to render their new schools not only perfect so far as that can be done in the internal arrangements for teaching and matters connected therewith, but in external architectural effect, has erected several of the finest examples of building in that city. They have further commissioned Mr. Aytoun to photograph for exhibition at the Chicago World's Fair exterior views of several of the schools, among them Jorphicen-street and Sciennes (the latter name derived or corrupted from an old Catholic foundation near its site, St. Mary di Sienna, *circa* 1200 to to 1300 A.D.). There are also interior views in the latter of the workroom, with boys at their joinery work, and girls amusing themselves in their swimming dresses in and around the swimming bath attached to the

school. There are also pen-and-ink drawings of the school furniture which is of a superior type, by the pupils. The fine bit of architecture by Playfair, of the High School, has also, in spite of its difficult position, been beautifully rendered in several views. These will form a part of the Board's contribution to the Fair.

That rather conservative body, the Royal Scottish Academy of Arts, has not thought it beneath its dignity to borrow an idea, and from a photographic source. It will be remembered by those who were privileged to see it that the Exhibition of the Edinburgh Photographic Society, 1890–91, was held in the galleries which the Academy is also allowed to occupy, and that the hanging of the pictures and the draping of the walls gave a very fine effect to the general show as a whole. The more august body, the Royal Academy, has this year in its annual Exhibition departed from the usual maroon-coloured barn or auction-room style of hanging. As one of the dailies puts it, "We have changes in the mode of hanging, in the decorations, and in the arrangement of the galleries," and these are but a reflection of the good taste and example shown them by the organizers of the Edinburgh Photographic Exhibition.

A New Departure.

A proposal has been brought before the Edinburgh Photographic Society to change its annual time of appointing Council and office-bearers from the beginning of the session in November to its later meeting in June. This seems so valuable a suggestion that we think it well worthy of consideration by that wider body, that photographic public which associates into societies with various designations extends all over this country, we might say the world.

The Council and office-bearers are elected at present in November, and, as a third at least of these are ineligible for re-election, a continued and desirable change of officials occurs annually, and before these new members get into working order a large portion of the early part of each working year is wasted; they therefore propose that the appointments of those officials should be the last work of the last meeting of the session in June, thus leaving them the whole of the recess to arrange and mature plans for the following year, and also to begin that in October instead of November.

This seems to be one of the most sensible proposals we have seen for the business working of photographic societies, which always make of the summer and autumn months a holiday for outdoor work, rest, and recreation. The adoption of it need not disarrange the ordinary terms of the beginning of the session, and of payment of subscriptions and other matters of that nature, for, although it might be better were the two periods simultaneous, yet they are by no means a necessity. As the names of the officials of all such bodies are carefully registered in the various almanacs, annuals, and year-books, those published at the beginning of each year would be certain of being correctly posted up to date.

We commend the idea to the consideration of those engaged in the work of carrying on the business of such societies as one likely to be of considerable help to them in their sometimes arduous duties.

Determination of Measurements by Photographic Means.

In a contemporary an anecdote is related as to the origin of the mode of doing this, and as it seems newly imported, and "Made in Germany," it may be as well to scotch it at once. It is, shortly, that Dr. Stolze says, in a recent number of *Photographische Nachrichten*, Dr., or Mr. Meydenbauer, architect, conceived the idea in the summer of 1862, during the restoration of Wetzlar Cathedral, and told him of it at that date. All the world knows that this had been done long before that, and by nobody more exactly or perfectly than by Charles Piazzi Smith, then Professor and Astronomer Royal for Scotland, in his memorable work at, in, and on the Great Pyramid of Gizeh. Previous to that date, also, the present writer was employed by Mr. David Kinnear, architect, inventor of the Kinnear camera, and an accomplished photographer, to photograph to scale, and with measuring rods set in various parts, the Free Church (St. George's) of the late Rev. Dr. Candlish, preparatory to its removal and reconstruction, on an improved design, in Stockbridge, Edinburgh, a mile away from its then site, and where it now stands, an ornament to the locality. Nothing was thought of it more than an ordinary bit of work.

AN EXHIBITION OF NEGATIVES.

The Birmingham Photographic Society had a very instructive and interesting meeting on the evening of Tuesday, the 31st ult., when a non-competitive Exhibition of members' negatives was held. The object of the Exhibition was to place before the general members, and especially the beginners among them, a standard of good work, and it is gratifying to report that, so far as the quality of the work on view is concerned, the Exhibition was eminently a success. Upwards of 100 negatives were shown, the work of sixteen members, and these were displayed to the best advantage on racks running down each side of a long table, a row of lamps being placed down the centre, and the light diffused by the intervention of tissue paper. It would be no exaggeration to say that there was not a second-rate negative amongst them, but the exhibits of Messrs. E. C. Middleton, E. H. Jaques, J. T. Mousley, J. H. Pickard, William Rooke, and E. Underwood called forth unstinted admiration. Mr. W. S. Horton also had on view a very fine series of collodion negatives, copies of celebrated pictures, taken many years ago, which were much admired. Altogether the Society has just cause to congratulate itself upon the success of the Exhibition and the good to the general members which will undoubtedly accrue from it.

AMMONIUM PICRATE FOR PREVENTING HALATION.

Before the Photographic Society of Japan on December 2, Messrs. W. K. Burton and K. Arito showed the results of a set of experiments with plates stained with picric acid neutralised with ammonia (presumably really picrate of ammonium) to prevent halation. Mr. Burton had, some years ago, tried the effect of staining films with various dyes to prevent halation, but had not been very successful. As a rule, if halation were prevented, the plate was very much slowed, or there was great difficulty in getting density. With picric acid this was not so. The sensitiveness was somewhat reduced, but not much; whilst, so far as density was concerned, the difficulty had, up to the present, been that too great density had been got in every case. The picrate did not seem so much actually to slow the plate as to act as a retarder in development. This necessitated a developer strong in alkali, and, even with very small proportions of pyro, or of eikonogen, the density came up too great. Doubtless further experiments would lead to the discovery of a remedy. The next were to be made with plates coated with emulsion with which picric acid (or picrate of ammonium) had been mixed. Both halation and solarisation were completely prevented.

Several hundred lantern slides were shown on the screen, and it was decided to hold a lantern evening in Yokohama at an early date.

CLEVELAND CAMERA CLUB EXHIBITION.

The first *conversazione* and exhibition in connexion with this Club was held last week in the Co-operative Hall, Middlesbrough, when some very pretty sets of photographs were exhibited both by amateurs and professionals. The judging was in the hands of Mr. Frank M. Sutcliffe, and his awards were as follows:—Set of six pictures: 1st prize (silver medal), Dr. Stainthorpe, Saltburn; 2nd prize (bronze medal), Mr. Jobling, Yarm. Single picture: 1st prize (silver medal), Dr. Stainthorpe, Saltburn; 2nd prize (bronze medal), Philip Bulmer, Chester-le-Street. Lantern slides: 1st prize (silver medal), Mr. Taverner, London; 2nd prize (bronze medal), Mr. J. W. Huggins, Hexham. The Mayor (Mr. C. Lowthian Bell) opened the exhibition, and a very large and exceptionally fine collection of lantern slides were exhibited by means of the limelight under the management of Dr. Stainthorpe.

Our Editorial Table.

A Catalogue of Stereoscopic Views.

We have received the catalogue of stereoscopic views issued by Messrs. Underwood & Underwood, of Liverpool, Chicago, &c. It contains particulars, with numerous illustrations, of many thousands of stereoscopic views of the chief places of interest on the habitable globe, together with, in many cases, explanatory notes. To lovers of the stereoscope unable to obtain views of distant places this catalogue affords the means of gratifying the most variegated tastes in stereoscopic views, and is besides admirably got up and printed.

Political Calendar.

The Meisenbach Company have sent us a specimen of their improved process of photo-engraving in the form of a Calendar for 1893. The subject, entitled *Queen of Flowers*, has been engraved from the coloured supplement to the *Lady's Pictorial* Christmas number, a picture of twenty-one printings, and is a charming and delicate example of monochrome reproduction from paintings and colour work by their "special orthochromatic process." The border consists of over 600 portraits of the members of the present Parliament, and, notwithstanding the minute size of the portraits, each is distinct and clear, and can be at once recognised by those acquainted with the original. The fineness of detail is remarkable, and we agree with the Company that it is questionable whether it would be possible to produce a type printing block giving equal results by any other known method of engraving. We esteem the Calendar as a unique specimen of process engraving, and both as regards the quality of the reproductions, large and small, and of the successful preservation of the enormous number of likenesses included, we congratulate the Company on a most admirable piece of process work.

Aide-Mémoire Pratique de Photographie.

By Albert Londe. Paris: J. B. Baillière et Fils.

The excellence and variety of M. Londe's desultory photographic writings, as well as his official photographic position at the Paris Salpêtrière, is sufficient guarantee that any work on photography from his pen is sure to be distinguished by carefulness of execution. The handbook under notice treats both theoretically and practically of most branches of modern photography, and is profusely illustrated. A chapter devoted to colour-photography includes a detailed description of M. Lippmann's experiments.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 1972.—"The 'Binnio' Photographic Lens." J. H. Newman.—*Dated January* 30, 1893.

No. 1991.—"An Improvement in Photographic Lenses, also applicable to Microscope and Lantern Objectives." H. D. Taylor.—*Dated January* 30, 1893.

No. 2035.—"Improvements in Photographic Cameras." J. G. Goosey.—*Dated January* 30, 1893.

No. 2202.—"Improvements in Photographic Printing by Electric Light and in Apparatus therefor." J. E. A. Gwynne.—*Dated February* 1, 1893.

No. 2226.—"An Improvement in Photographic Cameras." G. R. Allely, A. E. Allely, and T. E. Aston.—*Dated February* 1, 1893.

No. 2288.—"Improvements in Photographic Cameras and in Apparatus connected therewith. S. D. McKellen.—*Dated February* 2, 1893.

No. 2328.—"Improvements in Photographic Studio Accessories." H. L. Morel.—*Dated February* 2, 1893.

SPECIFICATIONS PUBLISHED.

1891.

No. 391.—"Photographic Apparatus." Sledge.

No. 2381.—"Magic Lantern Slide-carrier." Reed.

1892.

No. 4668.—"Magic Lantern Slides." Mason.

No. 4886.—"Photographic Cameras." Gotz.

No. 5008.—"Printing Photographic Plates." Hines.

No. 22,633.—"Photographic Dish." Rayner.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 13	Camera Club	Charing Cross-road, W.C.
„ 13	Darlington	Trevelyan Hotel, Darlington.
„ 13	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
„ 13	Lantern Society	20, Hanover-square.
„ 13	Norfolk and Norwich	Bell Hotel, Norwich.
„ 13	North Middlesex	Jubilee House, Hornsey-road, N.
„ 13	Putney	Boys' Gymnasium, Charlwood-road.
„ 13	Richmond	Greyhound Hotel.
„ 14	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 14	Derby	Smith's Restaurant, Victoria-st.
„ 14	Great Britain	50, Great Russell-st. Bloomsbury.
„ 14	Hackney	206, Mare-street, Hackney.
„ 14	Manchester Amateur	Lecture Hall, Athenæum.
„ 14	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
„ 14	Paisley	9, Gauze-street, Paisley.
„ 14	Rochester	Mathematical School, Rochester.
„ 14	Stockton	Mason's Court, High-street.
„ 15	Brechin	14, St. Mary-street, Brechin.
„ 15	Bury	Club Rooms, 13, Agar-street, Bury.
„ 15	Leytonstone	The Assembly Rooms, High-road.
„ 15	Manchester Camera Club	Victoria Hotel, Manchester.
„ 15	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 15	Southport	The Studio, 15, Cambridge-arcade.
„ 15	Southsea	3, King's-road, Southsea
„ 16	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 16	Camera Club	Charing Cross-road, W.C.
„ 16	Glossop Dale	
„ 16	Greenock	Museum, Kelly-street, Greenock.
„ 16	Hull	71, Prospect-street, Hull.
„ 16	London and Provincial	Champion Hotel, 15, Aldersgate-st.
„ 16	Oldham	The Lyceum, Union-st., Oldham.
„ 16	Oxford Photo. Society	Society's Rooms, 136, High-street.
„ 17	Cardiff	
„ 17	Croydon Microscopical	Public Hall, George-street, Croydon
„ 17	Holborn	
„ 17	Leamington	Trinity Church Room, Morton-st.
„ 17	Maidstone	"The Palace," Maidstone.
„ 18	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

February 2,—Mr. G. W. Atkins in the chair.

Messrs. Robert Debenham, G. D. Sargent, and L. N. Tyndall were elected members.

Printing-out Opals.

Mr. A. Haddon said he had tried the opals recently sent for distribution by the Paget Company, and had obtained most beautiful positives. There was one advantage in the use of the smooth surface over the matt-surface kind, in that with the former one would obtain a gradation in the shadows which most probably would be lost in the matt surface, on which, as compared with the glazed, the half-tones would suffer to a certain extent. He would most certainly select the smooth surface in preference to the matt.

"Haddon's Reducer."

Mr. F. A. Bridge said that, at the meeting of the Photographic Club on the previous evening, Mr. H. W. Sanford showed a print on gelatino-chloride paper which had been over-printed, toned, and fixed. Being found too deep, it was reduced by Mr. Haddon's reducer (potassium ferridcyanide and ammonium sulphocyanide), the image entirely disappearing. The paper was then washed and an amidol developer applied, with the result that a beautiful warm-toned print was obtained.

Mr. Haddon said it was well known that sulphocyanide would dissolve the silver salts, and that the ferridcyanide would attack the metallic silver.

Mr. J. S. Teape had once toned with uranium until the image had disappeared, but it redeveloped perfectly.

Mr. Haddon said that possibly the bromide in the developing solution converted the deposit into silver bromide, when development would be carried on, reduction most probably having taken place in the presence of light.

Mr. W. E. Debenham said that possibly such a proportion of the constituents of the reducing solution was used as not absolutely to dissolve the image, there being, perhaps, not quite enough sulphocyanide present.

The Late Mr. William Bedford.

Mr. W. F. Slater presented the Association with a portrait (handsomely framed) of the late Mr. Bedford, as presented with this Journal of January 27 last.

Albo-carbon in Paraffin.

Mr. J. E. Smith asked for information as regards albo-carbon in paraffin. Did it aid the illumination, or would it cause an explosion?

Mr. R. Child Bayley had tried albo-carbon, and could not get it to dissolve in paraffin.

Mr. Haddon said that camphor was often recommended and used. It required the use of a much longer chimney to consume the carbon, otherwise it would be smoky. There was no fear of an explosion.

Mr. Charles H. Oakden said that albo-carbon was slightly soluble in paraffin. It was formerly recommended for microscopic lamps, but its use had been abandoned. There were two or three qualities on the market.

Mr. T. Bolas said it was difficult to see any possible danger by the use of albo-carbon, but, as Mr. Haddon had observed, a somewhat better draught would be required.

In reply to Mr. Smith, Mr. Haddon, remarked that heating the oil was to court an explosion or conflagration. There was no danger, provided the reservoir of oil was properly filled. They only had explosions if the reservoir were partly filled and oxygen from the air entered to form an explosive mixture.

Calculation of the Angle of View.

Mr. P. Everitt read a paper on this subject (see page 87), at the conclusion of which

Mr. Haddon said he had been accused of having attempted to deceive the 20,000 readers of The British Journal Photographic Almanac for 1893, and for having given a rule which was utterly absurd. He had given that rule in order to remove the cumbrous methods adopted by some to obtain the angle of view on a given size plate with a lens of given focus. He had not invented the term "angle of view" as given by him in his Almanac article; it had a quarter of a century's authority. He was not an artist, and knew little or nothing of perspective, and he was perfectly sure that the first gentleman who used the term "angle of view" in the sense it had been used for twenty-five years was not an artist or teacher of perspective, but rather an optician or mathematician. In ninety-nine cases out of a hundred, pictures were taken with the axis of the lens very nearly opposite the centre of the plate, and the angle was calculated between two extreme rays drawn from the sides of the plate. It was absurd to give a picture a fictitious value on account of a few trees, or twigs, or rocks at a corner, and so dignify it with an angle of 52°, instead of, say, 42°. His article did not claim be to a method for calculating the maximum angle of view, but of that included on the base line of the plate. Mr. Everitt himself had to some extent adopted the same rule, as he had drawn his line from the extreme corner of the plate, but had calculated from a position at the side opposite to which the axis of the lens pointed. He did not see why the angle obliquely to that position should be taken. He would like to refer Mr. Everitt to some slides shown at a lantern evening, and ask him if their pictorial effect would have suffered by the corners being lopped off. He (Mr. Haddon) would answer, Not in the least. In a seascape there was a large amount of sky, but should that be dignified with an increased 5° or 10° because it had so much blank paper? When one admired a view, one did not look from corner to corner, but horizontally, and that gave the angle of view included. He had not used the term differently from what it had been used for twenty-five years. Having quoted Hardwich & Dawson, Monckhoven, Grubb, the Editor of The British Journal Photographic Almanac for 1888, Mr. J. Traill Taylor (the author of the *Optics of Photography and Photographic Lenses*), and Dr. Clarence E. Woodman as giving practically the same method of ascertaining the angle of view, Mr. Haddon asked, Was that rule, from a mathematical point of view, correct or incorrect, or had he given a rule which was, mathematically, nonsense? Was it true that one got the tangent of the angle by dividing the base line of the plate? He did not think he had gone wrong as regards that. The term angle of view had had a new meaning given to it that evening which, up to the present, in photography had never been accepted, or, if accepted by some, he (Mr. Haddon) had decidedly never seen it in print. It was a question for the meeting whether in the future they were to throw overboard the old method or adopt the mode suggested by Mr. Everitt.

Mr. DEBENHAM said the great use of tables was to know whether with a certain lens one could do certain work. As to the base line of the picture, they would get the angle only for the base; but, in so far as it was desirable to know what a lens would do, it was necessary to go to the corners, and if we wished to have our corners we must measure for them. With regard to the actual angle included, he supposed Mr. Everitt meant the angle necessary to have in the plate?

Mr. EVERITT replied that the angle which the lens of seventeen inches focus, as given in the diagram, should subtend, in order to take so much of the picture as indicated, should be 60°.

Mr. DEBENHAM said that was a mistake. It was desirable that the plane of the field should lie in the focus, but all that was necessary was that the angle should be the part of the circle covered. He thought Mr. Haddon's table required correction to the extent that "base" was understood where they must reckon half the disgonal of the plate. It was not necessary that the axis of the lens should be directed to the line of vision. In using a wide-angle lens, the axis should be at right angles to the plate, so that the plane of definition should be in the same plane as the plane of the plate.

Mr. EVERITT asked Mr. Debenham if he would take such a picture as he had drawn in the diagram with a shorter-focus lens than seventeen inches, and obtain an angle of 60°?

Mr. DEBENHAM said that a lens of 30° angle was not required. He would get the same perspective with a lens placed at the same place with less than 60°, angle included. An angle of 48° degrees would do.

After further discussion,

Mr. TEAPE remarked that Mr. Debenham had said that it was not necessary to have a lens that would cover more than the part of the circle included by the angle, but he (Mr. Teape) thought that, if the sliding front were used, it was necessary for a lens to cover more.

Mr. DEBENHAM agreed that one must have a lens which would cover from opposite the centre of the sliding front to the side of the plate. That was desirable for including the amount of picture, but not necessary.

Mr. TEAPE said that a mistake was made in saying angle of view when we wished to know the angle of view; the term should be "extreme" or "maximum angle of view." As a matter of fact, every portion of a picture was viewed under a different angle.

In replying to Mr. Haddon, Mr. EVERITT said that gentleman had quoted certain authorities on his side of the question, and triumphantly said that for twenty-five years his rule had stood, and now photographers were confronted with a new one. The art of perspective was considerably older than twenty-five years. If those gentlemen who devoted their attention exclusively to books wished to include the largest angle with a lens of a certain description and gave rules, he (Mr. Everitt) could quite understand that they would value the method of Mr. Haddon, and naturally would transfer that method to the calculation of an angle on a plate without noticing that the corners were not covered. Mr. Haddon had tried to minimise the difference in angle made by the sky, or trees, or twigs in the corners of a picture; but, if such were of no consequence, why not confine your angle to the object of interest, and trim the print down? By Mr. Haddon's rule there was an error of 28° in the angle and of about 33⅓ per cent. in the focus of the lens, according to the example he (Mr. Everitt) had shown. Photography had recently been putting forth claims to be recognised as one of the graphic arts, and they should therefore adopt the parlance of draughtsmen and artists.

Harringay Photographic Society.—February 2, The President, Mr. D. Towers, gave a demonstration of *Bromide Enlarging*, Mr. F. Bennett occupied the chair.—The demonstrator used a restrained ferrous-oxalate developer, with Morgan & Kidd's paper, the result being a perfect enlargement. Three new members were elected, and the Secretary read the request for affiliation from the Photographic Society of Great Britain.

Hackney Photographic Society.—January 31, Mr. G. J. Avent in the chair.—The Hon. Secretary passed round an arrangement for fixing on any ordinary gas jet for use with limelight. It prevented the tube buckling, and was readily applied. From the question box: 1: "Do the fumes of ammonia cause permanent irritation to the mucous membrane of the throat, eyes, and nose?" Mr. DEBENHAM said in olden days he had used strong, large quantities of it, not in connexion with photography, and he had had chronic pharyngitis through it, but with the small quantities and weak solutions used in photography he did not think there was much danger. Mr. NUNN said he had been troubled with a sore-throat, which his doctor attributed to the use of ammonia. Mr. GEAR said he had killed a mouse with it in two or three seconds. Question 2: "What is the effect of a sample of hypo on prints after toning?" It was said that a bad sample would probably be acid, and set free sulphur, which ammonia would correct. Question 3: "Which is the better light for reproducing a faded photograph—artificial or daylight?" Mr. DEBENHAM said if the half-tones had faded daylight would be the best; lamplight would add yellow all over and defeat its own end. He had used a violet-blue light to increase the non-orthochromatic effect where the faded half-tones were yellow. Mr. DEBENHAM then proceeded to give his demonstration on *Transparencies by the Carbon Process.* The first thing to do is to get the tissue, which is coated with gelatine mixed with a pigment, unsensitised; sensitise before using with one ounce of bichromate of potash to one quart of water, with or without ammonia, preferably without. The gelatine and bichromate acted on by light produce an insoluble substance, which does not swell in water. The pigmented film must be developed from the back, otherwise it would wash off the paper, unless for transferring; then apply a new support, cemented by indiarubber varnish to film, and wash away the first paper. The lecturer preferred red-chalk tissue. Colours were various, and by subsequent treatment different ones could be obtained. In drying, glass was perhaps better, at any rate would keep better, as there was less chance of bichromate remaining, and less chance of distortion. It was very slightly sensitive whilst wet, may be dried some distance from the fire, edges must be covered during printing, and a photometer was necessary to gauge it. He showed one he had had with about three dozen photographs on it. Red-chalk tissue may be toned and intensified by staining the gelatine with ordinary ink or other dyes. Mr. Debenham preferred permanganate of potash (ten grains to one ounce). Transparencies were then made and handed round. Mr. GEAR had used transparency tissue, and preferred it to the red chalk. He preferred ordinary bromide plates to carbon, and thought that with the latter there was a slight blurring. Mr. BECKETT said he thought this was hardly correct, as the Woodbury lantern plates were most admired of any. Mr. GEAR said he cleaned his glasses with nitric acid and washed them before talcing. Mr. DEBENHAM said the talc must be thoroughly rubbed in, and if they were properly talced over, the pores, so to speak, of the glass would fill up and remain so.

Leytonstone Camera Club.—February 2, Mr. A. E. Bailey in the chair.—Mr. L. E. Morgan, from Messrs. Fuerst Bros., gave a demonstration on the uses of the new developing agent amidol. Having previously exposed a plate, he developed same most successfully with amidol, giving every advantage with half-tone and density possessed with pyro, but without the stain. Bromide paper and lantern plates were next dealt with, and all with a one-solution developer, and with the same success; after which Mr. Morgan was deluged with inquiries, to all of which a most lucid explanation was given. It was the general opinion of the members present that amidol has a great future before it.

Leeds Photographic Society.—February 2, Mr. Warburton in the chair.—Mr. T. Illingworth, of Halifax, gave a demonstration on development. In the first place, he advised amateurs to fight shy of rapid plates, and stated that he found ordinary plates serve him for almost all purposes. He developed several "Barnet" ordinary plates with Mawson & Swan's pyro-ammonia formula; plates exposed in the studio—one five seconds and one fifteen seconds—he used 12 drachms pyro solution, 8 drachms ammonia solution; three minutes to develop. One twenty and another thirty seconds, 12 drachms pyro solution and 6 drachms ammonia solution; seven minutes to develop. One forty, another sixty seconds, 16 drachms pyro solution and 6 drachms ammonia solution; fifteen minutes to develop. He then made a transparency, same plate, forty seconds exposure, five feet from ordinary gas-burner, developed with 12 drachms pyro solution, 8 drachms ammonia solution, all of which proved complete successes.

Lewes Photographic Society.—Febrnary 2.—Dr. Collins gave a lecture on his visit to the north of Scotland, illustrating it with a number of lantern slides of the Island of Handen and neighbourhood, showing the rocks covered with innumerable sea-birds which come here to breed.

Liverpool Amateur Photographic Association.—February 2, a lecture and practical demonstration by Mr. E. M. Tunstall on *Lantern Slide-making.*—All points of a nature likely to lead to failure were fully explained, including suggestions as to the best negatives, exposure, and development. The lecturer strongly urged that the developer recommended by the maker should be used; he, however, preferred hydroquinone as the simplest, and as a good all-round worker. After several example plates had been treated, at the suggestion of Mr. Tunstall, Mr. G. A. Carruthers was asked to show the members his method of making slides by reduction by artificial light. This was done in a Pearson & Denham's reducing camera by an exposure of six inches of magnesium ribbon burnt behind the negative (a 5×4 film), with a sheet of ground glass between the negative and the light, and by moving the magnesium ribbon about while burning to ensure even lighting, the result being a perfect slide, with not the slightest sign of uneven lighting. A Mawson plate was used, this, in the opinion of the lecturer, being one of the fastest and most reliable plates for the experiment.

Dundee and East of Scotland Photographic Association.—February 2, Mr. J. D. Cox presiding.—A beautiful and interesting series of scientific experiments with the lantern were shown by Mr. Peter Feathers. Mr. Feathers demonstrated how the apparatus could be used for illustrating chemical and physical phenomena, such as the decomposition of water and of metallic solutions by electrolysis, the refraction of light in a soap bubble, the action of sound, waves, &c. Mr. Murray Feathers followed with a lecturette, entitled *A Holiday Trip to the Channel Islands.* A splendid series of photographic views of the Channel Islands were displayed on the screen. Mr. Feathers gave a racy account of life in the Islands, and described in glowing terms their picturesque towns, delightful rural scenery, and the magnificence of the coast scenery, with its towering cliffs and yawning chasms.

Glasgow Photographic Association.—February 2, Mr. Wm. Lang, jun., F.C.S., President, in the chair.—Mr. John Stuart gave a demonstration of printing in platinum and gelatino-chloride papers. Of both processes a large series of prints were developed or toned, and finished ready for mounting. At the close Mr. Stuart was thanked for his demonstration, which was much appreciated by those present.

Leith Amateur Photographic Association—January 31, Annual Meeting, Mr. Wm. M. Smith in the chair.—The Treasurer and Secretary read their respective reports, the one as to the financial state, which was pronounced satisfactory, the other gave a record of the work done during the past year, which was also approved of. The following gentlemen were then appointed for the ensuing year:—*President:* Mr. William Dougall.—*Vice-President:* Mr. William M. Smith.—*Council:* Messrs. Guthrie, Ewart, Hunter, Chapman, Dewar, Jas. Hislop, H. W. Hislop, Dr. M'Creadie, J. Lamb.—*Treasurer:* Mr. M. Campbell.—*Secretary:* Mr. Alexander Pitkeathly. The Secretary afterwards intimated that in the recent National Lantern Slide Competition two of their members had been successful exhibitors—Mr. Smith, who had been awarded the silver medal; and Mr. Guthrie, a former medallist, had received honourable mention.

Photographic Society of Philadelphia.—January 11.—The paper for the evening was read by Dr. John H. Janeway, U.S.A., his subject being *Some Thoughts on the Chemical Development of Dry Plates.* (See a future number.) Dr. JANEWAY remarked, in connexion with the reference in his paper to sound produced by the action of light, that he had noticed, while on duty on the western plains, sounds proceeding from telegraph wires—just after dawn and before sunrise—which he believed were due to the action of light rays. Mr. JAMES WILSON asked if most of the fog referred to by Dr. Janeway was not caused by decom-

position of the pyro or material used in development, and whether, if fresh developer had been used at repeated intervals, instead of adding more alkali, this fog would have been produced. Dr. JANEWAY said that where freshly prepared pyro developer had been added, instead of more alkali, fog had ensued. He did not think it was due to decomposition. Pyro might cause discolouration, but not fog, and discolouration could be removed. Mr. Earle exhibited the "Perfection Magazine Flash-lamp," for burning pure magnesium. The prominent feature of this lamp was its adaptability for either instantaneous or time exposures. The lamp was constructed on the principle of the Argand burner, with the purpose of ensuring complete combustion. Mr. ROSENGARTEN inquired whether any member, in experimenting with flashlight, had used powdered aluminium. He had been given a formula the other day—a mixture of aluminium, chlorate of potash, and some other highly oxidising substance. A party in one of the journals claimed that it was quite as valuable in its power as magnesium, and not explosive in any way. Professor SADTLER stated that he had used aluminium in the form of a very thin foil, and it burned with fully as vivid actinic light as magnesium, but was a little slow in ignition. Dr. JANEWAY suggested that the celluloid diffuser sometimes used in flashlight work could be protected from the danger of ignition by coating it on both sides with silicate of soda—liquid water glass. Professor SADTLER asked the Doctor whether he got the preparation to adhere uniformly. Dr. JANEWAY said the only requisite was to dilute it one-half and apply with a flat brush. It flowed very readily and dried in a few moments. Mr. EARLE thought the reason why the celluloid took fire in Dr. Janeway's case was because of the dampness of the magnesium powder, burning particles being blown against the screen, instead of being consumed. The powder should always be dried before using. Mr. LUDERS asked if the moist breath blown into the lamp would not account for the dampness of the magnesium. Mr. EARLE said that it might.

FORTHCOMING EXHIBITIONS.

February 14.....	Durham City Camera Club. Hon. Secretary, R. Haux-well, The Avenue, Durham.
,, 16-18	*Woolwich Polytechnic Photographic Society. Hon. Secretary, W. Dawes, 145, Chesnut-road, Plumstead, S.E.
,, 18.....	Holborn Camera Club. Hon. Secretary, F. J. Cobb 100 High Holborn, E.C.
March 1, 2	*Fillebrook Athenæum Photographic Society. Hon. Secretary, Joseph W. Spurgeon, 1 Drayton Villas, Leytonstone, Essex.
,, 3, 4	*Blackheath Camera Club. Hon. Secretary, C. W. Piper, 46, Shooter's Hill-road, Blackheath, S.E.
April 17-29	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.
May	*Forfarshire Photographic Association. Hon. Secretary, W. J. Auckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

ADJUSTING LIMELIGHT JETS.

To the EDITOR.

SIR,—I have never seen the following simple method of adjusting limelight jets, in use or in print. Having found it effective, I send it for what it is worth.

The rod supporting the jet tubes has a screw cut on it and milled-edged nuts above and below the socket.

To adjust the jet, loosen the top nut and screw the lower one up or down as necessary, at the same time moving the jet to and fro till in right position, then clamp with the upper nut.

I see jets advertised with endless thumb nuts to adjust, but never one in which the lime can be set out of vertical, by which the light may often be improved.—I am, yours, &c., H. G. M. CONYDEARE.

Camera Club, Charing Cross-road, W.C., February 1, 1893.

FLEXIBLE STEEL TUBING.

To the EDITOR.

SIR,—My excuse for troubling you with this letter is that the above-mentioned tubing seems to be unknown to the majority of lanternists, yet I think if they knew it they would be glad to discard the troublesome, evil-smelling rubber tubing now in general use, especially those users who, exhibiting in large rooms with blow-through jets, have to carefully lead the rubber pipe from the gas jet to the lantern, and yet are always in fear that some careless person may step on the tube and extinguish the flame. The smaller bores (quite large enough for lanternists) can be coiled in a circle of eight-inch diameter, and require a pressure of twenty-seven hundredweight to crush them. They are perfectly gas-tight, and free from any smell; and, being galvanized internally and externally, will not rust. Lastly, and not least, the price is considerably lower than that of the best rubber. No serious objection can be raised as to the additional weight, five-sixteenths weighing only two and a half ounces, and three-eighths three ounces per foot. Connexions are made with pieces of rubber tubing two or three inches long, as usual. The comfort of working the lantern without any fear of kinks, or the doubling up of the piping, is great. I say, Try it, and I don't think any one doing so will give it up.—I am, yours, &c., FRANK HAES.

28, *Bassett-road, W., February* 3, 1893.

[Mr. Haes, some weeks since, showed us a sample of the tubing in question, which we should think an admirable substitute for rubber tubing.—ED.]

FINISHING GELATINO-CHLORIDE PAPERS.

To the EDITOR.

SIR,—There has been a diversity of advice given as to the finishing of P.O.P. and kindred papers. I have often wished to finish P.O.P. by burnishing as albumen would, but at first could not succeed at all. One writer says, "Have the burnisher" (I refer to a bar instrument) "very hot," but in this way I spoilt prints wholesale. After considerable experiment, and when I had almost decided to get a roller enameller, I discovered that if the burnisher was only heated to a degree that the hand could hardly bear, the prints went through easily and with a splendid finish. This may be useful to those who are still using bar burnishers.—I am, yours, &c., OTUELLO.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

To the EDITOR.

SIR,—I cannot but express regret that Mr. Robert E. M. Bain should have any reason to complain of the treatment of his photographs at our last exhibition. Immediately on reading Mr. Bain's statement that he received them roughly tied together with a piece of cord instead of in the wooden case in which they were sent, I inquired of our agent concerning the matter. He is emphatically *certain* that these exhibits were returned in the box in which they were received. I can only suppose, therefore, that the case was opened after leaving our agent and before arriving at its destination.—I am, yours, &c., CHAPMAN JONES, *Hon. Secretary.*

Photographic Society of Great Britain, 50, Great Russell-street, Bloomsbury, London, W.C., February 4, 1893.

A DEVELOPER QUESTION.

To the EDITOR.

SIR,—The formula for a snap-shot developer that I gave in the ALMANAC has, in my hands, proved a practical success, as the various makes of plates that I developed with it have stood the quantity of *anhydrous* sodium carbonate mentioned without fogging.—I am, yours, &c., F. MIALL.

13, *Shelgate-road, Clapham Junction, S.W., Feb.* 4, 1893.

THE DUBLIN EXHIBITION.

To the EDITOR.

SIR,—In the report of the Exhibition of the Photographic Society of Ireland, published in THE BRITISH JOURNAL OF PHOTOGRAPHY of 27th ult., I find an error has appeared, by which Mr. John Stuart, of Glasgow (who sent some admirable flashlight pictures), is also credited with the production of the very fine portraits of Bishop Dowden and Professor Blackie, while those works, as well as several other splendid photographs not mentioned in the report, were very kindly sent by the eminent portraitist, Mr. W. Crooke, of Edinburgh.

I trust you will kindly publish this communication, giving honour to whom honour is due.

Thanking you on behalf of the Exhibition Committee in anticipation of correction.—I am, yours, &c., ALFRED WERNER.

38 *and* 39, *Grafton-street, Dublin, Feb.* 4, 1893.

DETERMINATION OF PLATE SPEEDS.

To the EDITOR.

SIR,—Mr. Williams has favoured your readers with the results of some comparative trials he has made with plates marked in accordance with our system. As, however, his conclusions are arrived at by mere ocular inspection, we trust Mr. Williams will pardon our saying that we do not attach any importance to them, nor do we believe that he could possibly decide, by ocular inspection, that one plate had received ten per cent. more or less exposure than another.

The eye is quite incapable of estimating such differences, and even when the difference is sufficiently marked, the eye is altogether unable to assign to it any numerical value. Quite recently we showed prints from two negatives, one of which received twice the exposure of the other, to

two practical photographers, and they were quite unable to decide which print was from the more, and which from the less, exposed negative.

We, ourselves, advocate quantitative methods, and our object in writing is to ask Mr. Williams to be good enough to send us the negatives to which he has referred. We will then compare them by actual measurement and report upon them in due course.—Yours, &c.,

Appleton, Widnes, Feb. 6, 1893. F. HURTER & V. C. DRIFFIELD.

To the EDITOR.

SIR,—In your issues of January 27 and February 3 appear two articles by Mr. G. F. Williams on the determination of plate speeds by the method introduced by Messrs. Hurter & Driffield. It is clear that one of the makes experimented upon must be of our manufacture; we therefore wish to say a few words on the subject. We do not consider that it is our province to enter into any defence of the scientific aspects of Messrs. Hurter & Driffield's method of speed determination, or whether the law they lay down as to the action of light be correct or not—this we feel can be better handled by them. Our object is to defend and assert the practical reliability of the speed numbers which we affix on each box of plates of our manufacture.

We see by Mr. Williams's own statement that he has experimented with five batches of one make, and with only one of another. Of the two makes which he letters X and Z, the latter we take to be ours, for we have never issued any plates over actinograph number 130. In the experiments, our plate Z has never been tried against another plate of our make of a different speed, thus the whole argument based on these series of experiments falls to the ground as regards our speed numbering. Knowing the value of the system from more than twelve months' daily working we are most desirous of offering the utmost facility for its trial. We should be pleased if Mr. Williams or any committee of experts would take the matter up with us.

We invite Mr. Williams to favour us with a visit at Southgate and in conjunction with our Mr. Cowan practically test the speed numbers. We are inclined to believe that he may see good grounds for changing his present opinions.

We may add, five English plate-makers, besides ourselves, one American, and one Belgian, have purchased Messrs. Hurter & Driffield's photometer for determining the speed of plates.—I am, yours, &c.,

22, *Soho-square, London, February* 7, 1893. MARION & CO.

To the EDITOR.

SIR,—I make it a rule not to be personal, so I will do my best not to ruffle Mr. G. F. Williams's equanimity more than necessary.

I do not remember any particular flourish of trumpets with regard to the Warnerke sensitometer, and from the first I think that most of the dry-plate makers were aware of the difficulties attending its use; but its numbers were used simply for the want of something else; instance the fact that, to this very day, three of the most important dry-plate makers print the Warnerke numbers on their labels. Quite apart from the difficulty of getting two Warnerke screens exactly alike, sensitometers of all kinds have failed for the want of that very knowledge of the laws of photographic exposure which Messrs. Hurter & Driffield have tried so hard to bring within the understanding of photographers generally; and also, for the same reason, camera-testing also fails, excepting under favourable conditions, which are rarely understood.

Mr. Williams speaks of his love for instruments of precision, and mentions those used in the science of electricity. Doubtless he knows of the characteristic curves of dynamos. Will he say why photographic exposures should not have their characteristic curves also? Has he ever used a Hurter & Driffield photometer, and will he venture to deny that this beautiful instrument is one of precision? May I inform Mr. Williams that it would compare favourably with a great number of electrical measuring instruments in general use? I must not, however, wander from the true point of discussion in Mr. Williams's article.

I venture to think that Mr. Williams has been a little hasty in speaking of Messrs. Hurter & Driffield's classical labour of years as an utterly unreliable, new-fangled method. Abuse is no argument, and I also venture to think that Mr. Williams will be sorry some day that he did not give the Hurter & Driffield system a little *actual* investigation before writing about it in the way he has done. He may take my word when I say that this system is not going to be a *fiasco* in any sense of the word.

I ask Mr. Williams if he has any right to judge Messrs. Hurter & Driffield's system by the interpretation of any dry-plate manufacturer? Is this fair? Has he ever actually investigated the Hurter & Driffield system? Has he the right to presume that, on his bare assertion, he is going to sweep away the work of years of patient investigation? Really, Mr. Williams, I thought better of you!

Not once does Mr. Williams speak of the *relation of density to speed*. This point, the very essence—the soul—in fact, the *all* of the Hurter & Driffield system, is completely ignored, or not noticed by him. Has he really gone through the "investigations" he speaks so slightingly of? I can scarcely think so. It seems to me that Mr. Williams's notion of the Hurter & Driffield system consists in the use of a candle for testing. This does not constitute their system. In consists in reading sensitiveness through *all* the densities of the plate in the period of correct representation, and does Mr. Williams think that he can read sensitiveness, even in the camera, without the proper consideration of density? And if he does not think so, will he say how he values this consideration? Here we have the very pith of the matter, and yet there is not a word in the article about it. Has Mr. Williams considered the true meaning of sensitiveness? Mr. Williams will agree that it is by the opacities in a negative, caused by exposure and development, that every one must in some way give a value for sensitiveness. Will he tell us what precautions he took against reading a mere development factor for sensitiveness? Can he distinguish under-development from under-exposure? I question this *very much*. I have tried experienced men on this point, and they fail, but the Hurter & Driffield photometer would not fail to easily show the difference. If Mr. Williams is prepared to deny that there is a period of under-exposure, one of correct exposure, and one of over-exposure in any given plate, perhaps he will state what he considers the true law of the case. If, on the other hand, he is prepared to admit that these periods exist, he has, in defence of his testing, to say what provision he took to distinguish them and give their proper value in the estimation of speed.

I say without hesitation that no comparative camera tests are worth a straw, unless exposure and development be such as to produce identical negatives *in the correct period*, and as this correct period varies considerably in different makes and qualities of plates, camera-testing is really *very* difficult. Let me tell Mr. Williams that there are gentlemen who make plate-testing by the camera a profession. Some little time ago, I gave two of these gentlemen some plates of considerably different sensitiveness for comparative testing. What was the result? In one case, 500 per cent. error, and in the other 400 per cent. Further *camera* tests proved the error, when identical negatives were demanded. In the case of plates having a relative sensitiveness of two to one, an error of 50 to 75 per cent. is easily made by camera-testing, owing to a widely different developing factor under the same conditions being likely to exist.

In ordinary portraiture, the photographer is kept in check by the necessity of producing a negative of suitable printing quality and this is where a rapid plate is properly estimated; but let such a photographer take to mere plate-testing, he immediately proceeds to do the very thing he ought not to do, he does what Mr. Williams tells us he did in *getting the most out of every plate*. No regard is paid to comparative printing quality, and therefore, as the true relation of density to speed is not taken into account, camera-testing, under such conditions, is a mere farce. Before the second chapter of Mr. Williams's article appeared, I foretold what he would do, viz., that he would over-rate the slower plates and under-rate the quick ones, and this is just what he has done.

I now come to the candle question. It is manifest that, provided that all makes of plates obey the same constant in the relative sensitiveness to candle-light and daylight, it does not matter a fig what that constant may be. Do plates obey that constant, generally speaking? All that I can say is this: that, after hundreds of tests, neither Messrs. Hurter & Driffield, Mr. Alexander Cowan, nor myself are able to say that plates vary in this respect. Even orthochromatic plates for ordinary landscape work obey the same constant very well, though, of course, it is easy to see that, under certain conditions of screen and light, such plates would require a different constant.

There is, however, a grave charge against the standard candle. It is not to be relied on as a standard, for its light is variable to an unexpected degree. I confess that, until I knew better, it misled me on two occasions to the extent of twenty-five per cent.; and, as I wish to be perfectly honest in letting your readers know the truth, I may say that, to my sorrow, the plates marked 135 and 140 were marked higher than they should have been. This was well known to some of the dealers whom we informed of the mistake, and, in justice to Mr. Driffield, I wish to say that he was the first to call us to account. Such, however, was the latitude in working that several people told us that the plates worked very well to the marked speeds, so that the error was not serious.

I am actively engaged on a better light for standard purposes, meanwhile we are working now to the same carefully standardised check-batch as Messrs. Marion & Co., through the courtesy of their Mr. Cowan. Until we get a reliable standard light, the only way is for makers to combine in the use of a check-plate. I can assure your readers that for all practical purposes they can rely on the speed numbers. This matter has been thrashed out by *so many* camera tests, that the few trials made by Mr. Williams go for nothing in deciding the Hurter & Driffield. Men who, by pure calculation, can, as I have seen, produce a transparency which will entirely obliterate a negative into one even tint, know what they are talking about. I have no doubt but that Mr. Williams would be horrified if he knew the errors in his own readings. If, as I gather from his article, he has ignored *density in relation to speed*, his tests must be entirely unreliable.

It is waste of time to argue the length of one's foot, when it can be measured. Please, Mr. Williams, go and measure your negatives.—I am, yours, &c.,

JAMES CADETT.

Greville Works, Ashtead, Surrey, Feb. 8, 1893.

A CORRECTION.

To the EDITOR.

SIR,—In your report of the discussion which followed the reading by Mr. Debenham of his paper on *Photographing Paintings by Artificial Light*, before the London and Provincial Association, I am erroneously reported to have recommended for isochromatic work a screen of a *yellow-red* tint, whereas my remarks were directed to call attention to the necessity of choosing one of a *pure yellow colour*, because with a screen of an unsuitable tint the time of exposure was likely to be unduly prolonged with a minimum of isochromatic effect. I shall be much obliged by your insertion of this correction.—I am, yours, &c.,

February 8, 1893. W. H. BARNES.

PHOTOGRAPHING AT THE CHICAGO EXHIBITION.

To the EDITOR.

SIR,—Your always valuable and welcome JOURNAL came to hand, and as you are always trying to keep your readers well posted, you should add a P.S. to Mr. S. A. Crawford's letter (p. 78) to the effect that Mr. Official Photographer, C. D. Arnold by name (very glad to take pictures, &c., against pay, &c.), does not even answer my inquiry to effect. Personally I have written three times to him without being able to obtain an answer, my first letter dating November 12 last. The above may prove interesting to other parties who may be tempted to ask Mr. C. D. A. for any reference or negatives.

By the way, Mr. Editor, what do you say to the American generosity towards allowing photographers on the Exhibition grounds? You were at the time very hard against French meanness in 1889. Let me remind you of the rules that existed then. Twenty francs, or 16*s.*, for one day's work, and no restriction to sizes or cameras—permission renewed if weather unfavourable, or 300 francs (12*l.*) for the whole time the Exhibition was open.—I am, yours, &c., ALBERT LEVY.

4, *Avenue Pinet, Asnières, Seine.*

P.S.—Is there any practical and easy way to wash film negatives after hypo, say, one dozen at a time, same as glass plates?

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

SEIKS.—We shall probably be having such an article shortly.

F. E. G.—The most suitable colour for the curtain would be a dark grey.

LUKE HEALEY.—Possibly one of the rapid types of lens would be the better for "all-round work."

KINNOUL HILL.—Your local gasfitter we should think could obtain an albocarbon burner for you. We do not know the cost.

GORDON PATERSON.—The specimens are very good, and we should think by their aid you would not have much difficulty in securing a position as improver.

CARPATHIAN.—A seven-inch is, perhaps, abnormally long in the focus for hand-camera work, but could be used successfully if the near objects are not too prominent.

PROFESSOR STENNING.—Presses for the Woodbury process are, we fear, not obtainable second-hand, but we will inquire. Thanks for your greetings; we reciprocate.

HAROLD GLASIER.—Messrs. J. J. Atkinson, Liverpool; Messrs. Holmes, Sadler, & Holmes, of Manchester; and, we believe, other dealers can supply you with the Air-brush.

J. HIGHFIELD.—Instruction in all branches of photography is given at the Polytechnic School of Photography, 309, Regent-street, W., and the fees are moderate. Write for particulars to Mr. E. Howard Farmer at that address.

HADLEY.—The euryscope has a larger aperture than the rapid rectilinear lens, and consequently works quicker. But it will not with its full opening cover so large a field with the same definition, nor will it possess the same "depth of focus."

W. A. T.—At pp. 790-2 of the ALMANAC you will find formulæ for sensitising albumenised paper, and for a hard negative varnish. Opalines may be obtained of most photographic dealers. Use gelatine or starch as the mountant.

G. PHILLIPS.—For the purposes of enlarging and reducing, the focal length of the lens is less material than its power of covering the negative to be enlarged or reduced. Either a single or doublet lens may be used—the latter by preference—for both purposes.

R. A.—Asphalt, such as that used for roadways, is not the kind used in photography. The right kind can be obtained at most photographic warehouses, and, for certain, at Hopkin & Williams', Cross-street, Hatton Garden. It is generally sold under the name of bitumen, and not asphalt.

W. B. SHERK (Waterloo, Ontario).—The Photographic Convention of the United Kingdom for 1893 will be held at Plymouth in the week commencing July 3 next. Full information can be obtained of the Hon. Secretary, Mr. F. P. Cembrano, jun., 10, Cambridge-gardens, Richmond, London, S.W.

M. D.—For such subjects as your desire an objective of somewhat longer focus will be best, say an inch and a half or two-inch power. The ordinary stand will do quite well if used in the way shown in the sketch. Extra rapid plates will not be necessary, unless with unusually opaque subjects.

ALLEGRO.—A studio built as described will answer very well, though we much prefer, particularly for groups, one of the ridge roof or the "lean-to" form—that is, with the vertical side-light and sloping roof. We do not know the addresses of any professional photographers who are working studios of the form referred to.

W. E. BRIGHT.—We have never seen a case of injurious action of hydroquinone on the skin. It is true that we have heard that it has a pernicious effect, but that is all. However, in working, there is no reason why the solution should come in contact with the skin if a little neatness and care be exercised in the manipulations.

STUDIO asks: "Is a studio with only a side-light (eleven feet high and about thirteen feet long) as useful and as easily worked with a satisfactory result with even lighting as the ordinary studio with top and side light?"—Yes, for single figures or studies, or groups of two or three; but for general all-round work the ordinary studio, with top and side light, is preferable.

HENRY JONES writes: "Will you kindly inform me how I can obtain information as to the composition of the mucilage placed on the back of postage stamps?"—The majority of the English and Colonial stamps are produced by Messrs. De la Rue, Bunhill-row. They may possibly supply the desired information if written to. We believe dextrine is the adhesive employed, with, perhaps, some addition.

ALFRED JACKSON.—1. Probably the spots are due to imperfect washing, and the negatives not having been varnished with a sufficiently protective varnish. 2. A lens of two to four inches longer focus would be better for inch and a-half heads than one of eight inches. 3. We have had no experience with that particular brand of plates. We should advise you to try the experiment yourself with a couple of plates.

ENGINEER says: "Could you tell me if any large firms of engineers keep photographers? If so, must they understand engineering, and what branches of engineering would they be required to know?"—We believe many engineers employ their own photographers. Probably a thoroughly good knowledge of practical photography would be more useful than an acquaintance with engineering, although the latter would be no disadvantage.

F. MACKENZIE writes: "With a pair of lenses of portrait type, such as stereographic, is it necessary to retain the hood when they are being used, or can they be used without it successfully? If not, when using a Thornton-Pickard shutter, could it (the hood) be dispensed with?"—A Thornton-Pickard shutter could be used with the hood, and for non-shutter work they may or may not be dispensed with, according to the position of the sun.

R. E. T. says he has some sensitised opal plates that work very well up to the time of washing, then they commence to frill. He says the washing is nearly, if not quite, completed before the trouble commences.—The remedy we should suggest, as the trouble does not begin until the major portion of the "hypo" is removed, is that before the frilling point is reached the plates should be immersed in a solution of alum, and the washing then completed.

S. HARDY.—Eikonogen, hydroquinone, and ferrous oxalate are all good developing agents, but they do not suit some persons' working and their taste so well as pyrogallic acid. With regard to amidol, the same may be said. We produce good work with every one of them. Why not try them all for yourself instead of being confused with other people's ideas? A little experience is far more valuable than a great deal of "hear say" in practical matters.

J. HAMILTON asks: "Would you be so kind as to inform me the best method of making enlargements on artists' stretched canvas for painting in oil? I do not want to take canvas off stretcher, if possible."—The most satisfactory processes for producing photographs on canvas are the carbon and the dusting-on processes, as they yield permanent results. In either case it will be necessary for convenience in working to take the canvas off the stretcher and replace it when the photograph is finished.

R. GODDARD says: "Would it not be an advantage and an improvement if we had tinted glass covers for lantern transparencies, say, shades of green, blue, yellow, purple? The eyes would then aid the imagination. The public are tired of the monotony of the cold, unpainted slide; they want warmer tones, and the various solutions offered for this purpose are a very doubtful success."—Such tinted glasses have long been articles of commerce, although they are not used as cover glasses, but as supplementary glasses.

A. E. NODES.—It is impossible for us to give any opinion as to whether you have or not received full value for the residues you sent to the refiners. The weight of the residue is nothing to go by; it is the amount of silver that it contained that has to be considered. We have frequently described how residues should be treated for sending to the refiner, and also for estimating their value. Where these directions have been followed we have never heard of any dissatisfaction with the returns when the waste has been sent to a respectable refiner.

OTHELLO says: "I have a cabinet portrait lens, no name, but apparently of French manufacture, which, use how I will, will not give a clear negative. The camera used I have ascertained to be perfectly light-tight; in short, it works all right with other lenses; but when this portrait objective is put in, the image on the ground glass is misty and the negative slightly fogged, even if under-exposed. I have tried screening from studio light, but with no effect. Can you suggest the cause?"—No. Send us the lens, and we will endeavour to ascertain why it will not give a clear negative.

T. W.—I. The lens with the medium focus will be the most useful for general purposes. A wide-angle lens should never be employed except in cases of necessity, such as when the amount of subject required cannot be obtained with a longer-focus instrument. Wide-angle pictures are usually unpleasant on account of their violent perspective. 2. For copying purposes a camera focussing from the back will be far more convenient than one focussing from the front, as in the latter case the front conjugate focus is altered with every movement, which makes accurate focussing extremely inconvenient.

OMEGA complaints that, a few months ago, he engaged a canvasser for club work. He says: "He offered to come and work the thing entirely on commission. I agreed to this, and paid him a much higher percentage than would have been the case had he had a weekly salary. He left abruptly last week, and I do not know where he has gone. I now find that he has taken several subscriptions, and not accounted for them. The police say it is not a case for them. What can I do?"—The only thing is to find the man and sue him in the County Court—that is all. Had the man been paid a salary, however small, he would have been a servant, and could be prosecuted for embezzlement.

WATERPROOF says: "I have a quantity of *carte-de-visite* mounts which are waterproof, and I cannot get the prints to adhere to them with ordinary mountants, such as starch and gelatine. After the prints are dry they peel off quite clean. Can you recommend a good mountant—one that will not cause the prints to fade? I can manage all right with thin glue, but am afraid to use that."—If our correspondent can succeed with thin glue he will succeed equally well with thin gelatine, provided the gelatine be similar in physical characteristics to the glue. Such a gelatine is Nelson's "No. 2 soluble," or Cox's soup gelatine. Both these gelatines may be accepted as having no injurious action on the photograph. With common glue this is not the case.

QUÆRO says: "I have recently been much troubled from spots (see enclosed print), caused by dampness in the sensitised paper when in contact with the negative during the process of printing. I notice some brands of paper are much more given to this fault than others. Is there any known process whereby I can remove these spots from the negatives, or are they entirely spoilt for further use? Any information will be thankfully received."—Several methods have from time to time been suggested in the back JOURNAL and the ALMANAC, though in some cases they have not proved altogether successful. Some little time ago Mr. H. N. King, in our pages, announced that he would restore any negative sent to him, gratuitously, to illustrate a method he had devised. Better communicate with him.

STEREO writes: "Can you tell me what should be the appearance of an albumen transparency plate after sensitising? After reading Mr. Hodges' description of the process, I have been trying to produce them, and, after following out the instructions which he gives in his *Lantern Slide Annual* most minutely, I have not been able to get more than the merest ghost of an image, after considerable forcing and very prolonged development. The exposure I gave was ample, and I am certain the fault is not there. My plates, when ready for printing, are quite transparent, like clear glass. Should this be so? I notice the developer that Captain Abney gives for practically the same plates contains fifteen times the amount of pyro that Hodges' does."—The appearance of an albumen plate after sensitising is opalescent, but much less so than a wet-collodion one. With the albumen process there should be no difficulty in obtaining any degree of density. The albumen process is a slow one, and it therefore requires a long exposure. The development is also a slow operation. We now refer to the albumen process such as that which has been frequently described in our columns and in the ALMANACS.

MESSRS. FUERST BROS. inform us that they now sell metol as well as amidol.

PHOTOGRAPHIC CLUB.—February 15, *Home-made Apparatus.* 22, Monthly Lantern Meeting.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The Annual General Meeting will be held at the Society's rooms, at eight o'clock, on Tuesday, the 14th inst.

WEST LONDON PHOTOGRAPHIC SOCIETY.—February 14, A Paper on *Art and Photography*, by Mr. A. Horsley Hinton, President of the Holborn Camera Club.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION. — February 16, *Demonstration of the Air Brush*, Mr. W. H. Harrison. 23, Annual Musical and Lantern Entertainment, Mr. J. Traill Taylor in the chair.

NORTH LONDON PHOTOGRAPHIC SOCIETY.—The meetings for February and March are:—February 21, Lantern Night. March 7, *Photo-lithography*, by Mr. A. E. Smith. 14, Special Lantern Night in Reading-room.

MESSRS. O. SICHEL & Co. write us to say that, although they have opened show-rooms at 47, Oxford-street, for the convenience of their customers, they have not removed from their old address, 52, Bunhill-row, to which all communications should, as hitherto, be addressed.

AFFILIATION OF PHOTOGRAPHIC SOCIETIES WITH THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The first of the lectures and demonstrations by Mr. Denison on *Photogravure* will be held on Friday, the 17th inst., at Bloomsbury Hall, Hart-street, Bloomsbury, W.C., at eight o'clock.

WE have received from Messrs. Arthur Schwarz & Co. samples of Dr. Andresen's diamidophenol. We shall take an early opportunity of testing its developing power.

TOOTING CAMERA CLUB.—Next meeting, February 19, Lantern Night. It has been decided to change the headquarters to Upper Tooting, and the temporary place of meeting for this night will be at the Bell Coffee Tavern, Upper Tooting, when photographers residing in the district will be welcome.

ARRANGEMENTS are in active progress for the holding of an important local exhibition by the Croydon Camera Club, at the Braithwaite Hall during Easter week, to be open during five days and evenings. Prospectuses will be out during the current week. Applications for space for showing apparatus, &c., and for terms of advertisements in catalogues, should be made to the Hon. Sec., G. R. White, 55, Albert-road, Croydon.

THE Annual Exhibition of the Dunedin (N.Z.) Photographic Society took place in November last. The Society was joined this year, as last, by the Nelson Camera Club, who sent a nice collection of pictures, chiefly in bromides and platinotypes. The total number of exhibits was smaller than before, but the quality of the pictures shown was higher. The plan tried of two societies exhibiting together had been found to work well, not only in making a better display, but also in creating a fraternal feeling between societies in different parts of the colony.

ANNUAL DINNER OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN, Captain W. de W. Abney, C.B., R.E., F.R.S., President, in the chair.—The Fifth Annual Dinner of the Above Society will take place at the Café Royal, Regent-street, on Monday, February 13, 1893, at half-past six. The whole of the Council, as far as possible, will attend, and ladies will be cordially welcome. After dinner there will be music, songs, and recitations. Tickets 6s. each, for which an early application is requested, may be obtained of Mr. W. England, 7, St. James's-square, Notting Hill, W.; Mr. Bayley, Assistant Secretary, 50, Great Russell-street, W.C.

WE learn from the "Foreign Notes" of a New York contemporary that the *Amateur Photographer* has started a Lantern Supplement, and that THE BRITISH JOURNAL OF PHOTOGRAPHY, "not to be too far behind the times," also publishes a similar supplement. This comes of our transatlantic contemporary drawing his inspiration from a tainted source. As a matter of fact, the Supplement idea originated with this JOURNAL three years since, although we suffered it to lie *perdu* until recently, and even then it was the first to carry it into effect. Our New York friends must select an "historian" possessing, at least, a reasonable amount of historical honesty.

WE are sorry to learn of the death of Mr. G. M. Whipple, Superintendent of the Kew Observatory. The deceased gentleman had a distinguished scientific career, and his connexion with the chief meteorological observatory in the country dated from 1858. He had made important contributions to the study of solar physics, the determination of wind force and velocity (a still only partially solved problem), assisted in a series of pendulum experiments to determine the force of the earth's gravity, and contributed to the Royal Meteorological Society a large number of valuable papers on rainfall, cloud photography, and kindred subjects. The magnetic part of the report of the Royal Society on the Krakatoa Eruption and subsequent phenomena was written by Mr. Whipple. He was only fifty years of age.

THE following are the Judges' awards at the exhibition of the Photographic Society of India, held in Calcutta a few weeks ago. It will be observed that many very well known pictures by English exhibitors secured recognition:—Class 1, Landscape, Architecture, Interiors: Amateurs—Gold medal, Mr. T. M. Brownrigg, *Evening, Derwentwater.* Silver medals, Captain Bullen, R.E., *Foot of Kedarnaeth Glacier, Gangutri;* Mr. J. E. Austin, *Winter;* Mr. Sub-Conductor O'Neill, *In the Timli Pass.* Bronze medals, Mr. M. V. Portman, *Interior of an Edible Birds' Nest Cave, Andamans;* Dr. F. Noetling, *Frescoes in a Pagoda at Pagan, Burma;* Mr. A. R. Dresser, *Meeting of Conway and Lledr Rivers;* Miss M. Watson, *Vallombrosa, Tuscany.* Professionals—Viceroy's medal, Messrs. Johnston & Hoffman, *Peaks N.E. of Simlolchu.* Silver medals, Mr. F. P. Cembrano, *A River Fog;* Mr. W. Bedford, *Salhouse Dike;* The Autotype Company, *Alpine View.* Bronze medal, Shrinivas Madadeo & Son, *Six Silver Prints.* Class 2, Portraits and Groups: Amateur—Silver Medal, Mr. C. B. Moore, *Groups of Three Little "Nips."* Professionals—Silver medal, Mr. R. Hotz, *Group of Children.* Bronze medals, Mr. W. W. Winter, *Blushing Sixteen;* Messrs. F. Kapp & Co., *Set of Window Transparencies.* Class 3, Genre Pictures and Studies: Amateurs—Silver medals, Surgeon-Captain A. G. E. Newland, *Life and Scenes on the Chin Hills;* Mrs. S. Francis Clarke, *"Aha!"* Bronze medal, Mr. S. Francis Clarke, *The Seven Ages of Man.* Professionals—Gold medal, Shapoor N. Bhedwar, *Consecration of a Parsee Priest.* Silver medal, Mr. E. Scamell, *Series of London Street Cries.* Bronze medal, Mr. S. C. Sen, *Noon-day.* Class 4, Photographs of Objects of Motion: No awards. Class 6, Photo-Mechanical Processes: Professionals—Gold medal, Mr. R. Panlussen, *Pferdemarkt.* Bronze medals, the Typographic Etching Company, *Specimens of Photogravure;* Mr. W. L. Colls, *Specimens of Photogravure.*

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1711. Vol. XL.—FEBRUARY 17, 1893.

THE EYE AND THE CAMERA.

The ever-recurring analogy of the human eye and the photographic camera and lens is always of so much interest that no apology is needed before bringing to our readers' notice recent discoveries in optical science in which the resemblance between the two is shown to be still more close. In the eye we have four transparent optical media through which the rays pass to form an image on the retina; in the photographic analogue we have media which equal, exceed, or are less in number, according to the construction of the lenses. The eye has, first, the cornea; next the aqueous humour; after that the crystalline lens; and, finally, the vitreous humour, immediately behind which the image is thrown. In our apparatus, the work of man, we have crown glass or its equivalent; flint glass, the latter possibly of more kinds than one; and, finally, in the interior of the camera, atmospheric air, which corresponds to the vitreous humour. The sides of the camera itself correspond to the walls of the eyeball. Whether influenced by a knowledge of the construction of the eye or not we cannot say, but the makers of our early cameras gave them black walls, just as the eye has. Two most important differences, however, are to be seen in the two cases. In the camera the surface which receives the image is separated from the chief curved refracting media by air, the index of refraction of glass into air being very much greater than from the crystalline lens into the vitreous humour, an entirely different series of refractions taking place in consequence. There is no doubt that if there were practical means of carrying such a system out in photographic work, some remarkable results would be obtained. The second difference to which we would draw attention is one which, if earlier observed, as were the darkened walls, would have led to a better appreciation of a still much-neglected point. We are not aware that attention has been drawn to this remarkable and valuable provision as a still more extended analogue to the "backing" of the sensitive surface with black pigment (over all, except one spot). The retina, which receives the image, is transparent, as is our photographic plate, and reflections which would mar the delicacy of its perceptions are by this backing provided against. It is true that a minute area is not so provided; but, as the inner surfaces are curved, the effect of the circumjacent non-backed retina upon this central spot may be readily imagined. It is thus seen that a due study of the eye would have provided a skilled inventor with effective modes of treating our photographic instruments, one, at least, of which modes was not adopted for years after the advent of photography.

We are now come to a point which will enable us to more fully understand the most recent aspects from which we are taught to regard the eye. When flare spot was investigated, and its cause discovered, no one drew attention to the fact that the eye also had its difficulties to contend with from internal reflections; but, as a matter of fact, at the beginning of the present century, Purkinjie described four different kinds of these reflections that he had seen himself, though, of more modern investigators, Helmholtz and others were only able to discern three. These reflections are not the Purkinjie figures described in most works treating of the eye, and caused by shadows from overlying blood-vessels thrown upon the retina; but are distinct images of such an object as a lighted taper, exactly like what is seen in a photographic lens when held between the eye and a spot of light. These three reflections can be seen if two persons hold a lighted taper between their eyes, and, moving it to and fro, so that the reflections appear to come from the pupil, which, as we need scarcely explain, is not a black substance, but merely a hole—an exact diaphragm in fact—in the iris (hence our "iris diaphragms"). The brightest image is formed from the front surface of the eye, and the other two come from the "lens" and the hindermost medium (the vitreous) respectively. The fourth reflection requires the greatest skill in searching for. It arises at the back surface of the front medium, the cornea, and will be seen by observing the brightest image with a magnifying-glass. When this latter is caused to leave the centre of the pupil, there will be seen, between it and the centre of the pupil, another small, pale, clearly marked image, which makes four reflections.

It has always been pointed out that the fewer the reflecting surfaces in a lens the quicker it will be. In a single lens 92 per cent. of useful light is obtained; but the eye gives 97. The internal reflections into a camera, say, in the case of a single lens, amount to one-sixth per cent., but to the eye to not one-eightieth of that amount! But at last even this small amount of reflection has been observed in two distinct phases. This makes six reflected images now perceivable in the eye, and a seventh was expected to be visible. It was found in an artificial eye, but not in the living organ; the amount of available light in the eye swamps this image.

In conclusion, we may continue the analogue by pointing out that, as the lens-maker carefully examines in every instrument he makes the way the various images of a spot of light behave in different positions of the lens, and so knows whether the components are duly "central," so an examination of the images in the living eye enable the physican to discover when anything is wrong with its interior optical media or surfaces. It is thus seen in this brief survey how much that is valuable in

photographic practice is indicated by a study of the eye. Is it too much to anticipate that even yet it may be found to point out further improvements in optical construction or the application of optical principles in photographic technics?

PHOTOGRAPHING HORSES.

On more than one occasion of late, photographs of horses have been sent us by correspondents, for various purposes, which have seemed to us so unsuccessful in the rendering of the equine subjects, both as likenesses and as technical representations illustrating the principal points of the originals, that we have thought it opportune to devote a brief article to the subject, in which branch of their profession most photographers at some time or other will probably have found themselves engaged. Without pretending to the possession of any trace of "horsiness" ourselves, we can at least appreciate the circumstance that, as in the portrayal of the human species, something more than hap-hazard or chance is demanded at the hands of the photographer before a favourable result can be expected.

We cannot possibly do better than indicate at once in general terms the character of the equine photographs we have recently seen, and which we will take as displaying to a singular degree of perfection the very worst way in which the friend of man should be photographed. The animals have been taken against such backgrounds as stable doors and the sides of houses, and so that only the near fore and hind legs were visible in the photographs, while the animals' heads were drooping, the ears turned backwards, the positions betokening listlessness of demeanour, and vouching so little on behalf of the animals' spirit and character, that we can quite imagine to the eye of an horse expert the photographs conveyed far from a favourable idea. What we here say applies, we have observed, to racehorses, carriage horses, and even to the simple Dobbin of the tradesman's cart.

Captain Hayes, a distinguished authority on the horse, and whose photographs of that and other animals, which have been recently shown at the Polytechnic Institution and some of the photographic societies, attest the possession of a very high degree of photographic skill, which we can confirm from personal inspection of them, gives some simple directions for the photographing of horses which may be so useful to photographers that we make no apology for here alluding to them. That gentleman, if we take him aright, recommends that a horse should, where possible, be photographed away from his habitual surroundings, such as his stable, for the reason that when near home his condition is largely influenced by his environment, so that his bearing and attitude are of a *dégagé* character, and therefore not entirely favourable to the display of his best points. Captain Hayes says that when a horse is in a strange place he is all agog with curiosity and alertness and the excitement engendered by novel surroundings, a condition which is the most suitable for obtaining an animated portrait of him.

In this interested and excited condition the animal's ears are well placed forward, the curvature of his outlines is at its most natural rendering, and possibly the four legs are so placed on the ground as to impart a realistic air to the animal. The horse should be photographed, according to Captain Hayes, against the sky-line in profile—and broadside on. Other authorities, however, unite in recommending the picture to be taken slightly in perspective. Both methods, doubtless, are excellent for securing a likeness, but we should incline to favour that of Captain Hayes, where it is sought to secure an animated picture and to show the dominant points of the animal, although possibly the latter, from the standpoint of picturesqueness as understood by artists, has something to recommend it. In any case, however, it is seldom that a satisfactory picture of a horse taken "end on" can be obtained. We recommend this consideration to the attention of the numerous amateurs who are fond of including sheep and cows in their pictures. Such animals, taken end side on, often have a grotesquely squat appearance.

It is, we believe, at times difficult to get a horse to stand so that his four legs are placed in such positions as to show separately in the picture taken broadside on. Too many photographs of horses portray the animals, as it were, standing on two legs only, on account of the photographer having an insufficient conception of how the portrait of a horse should be taken, or possibly of a lack of the necessary patience to secure a suitable attitude. Hence, as short exposures as practicable are to be recommended, a condition of things which, with a stand camera, necessitates a very rapid lens and plate and a quick shutter. Captain Hayes, we believe, works with a twin-lens hand camera.

In the foregoing we are alluding less to horses in rapid motion than in the comparative repose of the paddock the field, or the stable-yard, our remarks not being intended to include horses racing or jumping, although there is a certain parallel throughout. Farm subjects including studies of the placid animals usually to be found therein, necessarily should engage special attention on the part of the photographer towards the horses, as well as to the two-legged figures in the picture.

Few photographers have the skill of getting a horse to stand as they would wish him to, and therefore the use of a hand camera is all the more to be recommended, having regard to the ease with which subsequent enlargements may be made. As regards the backgrounds, the sky is, of course, less suitable for grey horses than for those with dark coats, as the outlines might not appear so sharp as they really were, and in that case a mass of trees, or even the side of a house, offers no objections. Now and again a single horse may be found so tractable as to allow of an exposure by means of a cap being given, but where several horses are to be included quick shutter exposures are indispensable. The variety of movement in which they indulge can only be appreciated by the photographer who has to wait till they are still before removing the cap from the lens.

AMATEURS' BACKGROUNDS AND ACCESSORIES.

I.

There is probably no point in connexion with portraiture to which amateurs, as a rule, give less attention than to the background, although, as every observant individual must agree, nothing contributes in a greater degree to the final effect in the picture. It is a pet theory with many of the class that amateurs' portraits are "so much more natural," because they are usually taken under more home-like conditions, and without the conventional surroundings of the regular professional studio. But it is possible to take an exaggerated view of the supposed advantages referred to, and by carelessness allow what might otherwise be an artistic portrait to degenerate into the commonplace.

Reviewing the various styles of portraiture that have prevailed since the earliest days of photography, we shall find a vast difference in their general character at different periods. Take, for instance, the Daguerreotype of forty years ago or more, and we have to chronicle an almost entire absence of accessories of any kind, the style of picture at that time, and for some years later, consisting chiefly of busts, or at most half-length sitting figures, in which there was little room for the introduction of anything in the shape of furniture or ornament. But with the advent of the *carte-de-visite* there came an entire change, and with balustrades, pedestals, bookcases, pianos, and similar accessories, solid or sham, together with curtains and painted backgrounds in every possible style of subject, the actual portrait frequently had to take a very subsidiary position in the picture.

The next change was in the direction of more artistic lighting, and with cabinet and larger portraits came "Rembrandt" and "Salomonesque" effects, and a partial return to the simple style of earlier years. It would be difficult to say what is the "prevailing" fashion at the present day, for while accessories of various kinds, as well as scenic backgrounds, are just as much used as formerly in certain classes of portraiture, though perhaps with more artistic taste, we have also a wide choice between the plain vignette or bust and the home portraits and family groupings that have become so fashionable in recent years. It is in the latter direction, indeed, that modern photographic portraiture is surely tending, owing to the ease with which the exposures may now be made in ordinary rooms, or without the necessity that formerly existed for a specially glazed studio.

Home portraits, as we usually understand them, are such as are actually taken at the home of the sitter, though there are professional portraitists, both in this country and on the Continent, who make a feature of this style of picture in studios specially fitted for the purpose. Whichever plan may be adopted, however, it is certain that the professional will suit his background and accessories to the immediate requirements of the case, and not leave the portrait to take its chance amongst incongruous surroundings; the amateur, on the other hand, is too apt to take things as he finds them, and, for want of a little thought and management, to produce work that were better left undone, when it might almost as easily have been of a totally different character. How often, for instance, do we see home portraits, or those taken in an ordinary room, well lighted and posed, and possessing all the characteristics of naturalness, and yet entirely spoilt by the obtrusion of some article of furniture very much out of focus, filling up a portion of the background. Or it may be that the blurred pattern of an elaborate wall paper draws the attention away from the portrait, or the latter is perchance half lost in a mass of total darkness.

Again, in the case of outdoor pictures or groups, it is seldom that a due amount of care is taken in arranging the figure or figures so that the surroundings harmonise and form anything worthy of the name of picture. Beyond placing the sitter so that a fair amount of light may fall on him or her, no further care seems to be considered needful, and the backgrounds may be composed of shrubs, foliage, and brickwork in happy confusion. Such a rendering may be natural in one sense, but it lacks the *ars celare artem* necessary to make it artistic. It is not, of course, everywhere possible, even with the best efforts, to bend the surroundings to the artistic will, and where such is the case it is, in every sense, preferable to relinquish the attempt, and to substitute a plain and unobtrusive background which will, at least, leave the portrait to stand upon its own merits.

We by no means wish to decry the practice of utilising the natural surroundings, either indoors or out, where they can be artistically combined in the formation of a picture; but what we do counsel is the exercise of judgment. Thus, perfectly natural and, perhaps, artistic full-length portraits may be made by posing a standing figure in front of the fireplace, or a sitting one at a table, or *escritoire*, or even beside a window; but to take a mere head and shoulders under similar circumstances would be little less than ridiculous. In like manner, a natural and pleasing group may frequently be made with available outdoor surroundings if a little attention be given to common sense and perspective; but to see three or four figures cut off at the knees or waists, posed against a background of climbing foliage, is neither natural nor artistic.

The Free Portrait Case.—The Treasury appear to be sparing neither time or money in the prosecution of the man Gould in this case. Witnesses are being brought from all parts of the Kingdom to prove the extent of the fraud. The case was first brought before the Folkestone magistrates on December 30, and weekly ever since. A layman might have expected that such an expenditure of time was scarcely necessary in a matter of this kind, but the lawyers evidently have a different opinion.

Difference of Opinion.—It is curious, at times, to note the diverse opinions that different persons may have on the same subject. The scientific world has been pretty unanimous in opinion as to the utility of Herr Anschütz's clever invention, which is now on view in the neighbourhood of Charing Cross. But this idea is not shared by every one, as the following remark by one lady to another overheard outside the place in the Strand the other day. "It's a show of pictures of moving figures. It's awfully stupid." It is quite possible that if what the exhibition were intended to illustrate were made more prominent it would be the better understood by the general public.

"A Novelty?"—An evening contemporary informs its readers that, by an ingenious process of engraving, practised in Germany, a subject can be drawn on a plate of zinc, which is covered with a layer of bitumen, either by the artist or by photographic means, then plunged in a bath of diluted acid. The acid then attacks the metal, and in a few minutes sufficient depth is obtained. Our contemporary adds that the process is already seriously affecting working engravers. Apparently it is not aware that the majority of blocks used in illustrating the daily and weekly papers are produced in this way, and have been for years past. Possibly some few of its readers may think that some new invention is referred to.

Sale of Poisons.—Some little time ago we referred to a crusade the Pharmaceutical Society had made against grocers for selling patent medicines containing poison—Dr. Collis Browne's Chlorodyne to wit—under the Pharmacy Act. The decision of the County Court Judge, which was in favour of the Society, was appealed against, but the appeal was, last week, in the Court of Queen's Bench, dismissed with costs. Leave was, however, given to take the case still higher, namely, to the Court of Appeal. As we have said before, photographic dealers who are not pharmaceutical chemists should be careful whom their assistants supply with the prohibited articles, as the Society occasionally become very energetic in asserting its privileges.

Photographing at the Chicago Exhibition.—After all the murmuring about the two dollars a day and other restrictions as

to taking photographs at the Show, it now appears that these terms only hold good up to May 1, or while it is in a more or less chaotic state. After that date they will not obtain. It is announced that the "official photographer" will take pictures to order at stated prices. Those who have been protesting against the two-dollar impost when they imagined the Exhibition would be in "full swing" are now given to understand that the privilege of photographing on those terms will be withheld. Of course our American friends can make what conditions they choose, and others may think what they like about them.

Combustion of Magnesium Powder.—At a recent meeting of the Photographic Society of Philadelphia a condition in connexion with magnesium powder that is frequently overlooked here was alluded to—namely, its dryness. If the powder contains moisture, it is obvious that its ignition will be retarded, and many particles when projected through the flame will often escape combustion, with a corresponding loss of light. It was also pointed out that moist breath blown through the lamp would sometimes cause dampness of the powder. There is yet another cause which impedes the combustion of magnesium, namely, oxidation of the metal itself. When its surface is coated with a layer of oxide a greater heat is required for its ignition than when it is bright. For this reason the stock of powder should be, as much as possible, protected from the action of the atmosphere by being closely pressed into well-corked bottles.

Patent Law Reform.—Mr. Leng, M.P. for Dundee, has recently been in correspondence with the President of the Board of Trade on the subject of the granting of patents. In it Mr. Leng directed attention to the fact that, when a patent was applied for, no information or notice was given to the applicant, even if there were a score or more patents already in existence that would cover the supposed new invention. He suggested that this country should follow the system carried out in the United States, Germany, and some other countries, of making an official examination before the patent is issued. Mr. Mundella, in his reply, says that the proposal would involve a radical change in the principle and policy of the patent laws; but the suggestion should receive "careful consideration"—the usual stereotyped phrase. If the member for Dundee's idea were carried out, there is no question that the receipts of the Patent Office would be considerably reduced, and its profits lessened; still, when it is considered that in America a patent for seventeen years, with a certain kind of guarantee that the thing has not been patented before and therefore the patent is valid, for about 7*l.* 10*s.*, between 90*l.* and 100*l.* seems dear for a British one for only fourteen years, that may be absolutely worthless through the invention having been patented previously. We have no hesitation in saying that, if an examination of specifications were made, the number of patents now granted in connexion with photography would be materially curtailed. With an examination of specifications one abuse of patents would be checked. Patents are often now taken out which the patentees know quite well are not valid through the invention being old. They thereby obtain a fictitious monopoly, which others imagine is really genuine, while the invention is public property.

The Eight Hours a Day in Photographic Establishments.—Messrs. James Valentine & Sons, the well-known photographic publishers of Dundee, recently issued the subjoined notice to their *employés*:—"Notice. Alteration of working hours. We have been considering the hours of employment, and have decided to institute a forty-eight hours' week for all our *employés* at Perth-road, Dundee, and Baldovan, the week's work to be arranged as follows: Mondays, 8 a.m. till 5 p.m.; Tuesdays, 8 a.m. till 6 p.m.; Wednesdays, 8 a.m. till 5 p.m.; Thursdays, 8 a.m. till 6 p.m.; Fridays, 8 a.m. till 8 p.m.—dinner hour as usual on these days; Saturdays, 8 a.m. till 1 p.m. We do not intend to reduce wages, as, with the co-operation of our *employés*, we believe it possible to fully maintain the same production as under a fifty-two hours' week. We propose to give this scheme a fair trial for six months from this date (February 9), when, should our anticipations not be realised, it may be found necessary to reconsider the matter. We, however, hope that our *employés* will unanimously endeavour to make the movement a success by prompt commencement of work daily, and continued attention to it during the hours specified. As the success of the scheme depends entirely on the diligence of every *employé*, it must be distinctly understood that any idling or negligence may cause the instant dismissal, without warning, of any *employé*. Trusting that this proposal will meet with your hearty approval," &c. The local papers applaud the action of Messrs. Valentine, and a few nights ago, at a social gathering of the firm's *employés*, the introduction of the eight hours a day was acknowledged in terms of the highest thanks by representatives of the latter, one of whom stated that the establishment of Messrs. Valentine was steadily progressing year by year, and in regard to the latest movement—that of working a forty-eight hours' week—which was no small matter where about 230 persons were employed, he thought they ought to assure Mr. Valentine by a hearty round of applause that they meant to make it a success. We congratulate Messrs. Valentine on their enlightened enterprise, which we hope will prove as successful as they wish, and will be imitated by other large photographic firms throughout the country.

RAPID SOLUTION-MAKING.

In the pages of this Journal for February 3 will be found an illustration of an apparatus for the rapid making of solutions, which embodies a plan I have had in use in my laboratory for some years past, and which I can speak of in the highest terms. It is described in an article from my son's pen in The British Journal Photographic Almanac for this year, where full details of its usefulness and manner of use will be found. Those members of the Convention who did me the honour to call upon me during the Chester meeting will remember the apparatus, if such a name can be applied to so simple a contrivance. I do not remember when Mr. Ayres, as referred to by the Editor, described such an arrangement; in my own case the invention was spontaneous. We all know "great minds think alike!" doubtless in our cases the invention was original, whichever can claim priority of publication. The purpose of this brief memorandum, however, is not as a reclamation of priority, but to again draw attention to a plan of extreme usefulness for lightening and facilitating the monotonous routine work of making stock solutions. It may be stated that, apart from the special apparatus described a fortnight ago, there are already on the market the necessary utensils, in the shape of the perforated receptacle for the crystals, and the jug or jar for holding the liquid. The former, as used in my laboratory, is made at the Lambeth Potteries (and very probably at other manufactories where chemical utensils are made); it is known as a "perforated dipping basket." In Doulton's pattern the means of suspension is a handle, like that of an ordinary basket, made in one piece with the vessel itself, and the buckets can be had in all sizes, from a capacity of one pint to one gallon.

A very important matter in the jugs employed, when used for "hypo," is to obtain one the glaze of which will not give way to the action of that chemical. The ordinary jugs for domestic and culinary work are useless after a time, and I have found that the common salt-glazed red ware most commonly obtainable at the dealers in sizes of a gallon or upwards will begin to leak in a fortnight's time. At least, that has been my experience, and I had several of them before finally adopting the kind I now employ, each holding three gallons, and which have been in daily use for several years. These latter also are of Doulton ware, sold as "acid jugs." Of course porcelain could not be excelled for the purpose, but for large jugs its price would be prohibitive, and even for the dipping basket itself, unless of diminutive proportions, the cost of real porcelain would greatly exceed that of stoneware.

I need scarcely remind my readers that, without any intention of deceiving the public, many of the utensils for photographic use sold under the name of porcelain are not porcelain at all—dipping baths, dishes, &c.—and their glaze quickly gives way under the action of ordinary chemicals. G. Watmough Webster, F.C.S.

AMERICAN NOTES AND NEWS.

Positives Direct.—Mr. Charles W. Weatherwax writes to the American journals: "I have discovered a simple solvent for metallic silver, and beg space in your valuable journal to acquaint your many readers with a very simple and practical way of making positives direct in the camera. I will not enter into a discussion on the reversal of the image, but give my method as follows:—*First*, expose the plate in the usual manner. Develop with—

No. 1.

Sulphite of soda (crystals)	3 ounces.
Eikonogen	1 ounce.
Hot water	45 ounces.

No. 2.

Sal soda	4 ounces.
Water	15 „

To develop, take of—

No. 1	3 ounces.
No. 2	1 ounce.

When the negative is almost developed, expose it to daylight, keeping it well covered with developer. In about thirty seconds you will see the change from negative to positive. Wash and fix in the usual manner, and you will have a well-defined positive." We should like to see this experiment duplicated and confirmed, if only to establish the fact of an alkaline developer being a "solvent of metallic silver."

To Prevent Silver Stains.—Mr. J. Heygessy, in the *St. Louis and Canadian Photographer*, who had tried many remedies for preventing silver stains without success, says that one day, being in a hurry to get a few prints from a negative, he noticed silver stains spreading all over it save where the retouching medium had been applied. Ever since then he has rubbed the medium over the entire negative, and has tried every way to produce silver stains upon rejected negatives, purposely making the paper damp, but cannot do so Any medium having turpentine for its base answers the purpose.

Sunday Work in the States.—*Anthony's Bulletin* says: "Hereafter Boston photographers are forbidden to work on Sundays. This will be a serious loss to certain of them who do a larger business on this than on any other day. It seems that the law regarding Sunday work has long been in existence, but had practically become a dead letter. All this is to be changed, as the Chief of Police has expressed his intention of strictly forcing this regulation."

A Convertible Camera and Photograph Exhibitor. A recently patented invention in the United States is a convertible camera and photograph exhibitor, by means of which negatives may be taken and the pictures, after being printed on suitable material, such as sensitised film, to produce transparencies, reinserted into the camera and viewed under transmitted light, in the camera, through a lens in the camera case. The device is designed to afford not only a good camera, but also means for magnifying and inspecting the finished photographs, and is preferably made so small as to be conveniently carried in the pocket.

"As Others See Us."—The editor of the *Photo-Beacon* (erstwhile the Chicago *Beacon*), in the course of an appreciative article on "Prints on Rough Paper," remarks: "The so-called impressionistic photography was unfortunate in having for its godfather a man steeped in egotism, and whose language was as intemperate as is that of a temperance lecturer, and consequently both he and it were simply laughed at by all but a very few. As nothing kills so quickly as ridicule, the disciples of the then-called "fuzzy" school had a hard fight to make their way, and not indeed till their self-constituted leader, disgusted at not being appreciated according to his own idea of his merit, turned his back upon photography, did they get anything like a patient hearing." Dr. Emerson will chuckle at reading this, we are sure. We hope to find, when he reads his paper next month at the Great Britain Society, of the council of which he is now a member, that he has *not* turned his back on photography, as the *Photo-Beacon* has it.

American Photographic Societies.—A writer in an American journal claims that there are about 100 photographic societies in the United States, and the editor of *Wilson's Photographic Magazine* (the appearance of which in its new dress is exceedingly attractive and quite up to date) interjects, "More than that." Assuming that there are 120, we in Great Britain, with not much more than half the population of the States, have between 200 and 300 societies.

ON THE PRODUCTION OF BLACK AND WHITE NEGATIVES BY MEANS OF ARTIFICIAL LIGHT.

II.

In a former article I described a convenient method of using the Argand burners as a means of lighting the subject, and mentioned that a very effective set of reflectors were those made of plaster of Paris, in form almost similar to such as are in use on microscope lamps. These reflectors are not to be had in the market, so a worker must spend some little time and trouble in making them for himself; but such trouble will be amply repaid by the after pleasure of working with them.

Procure from some stucco shop about three pounds of pure white plaster of Paris (make sure it is pure white), for frequently samples having a distinctly pink or yellow tint are supplied as white; and having got this, next procure a large lump of common clay, work it up by the hand until it is nice and soft. Next procure two pieces of thin cardboard, or very stiff paper will do, and proceed to roll one of them into a tube, one inch larger in circumference than the glass funnel of the Argand burner; the length of the paper tube should be about as long as the funnel. With the other piece of cardboard make another tube about one inch larger in circumference than the other; these two tubes will serve the purpose of making a mould into which the plaster of Paris is to be afterwards poured. It is well to expend a little trouble in getting these cardboard tubes nicely rounded in shape. Sometimes a metal tube or a wooden roller may be picked up in any household that will come in very handy for rolling the paper round so as to get a good shape. If such can be got, it will make the labour of producing the tubes mere child's play.

When the glue is dry the tubes may be drawn off the roller; they are then ready for being placed end on, one inside the other, on the lump of clay which is conveniently used by being padded down on a common soup plate. Make sure the ends of the tubes are well pressed into the bed of clay—if you cannot get a supply of common clay, some fine sand or glaziers' putty will do as well—to hold the tubes upright, and so prevent the plaster from running out at the bottom. The two tubes at the top can be separated the proper distance, and held in such position by merely placing small splinters of wood, or a piece broken off a match will do nicely.

The mould is now all ready to receive the plaster of Paris.

To any of my readers having no experience in the working of plaster of Paris, a few words of explanation will be acceptable, for it is a peculiar material to work with. Shortly after plaster of Paris is mixed with water, and appears to a novice to have acquired the consistency of thick cream, it suddenly begins to set, and in a very few minutes becomes a hard block or mass of stucco. Therefore, when working with it, everything should be nicely arranged beforehand. See, therefore, before you begin to mix the plaster that the mould is right and in a convenient position to receive the fluid plaster.

There need, however, be no flurry, and a worker should not get excited; although it has to be expeditiously gone about, there is no difficulty in using it before it hardens in the mixing bowl. The best utensil to mix the plaster in is a large bowl having a pouring lip; it is advisable to get such, for without the lip very likely as much will be poured outside the mould as in it.

Having got a suitable bowl and a thick stick, flattened at the end, place four or five good handfuls of plaster of Paris on the bottom of the dry bowl, and with the stick make a hollow in the plaster, and having a jug of water at hand, in which a little common alum has been dissolved, pour steadily into the centre of the plaster of Paris. Stirring from the sides inwards by means of the flattened stick, go on adding water till all the plaster of Paris seems to have become dissolved and the mixture is about as thick as cream. There is no need to hurry, but there must be no undue delay when it is all mixed in

pouring it into the mould. After being poured into the mould, let it stand for about half an hour, when the whole can be lifted away from the clay, and the two paper moulds may be torn off the plaster. If these instructions have been carried out, the result is a perfect cylinder of plaster of Paris, which, on drying thoroughly in a warm room, say, in about two days, will be of a beautiful white colour. When dry, the cylinder has to be trimmed by means of a sharp knife, and with such proceed to cut an aperture out of the side and end, just like the shape of a microscope lamp. There is no difficulty in this, as the plaster will cut easily. With the aperture cut out the reflector is all ready for being placed over or to surround the glass funnel of the Argand burner. This is the best form of reflector I know, and serves at the same time to shield the worker's eyes when photographing by night, as well as preventing the rays of light entering the lens when the lamps are being worked at close quarters.

Somewhat recently I have been making experiments by using coloured reflectors of this pattern in conjunction with isochromatic plates when copying coloured subjects, and, at some future time, may give the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY particulars of the results obtained.

So much for what experience has shown me is the best and most practical method of lighting by means of common house gas, and once these reflectors are used they will never be discarded.

Next in importance to adopting a good method of illumination is the employment of a plate suitable for use with house gas. In isochromatic plates we have everything that can be desired. Such, however, should not be of the utmost rapidity—a slow or medium plate yields better results than the extra rapid quality.

In using these excellent plates, a word of caution is necessary. Before exposing a plate every camera and dark slide ought to be thoroughly overhauled and examined for any leakage, the interior of the bellows should be reblacked if in any way worn, every bright speck on the interior of the camera front should be obliterated with a good black stain, and no lens ought to be used that will tend to throw rays on the side of the bellows. The dark-room lamp must be suitable for these plates. I firmly believe one half the dark-room lamps supplied at the present time are quite unsuitable for use with isochromatic plates, and when developing see that the dish is provided with a cover to shield the plate even from the light of a deep ruby lamp. Attention to such points as these will go a long way in aiding the production of negatives free from fog, so detrimental in the class of work we are considering. A safe lamp will be found by shielding the light by means of one piece of orange and one of deep ruby glass.

Perhaps one of the best subjects a beginner can get to practise on is an ordinary page of printed matter, and practise on such until he can with certainty produce clear glass, or as clear as gelatine will give, and the blacks so opaque that no light is visible through same when held up before an ordinary gas jet at a distance of eight or twelve inches.

To use the Argand burners a good rigid table should be obtained, and a copying board about six feet long by fifteen inches wide. This copying board is a great acquisition, as it enables the object to be placed and held *in situ* in a true plane with the sensitive plate.

If somewhat large work has to be done, the top of a kitchen table may have wings screwed on to the sides. These arms will extend over and hold the lamps at any distance out. My operating table is provided with such, and I find it a great convenience.

In using two Argand burners the supply from one gas pipe may be insufficient; it is therefore advisable to feed each burner from a separate pipe. When this is done both burners are easily made to work at their best capacity, and, what is of equal importance, when one is being screwed down, the other is unaltered, as is likely to occur when both are fed from the one pipe by means of a T-piece.

A very little close examination will show when the surface of, say, a page of printed matter is evenly lighted all over. At first a few failures will likely to be met with; these will be observed on development of the plate, but after a few exposures it is easily apparent when an equal illumination is obtained. Such failures are more likely to occur when large surfaces are being copied; therefore a beginner had better commence with a small page of printed matter, as previously suggested.

Two good Argand burners are said to be equal to about thirty-five candles, but with the reflector described the light is beautifully concentrated. At the same time there is an absolute freedom of shadow or any dark lines so often met with, and troublesome in the using of very many of the common form of oil lamps, even including the Sciopticon form. If the Argand burners are carefully placed at equal distances apart from the centre of the picture, there will be a perfectly evenly lighted surface, and one of great brilliancy; in fact, I know of no other method of acquiring such an evenly lighted surface as by their means when used in conjunction with these plates and plaster of Paris reflectors.

T. N. ARMSTRONG.

ON THE COMPARATIVE ADVANTAGES OF THE WIDE-ANGLE AND TELE-PHOTOGRAPHIC LENSES.

[South London Photographic Society.]

IN your invitation to read a paper on some optical subject, you have been good enough to select a title for me. I shall approach the subject chiefly from the side of the "man of measurement," for adequate criticism of photographic representation by optical means requires the combination of an exhaustive study of the physiology of "vision" and the recommendations of a mature student in pictorial art.

As I understand, the two main branches of photography are mathematical exactness on the one hand, and on the other such artistic skill applied to the representation of the subject as the instruments and methods we have at our disposal will allow; the first a scientific record, and the second an attempt to make such objects and scenes in nature that we wish to reproduce "*look right*," to use an artist's phrase.

WHAT WIDE-ANGLE AND TELE-PHOTOGRAPHIC LENSES DEPICT.

Carried to extremes, neither photographs taken by wide-angle lenses nor by tele-photographic lenses depict actually what is *seen*. The wide-angle lens forces the perspective to such an extent that a "den" may be made to look palatial in its proportions, and tele-photographic images may be made, large and clearly defined, of objects situated at such distances that the details shown in them would be quite invisible to the naked eye.

On the subject of the first branch, viz., scientific photography, provided both types of lens are non-distorting, the drawing given by them is in exact accordance to the laws of monocular perspective, and being due solely to the fixed point of sight for the time being. The tele-photographic lens has a very pronounced advantage in being able to record that which could not be seen without recourse to the telescopic aid, and the wide-angle lens has its own scientific value in that it can record in one view a greater amount of subject, so much so that from one standpoint the whole horizon may be recorded in three views, in other words, taking in as much as 120° in each operation.

When we come to the consideration of instrumental aids to pictorial photography, or our endeavour to make a picture *look right*, our object lies in the direction of seeing how nearly we can approach to a parallelism to visual impressions. I have thought it might be of interest to you if we were to go through such laws in connexion with the subject of "sight" as might assist us in an analysis of the best instrumental means to adopt in order to keep our representations as much in touch with these laws as possible, for the subject before us is really one involving in a great measure the science of perspective.

THE LAW OF VISIBLE DIRECTION.

Knowing that the images on the retina of the eye are inverted, it is interesting to ask, first, how it is that we have erect vision. The question would appear to have puzzled metaphysicians; the scientific answer as explained by Le Conte, Helmholtz, and others (Le Conte is most familiar to me, and I have frequently drawn from him), is found in what is known as the "law of visible direction," and is stated thus:—"When the rays from any radiant strike the retina, the impression is referred back along the ray line (central ray of the pencil) into space, and therefore to its proper place." Points in the horizon are referred back in a straight line to the horizon, radiants above the horizon impress the lower half of the retina and are referred upward again, and points below the horizon on the ground impress the upper half of the retina, and are therefore referred downward. Thus every impression on the retina reaching it by a ray line through the nodal point is referred back along the same ray line to its true place in space, so that we may say that space in front of us is under all circumstances the outward projection of retinal states. If we compare the properties of other senses, we shall find a complete analogy; if we receive a blow in the front part of the body and were not even to perceive the impact of the blow, our senses would enable us to infer very very distinctly the direction from which the impact came. It thus appears difficult to comprehend that the retinal images should be other than inverted, as also that their projection could give us other than erect images. In the photographic camera

we have thus far a very close analogy; is is complete as regards the inverted image, and the possible transmission back again into space by "the law of direction," as also by the "law of conjugate foci," by which points in the image and object are always interchangeable. In the ordinary camera we can, of course, only compare its visual rendering with that of monocular perspective. Stereoscopic views seen through the stereoscope complete an *illusion* that is dependent on the fulfilment of another law, known as the "law of corresponding points." From this law proceed all the phenomena of *binocular* vision, with which, however, we are not concerned this evening. From the "law of direction" proceed all the phenomena of *monocular* vision, and we will proceed to examine the different forms of perspective included in monocular vision that enable us to judge of the relative sizes, distances, &c., of objects in the field of view.

Different Forms of Perspective.

There are three, viz., Aerial, Mathematical, and Monocular, or Focal Perspective. The fourth, and only other form, binocular perspective, is not capable of representation on a plane surface either by the painter-artist or photographer. Before dismissing this form of perspective, however, it may be worth while noticing its bearing on the "focus" question. By binocular vision we gather up all the distinct impressions in what is called the "deep" field, by running the point of optic convergence back and forth, and thus gather up all the distinct impressions into one mental image. From the fact that we can utilise this power in the same manner, with either monocular or binocular vision, in sweeping the point of sight laterally over a "wide" field, and collect a distinct impression of the scene, some writers on photography have contended for universal sharpness, or, at any rate, uniform treatment in respect of the quality of definition throughout photographic representations. Other writers, following on the lines first laid down by Dr. Emerson, have maintained that that portion of the photographic picture which in nature was of chief interest, and when looked at exercised a particular optical convergence of the eyes, should be emphasised by better definition than the remaining portion of the picture. As a matter of fact, outside the small area of distinct binocular vision, all objects in the "deep" field are duplicated, either homonously or heteronomously, and are therefore indistinct, but cannot be exactly represented on a plane surface. It seems to me that Dr. Emerson's plan contributes, in no small degree, to a more complete illusion optically.

To return to the first three forms of perspective:—

Aerial Perspective.

(1) *Aerial Perspective.*—"The atmosphere is neither perfectly transparent nor perfectly colourless. More and more distant objects being seen through greater and greater depths of this medium become, therefore, dimmer and dimmer, and bluer and bluer. We judge of distance in this way; and if the air be more than usually clear, or more than usually obscure, we may misjudge" (Le Conte). Most of us have probably observed for ourselves that in foggy and hazy weather objects look larger, and we are very apt to over-estimate distance. A train or vehicle coming towards one in a fog is very likely to be almost upon us before we are aware of its proximity, due to this illusion. On the other hand, the undoubted testimony of all mountain-climbers is, that they misjudge distance in the opposite direction in very clear atmosphere, as, for instance, a mountain top, that may appear to be only, say, two or three miles off, generally turns out to be ten or twelve. Aerial perspective is of little importance when employing wide-angle lenses of short foci, as experience has taught photographers the insignificant rendering they give to distance, and, in fact, such lenses are best dispensed with except in confined situations, when aerial perspective is not appreciable. In tele-photography, on the other hand, it is of great importance, not only in the judgment of distance, but also for the quality of definition attainable.

No matter what lens be employed to attain good definition of distance, the clearer the air the better the result; but, as before stated, in tele-photography, one can record on the photographic plate, no matter what the conditions of atmosphere may be, considerably more than the unaided eye can perceive. Furthermore, it is quite beyond dispute that small images produced by ordinary aplanatic lenses on the sensitive film, and subsequently enlarged to dimensions equal to those produced by direct photography, will bear no comparison whatever as regards definition. The comparative proofs I hand you were taken by Col. Colville on Wimbledon Common in hazy weather. He was working in conjunction with Capt. Simpson, of the Intelligence Department of the War Office, and the results will speak for themselves. You will note that the enlargement from the ordinary sharp-looking negative has not a vestige of definition at all. I am indebted to Capt. Simpson for the loan of the negatives from which Mr. Bridge has prepared the comparative lantern slides I show you. They exhibit the manner in which tele-photography can analyse an ordinary view. If a tele-photographic lens be used at a very short distance from the photographic plate producing an image of the same size as that of an ordinary lens of considerable length of focus, the definition is practically identical. It should favour the long-focus lens from the fact that this is easier to construct on optical grounds, but, with a finely finished and corrected positive element for the tele-photographic lens, I have failed to find a difference as against ordinary lenses, with equal intensities, up to forty-eight in. focus. An ordinary lens of *twenty-five feet* focus would be required to attain the dimensions of Boissonas's *Mont Blanc*, exhibited at Pall Mall. I cannot say whether an ordinary lens of such a focus would have given better definition. The experiment is hardly likely to be tried.

Mathematical Perspective.

(2) *Mathematical Perspective.*—Objects become smaller and smaller in appearance, and nearer and nearer together, the farther away they are. Thus streets appear narrower and narrower, and the houses lower and lower, the more distant they are. Parallel lines of all kinds, such as railway stringers, bridge timbers, etc., converge more and more to a vanishing point (Le Conte). Our judgment in the matters of size of objects, and degree of convergence of parallel lines, enables us to judge distance with great accuracy and almost without limit. Again, the size of an unknown object is judged by its angular diameter multiplied by its estimated distance. The retinal image of a given object, or the image of that object on a photographic plate, may have the same area covered by a larger object at a greater distance, or a smaller object at a less distance. In vision the estimated size of the object which produces the image will depend upon the distance we imagine the object to be from us. Thus estimates of size and distance are very closely related to each other, and an error in one would involve an error in the other.

It is important to note in this connexion that if we mistake the size of a known object, as, for example, a boy for a man, we shall to the same extent misjudge distance. It appears to me that this is the crux of the unsatisfactory images given by wide-angle lenses, or lenses of short focus when a near foreground is included. In viewing photographs taken by such lenses we never do, as a matter of fact, place our eye (or take our point of sight) at such a distance from the photograph that the angular dimensions of a foreground object and another object, distant, it may be, only a few yards further off, shall include the angles which mathematical perspective has rendered them in the photographic image.

Take the case of an ordinary interior. The figure of a boy in the foreground would be represented by a much larger image than that of a man at the further side of the room. To look at such a photograph from the ordinary distance of vision—say ten to twelve inches—it would convey the impression that this room must be immense as regards its length, that such proportions could possibly be brought about. Our knowledge of the comparative dimensions of the boy and the man is such as to make the treatment of the latter not only disproportionate, but ridiculous. The same argument applies to the unsatisfactory rendering of all architectural subjects in confined situation. Were it possible to remove the point of sight, or the camera, further away from the subject in the foreground, one would immediately bring about less disproportion between the sizes of objects in the foreground and more distant points of the subject. We value short-focus lenses on account of their adequate depth of definition through receding planes, but their perspective, when including near foreground, never *looks right!* The painter-artist fulfils in his drawing what no lens yet constructed can do; he takes his point of sight at an imaginary distance, anywhere further back from where he is forced to stand (if he finds it necessary)—at a distance, in fact, that his knowledge teaches him will practically put all his facts in the picture more nearly in the same place, so that the picture, as a whole, will look right; as, for instance, the daisy that he is painting in the foreground may really include an angle as large as the lady's foot some distance away, but he does not draw it as it actually is in mathematical perspective dimensions, but in his mind he makes that daisy go away and keep its relative size as a daisy to a human foot. This, from a near point of sight, the camera cannot do. If one were enabled to get far enough away to make such a subject more nearly on one plane, and so look right, it would, as a rule, be so small in size as to be useless. The advantage of "long-focus" lenses, or the more extravagant form, the tele-photographic lens, may now come in where a sufficiently uninterrupted and satisfactory view of any subject can be obtained. Distant groups of cattle, villages,

architectural structures, &c., can thus be well illustrated, for, although they are considerably distant, the size of the image is such that they do not become insignificant.

Example.—Take an interior 50 feet long, or a group 50 feet deep, say nearest figure 10 feet and furthest 50 feet, and take both figures as 6 feet in height. With a lens of 10-inch focus the dimensions of the near and distant figures are 6½ and 1¼ inches respectively, or a proportion of five to one. The same subject, with the lens removed 50 feet from the first figure (and, therefore, 90 feet from the furthest), would give the dimensions of the figures as 1¼ and ⅛ inches respectively, or a proportion of only five to three. A longer-focus lens, viz., 50 inches, at the greater distance would maintain these more reasonable proportions, and also give the same absolute size, viz., 6½ inches to the foreground figure, as in the first case, but a proportionately larger image to the distant figure, viz., 4 inches. Now, a tele-photographic lens, to give the equivalent of 50 inches, would only require an ordinary camera extension of from 12 to 15 inches.

Another interesting comparison between wide-angle and tele-photographic views arises from the fact that we almost invariably look at the former from a greater distance than that of the focus of the lens with which it was taken, and at the latter from a less distance than that of the corresponding focus of the lens. So that wide-angle views may be said to be seen through a magnifying-glass, and tele-photographic views through a magnifying-glass.

Outline Form and Solid Form.

The other aspects of mathematical perspective are those of *outline form* and *solid form*. As we have but little to do with the latter in photography, we had better dispense with this first. In sight we judge of it chiefly by binocular perspective, but we also judge of it by light and shade. Light and shade are admirably rendered by photography. Binocular perspective comes into play very much more for near objects than for distant ones, and hence the illusion of solidity produced by the painter is most perfect *at a distance*, where binocular perspective is very small. In all photographic work one main feature has been its paltry and insignificant rendering of distance, but I think it will be agreed that tele-photography has overcome this drawback, and placed the illusion that is most easily carried out by the artist within the reach of the photographer.

For reasons already stated, *outline form* is most unsatisfactory in photography when near objects are depicted at the sides of a picture taken by wide-angle lenses. We have seen that the drawing given to such objects is in strict accordance with monocular perspective, and this can easily be proved. No doubt many will remember this illustration of Mr. Debenham's vase (*British Journal of Photography*, October 30, 1891). Looked at in the ordinary way, it appears to be entirely out of drawing, although, viewed under the necessary fixed conditions described, the vase can be made to assume its proper shape. The unsatisfactoriness of such outline form in photography is so palpable as to make some subjects impossible in pictorial work. Take an ordinary interior with, say, an old couple one side of the room and a young couple at the further side. The necessary distortion brought about by a wide-angle lens could pay but a poor compliment to the features of those it depicted.

Focal Perspective.

(3) *Focal Perspective.*—Monocular focal perspective again will have but a very small bearing on the subject. We are aware that, if one eye be concentrated on some particular near object, that object is distinct, but all other objects nearer or further away become dim. This is perceptible within much narrower limits than that of binocular vision, and can only in a minor degree contribute to the question of the insistence of better definition for some part of the picture as compared to the remainder.

The fact that the exercise of focal perspective is comparatively imperceptible has an interesting bearing on photographs, in that it accounts for the more perfect illusion of depth and solidity effected when they are looked at with only one eye, as the perspective comes out a great deal more distinctly; and here we note the great contrast that there is in viewing natural scenes with one or both eyes. With one eye the reverse takes place to viewing the photograph, and we require both to fully appreciate distance and solidity.

In concluding, gentlemen, I fear I must admit that I have hardly adhered to the title of my paper, and also I am afraid I have had but little to say that is new, but I hope the subjects touched upon and the suggestions I have ventured to make may not be without interest to you, and may encourage photographers to include among their other studies that of "vision," for I am sure they will find it not only a most interesting one, but also one that I may say is absolutely essential to the production of the best work.

T. R. Dallmeyer.

THE OPTICAL LANTERN: ITS CONSTRUCTION AND USE.

[Before the Brixton and Clapham Camera Club.]

Mr. B. E. Pinder, one of the members, read a paper on the *Optical Lantern: its Construction and Use.* With regard to the lantern itself, he advised his hearers to purchase none but those of English manufacture, as being more solidly constructed and longer lived than foreign lanterns. It is, however, absolutely necessary that the lantern itself should be fitted with the best made English condensers and objectives. With regard to the latter, the most useful focus was eight-inch, the lens being two inches in diameter when four-inch condensers are used. Reliable templates should always be used in order to make the disc exactly concentric, without which it is impossible to show registering pictures accurately. He advised that the springs in the spring plates should be weakened, and found that washleather pads prevented the clicking of the plates whenever a slide was withdrawn from the stage. He recommended the use of grips to hold the jets firmly when properly centred, and advised purchasers to obtain the best jets they could afford. In using mixed jets, the chamber should be well packed. He himself found that the closely woven gauze, such as is used for cheap tea-strainers, compressed into a conical plug and inserted in the mixing chamber, answered admirably, especially when using the ether light. Having described the use of cylinders, regulators, and dissolvers, he proceeded to give a practical demonstration of the use of the lantern, for which purpose he had brought to the meeting a fine biunial recently constructed for him by Norton, of Russell-square. The lights described and used were the oxy-calcium, the oxy-hydrogen, and the ether lights. He found that the ethoxo light required too much attention to use very often, but advised the passing of the hydrogen, instead of the oxygen, through the saturator. The light produced burned as steadily as the oxy-hydrogen light, but was more brilliant. He pointed out the necessity for keeping the ether in a safe place, preferably a hole in the ground, where accidents could not happen. Having shown how to adjust the lantern with templates, adjustable runners, and stops, he proceeded to give an exhibition of elaborate effects and statuary, the use of the roller curtain being also clearly explained.

The President, in thanking Mr. Pinder, said that the paper was made the more interesting by the practical demonstration. The members were surprised to find what a good light could be obtained from common billiard chalk, asbestos, fireclay, or even the bowl of the homely clay pipe, the two latter slightly vitrifying under the intense heat of the ether light.

During the evening the following resolution was passed:—"That the members of the Brixton and Clapham Camera Club having heard with regret of the death of Mr. William Bedford, one of the judges at their recent Exhibitions, hereby tender to his bereaved family their most sincere sympathy."

PHOTOGRAPHY IN ITS RELATION TO THE ART OF PRINTING.

[Richmond Camera Club.]

In dealing with our subject I do not think it will be out of place to sketch, if only in outline, the history of the sister arts mentioned in our title.

I call printing and photography sisters because, in their highest adaptation, both are applied in expressing all that is most beautiful in nature, in science, or in art. A photograph will present to us a delightful representation, and by the help of printing we can not only look upon a pleasing picture, but the words we read can speak to us almost with the force of a living agent. Printing may be described as the art of taking impressions from characters, or figures, on any kind of fabric.

What is Printing?

As we understand the term "printing" in the present day, it may roughly be divided into letterpress printing, lithography, copper or steel-plate printing, and photographic printing, such as Woodburytype, collotype, &c.

The first of these is from movable letters, metal casts, or blocks either of wood or metal; the second from drawings on stone; the third, as the description explains, from subjects engraved on steel or copper; and the fourth from sensitive gelatinous surfaces acted upon by light, and forming reliefs for printing typographically in specially constructed presses.

This is, perhaps, a somewhat technical definition of printing, and a much wider meaning may be given to the term which brings the history of the art back to the very earliest times.

It has been said by one writer that printing is the production of a copy by pressure. That is perfectly true with regard to the processes I have already named; but, to quote from a history of printing published some years ago,

"It may also be applied to a seal impressed upon wax to close a letter, or to attest a document; to coining, *i.e.*, to print upon gold, or silver, or copper, or whatever substance used. If we give this comprehensive meaning to the word 'printing,' we must recognise the ancient Egyptians as the earliest printers, for they printed inscriptions on bricks, and some of the stamps which they used for the purpose now form part of the antiquarian treasures of the British Museum.

"The Babylonians also practised the art in this rude form more than 2000 years ago, and bricks have been found bearing the name of Nebuchadnezzar. This may be called clay printing, and probably was the first step in the art.

"The next was the use of the seal for making impressions. The Romans used seals at a very early period of their history, and the principle of letter-press printing, though crude, was known to them. They seem certainly to have practised the branding of cattle with red hot irons, which, after all, is printing in hair, wool, and hide. That they narrowly missed the invention of printing by wooden blocks, which must have led to movable types, is evident from the inscriptions on some of the Roman pottery unearthed from time to time. Many of these inscriptions are in raised letters, stamped upon the clay when soft by means of dyes cut in intaglio.

"An accident might have suggested the whole art of printing to an inventive Roman, if one of these inscribed pots had become smoked by a lamp, and in that state had come in contact with a piece of linen or damp vellum; the fortuitous impression thus produced might have given birth to the art.

"The invention of money was another step in the art of printing As I have already stated, to stamp on a piece of money was nothing else than printing on metal. The method used has not been materially altered in the present day. An engraving of the device to be stamped, or die, as it is called, is cut in a punch, and the punch is forcibly drived against the metal, which is thereby stamped with the device.

"As seals were formed with a graver, and money with a die, it is obvious that engraving preceded the primitive method of printing.

"The first appearance of printing in a practical shape was when the seal, or other stamp, instead of being forced against a softer substance than itself, was wetted with some liquid of the nature of ink, and pressed upon another body, so that an image or picture of the stamp was transferred to that other body."

It is remarkable that, as the Chinese are generally credited with the first knowledge of the compass, and with the discovery of less useful but delectable things withal, as fireworks and roast pork, so printing was first accomplished in China, by a minister of the State named Foong-taon, in the tenth century.

"His plan was to place a page of writing, while it was wet, upon the face of a smooth piece of wood. The writing made a mark on the wood, just as a letter does when it is turned down upon a piece of blotting-paper; in a word, the writing was impressed or transferred to the wood. Then all that part of the surface of the wood not touched by the writing was cut away, leaving the letters standing out. These were wetted with some kind of ink, paper was then pressed upon them, and an inked copy of the letters was thereby transferred to the paper. This was really and truly the art of printing."

The Chinese are remarkable for their stationary character, and I believe it is a fact that they print in much the same way to-day as they did 1000 years ago. That movable types are not used may be owing to the nature of the Chinese language, consisting as it does—so, at least, I understand—of separate characters for every separate word, being, in fact, signs of words formed without the use of letters.

Printing with wood engravings was effected in 1285, and playing cards, invented to amuse the mad king, Charles VI., were also printed from blocks about 1350; so that we may presume that the art was transplanted from China to Europe most probably through Marco Polo's description of it on his return from his travels.

Movable Types.

The introduction of movable types forms a great stride in the progress of the art of printing. This improvement naturally grew out of block-printing; yet it was effected somewhat circuitously, and may have been as much the result of accident as of design. John Gutenberg was the first person who ever printed with movable types, though his right to the honour of the invention is disputed by the city of Haarlem, which claims the discovery of the art for one of its own citizens, Lawrence Koster.

The pretensions of the Dutch, however, in his favour have been extinguished, and Gutenberg is recognised as the inventor of printing in the methods mentioned.

In 1449 Gutenberg connected himself with a fellow-townsman, named Faust, in the prosecution of his invention, a connexion which terminated six years later by a law-suit commenced by Faust for the recovery of money advanced.

Previous to his quarrel with Faust, Gutenberg had made types of cut metal. The first book ever printed from these was the *Mazarine Bible*, so called because, after the existence of the edition had been forgotten, a copy of it was discovered in Cardinal Mazarine's library in Paris. The leaves are printed on one side only, and seven years were spent in producing it. The first letter in each chapter is painted in by hand.

Peter Schœffer holds the honourable position of being the inventor of cast metal types, without which the art of printing could scarcely have become generally practised.

The casting of types at once reduced the cost of their production to less than a hundredth part of what it must have cost to cut them, and thus ensured the eventual spread of the printer's art as an ordinary profession.

It is curious to note that it was the practice of the early printers to pretend that their books were manuscript, their object being not simply to conceal the art, but also to obtain the high prices which were given for manuscript books.

Books were curiosities because they were few and costly in production. They were deemed as valuable as houses and lands, and were conveyed from seller to buyer in the same manner as estates. The inducement held out by the value set on manuscripts was so great, that the early printers never sold their books as printed books if they could avoid it.

With one or two exceptions, all the books printed by Gutenberg, Faust, and Schœffer are in the British Museum.

Introduction of Printing into England.

The introduction of the art of printing into England has generally been assigned to William Caxton. He commenced printing in the year 1474, and found a patron in Mulling, Abbot of Westminster, afterwards Bishop of Hereford, who gave him an old chapel in the Abbey for a printing-office. The spot now forms part of the site of Henry VII.'s Chapel. The first book printed by Caxton was a *Book of Chess*, a title which sufficiently describes the nature of the work.

In 1483 there were only four presses in England—Caxton's, at Westminster; Rood & Hunt's, at Oxford; De Machlinia's, in London; and a fourth (name of the printer unknown), at the Benedictine Monastery at St. Albans. Caxton, however, seems to have been the greatest printer of his time.

Caxton died about the year 1491, and was succeeded in his business by Wynkyn de Worde and Richard Pynsent. The first, a most accomplished man, accompanied Caxton from the Continent. He introduced the Roman letter into England, and the shape of his types was used for two centuries afterwards. The punches and matrices he used in casting his types were in existence as late as 1758. The art of printing spread throughout Britain as the years rolled on. It seems pretty certain that it was not before 1480, at the earliest, that Oxford had its own printers; while the first printer in Cambridge was John Sibert, whose productions in Latin, Greek, and English bear no earlier date than 1521.

It is not necessary to follow the art as it spread gradually throughout the kingdom during the next and following centuries.

The Art of Photography.

If time permitted us to follow closely the various discoveries connected with the art of photography, I suppose we might go back to the period when the knowledge of the action of light was known to the Egyptians.

The discovery of the "camera obscura" (darkened chamber) may, however, serve very well for a starting point.

Giambattista della Porta, a Neapolitan, had noticed that external objects were reflected on the wall of a darkened room when the light was admitted through a small aperture. Following up the inquiry thus opened to him, he contrived the fitting of a lens in a movable box, and in this way produced the instrument which has suggested greater things, and which to the draughtsman and photographer is invaluable.

The action of light on chloride of silver was known as early as the sixteenth century, and the phenomenon was studied by early experimentalists, whose names will occur to you—Scheele (1777), Genebier (1790), Ritter and Wallaston (1801).

From the results of these investigations experiments were made by Thomas Wedgwood and Humphrey Davy in the Royal Institution, London, which were published in its Journal, 1802. Wedgwood, who was the fourth son of the great potter, may be regarded as the first photographer. He discovered a method of copying paintings on glass by placing beneath a white paper covered with a solution of silver nitrate, and exposing to the action of solar light. He could not, however, fix the images. But in 1814, M. Niépce discovered a method of producing, by means of the camera obscura, pictures on metal plates (coated with bitumen), at the same time rendering them permanent.

Another name will suggest itself to many—M. Daguerre. He commenced experiments in 1824, and two years later joined Niépce, and worked with him till the death of the latter in 1833.

In 1839, Henry Fox Talbot first published his mode of multiplying photographic impressions by producing a negative photograph (*i.e.*, with the light and shades reversed), and from which any number of positive copies may be obtained.

Photo-Zincography and Photography on Wood.

I think the earliest application of the art of photography to that of printing is the discovery of photo-zincography in the year 1860.

This is a process by which photographs are transferred to zinc plates, which may be printed from.

It was invented by M. Toowey, and perfected by Sir Henry James, Chief of the Ordnance Survey, and made known at the date already mentioned. Charts, maps, and engravings can be printed in this way at small cost. The adoption of the process by the Ordnance Survey Office has resulted in the saving of expense to the Government.

It was not till 1861 that photography was successfully applied to the transfer of works of art to wood blocks. This was accomplished by Mr. John Leighton in his illustrated edition of the *Lyra Germanica*. I have here wood blocks of two subjects showing the image photographed on the wood. The process is of much importance, as the original drawing is preserved, not only for comparison into the finished engraving, but it may be for its artistic value. The drawing also may be of any convenient size, and reduced on wood; a great consideration when minute objects are to be represented.

After the photographing on to the wood is done, the picture is "lined up," if necessary, and more clearly defined by the aid of the pencil and

Chinese white. This is not always done to aid the engraver, as a skilled engraver prefers to interpret the drawing in his own way without aid, even though the photo on wood be indistinct; but it is very often important that the subject should be clearly defined, so that the person to whom it is submitted for approval may judge of the correctness and suitability of the block for his purpose.

Photo Blocks.

Photography itself, as a science, has advanced very rapidly, even within the last few years. Discoveries are constantly being made of more or less merit, and makers of apparatus are ever ready with something new. But, apart, from this, during the last decade photography has entered very largely into the ordinary commercial undertakings where printing is employed. The art of making blocks with the aid of photography, for the purposes of illustrating forms at the present day, is a flourishing industry. Whilst admitting the beauty of a really good wood engraving, it must be granted that for truthfulness and delicacy nothing can excel a good zinco block for use with letterpress; and it has this further merit, that the cost is considerably below that of wood engraving.

Of course, artistic taste and great skill and care in manipulation are required to produce a beautiful illustration, though it is often the case that the choice of picture is with some one who is unacquainted with the requirements of the half-tone process, as it is termed. The beauty of execution in the block is due to the zincographer; but photographers also have a great deal to learn as to the requirements of the half-tone process, in order to ensure a really good block. This will account for the great differences in the appearances of some blocks in illustrated magazines and papers.

It is impossible to produce a good block from a negative or a print which does not lend itself to the process; and it is eqnally impossible for the printer "to make anything," as the phrase goes, from some blocks that are produced, owing to want of depth and other circumstances. Sometimes, however, by force of circumstances, it is really impossible to obtain a good negative or photograph to illustrate a given subject—a fact which will serve to explain, in a degree, the great variety in the quality of the block produced and printed.

There are, as you know, various methods of illustrating the text of any given work, more or less elaborate and more or less expensive in execution. For example, there are lithographs, where many colours are used; or many coloured prints from a series of wood blocks or zincos carefully registered, *i.e.*, so made that each colour will fall exactly where required. Photography is largely employed for the production of these pictures, or in lithography to ensure accuracy of outline, or for the sake of exactly reproducing stains of age, or usage, or imperfections in old documents, or parchments, or other subjects of antiquity.

Direct Photo Processes.

Then, again, there are the various and beautiful photographic processes and prints, printed direct on the paper which is to form the leaf of the book; or a photograph may itself be mounted on to the leaf of the book, to form an "inset" or frontispiece.

Of the methods I have already mentioned, I suppose that Collotype, Autotype, or Woodburytype, would be the best forms of illustration for certain subjects for commercial purposes, as they most closely represent actual photographs. Collotype is described to me as bichromatised gelatine spread upon glass and printed beneath a negative, then washed out and used as a printing block in specially constructed presses or machines. The gelatine, I believe, is affected a great deal by the weather, and I am told that there is difficulty in obtaining two impressions alike; but I have no doubt, in the hands of the experienced collotype printers of the present day, these difficulties will soon be overcome, and it certainly is to their great credit that such good work is turned out in spite of the drawbacks mentioned. Collotype, too, has one distinctive and attractive merit besides beauty, and that is economy in cost of production. But I must not, even if I could do so, dilate further upon this subject, as by the kindness of one of our members, I believe, we are to be favoured shortly by a demonstration at his works.

It was rather my wish to bring before you this evening examples of the employment of photography in helping the printer to produce an illustration at once effective and economical. For our purposes, then, we can divide the term printing into two main divisions, viz., lithographic and letterpress printing.

Photo-Lithography.

In the first of those, then, photography can be employed to produce a subject or design upon a lithographic stone, ready for printing purposes, in much less time and with greater faithfulness than can be secured at the hands of an average lithographic draughtsman.

Take, for example, a white lace curtain or piece of lace. It is required to show effectively the design of the curtain. This must at least incorporate a corner—most generally half a curtain is preferred. Now, it is quite obvious that to secure the print which you see (*specimens shown*), it would take a draughtsman a long while to complete his work, and it would of neeessity be very costly; so the end is achieved by means of what is called the photo-transfer process. An ordinary wet-plate negative is taken, and a print obtained on paper coated with bichromatised gelatine. This receives a coating of lithographic transfer ink specially prepared for the purpose. It is next floated in warm water till the lines are seen as depressions. With the aid of a sponge and water, the soluble portion (or white) is removed, leaving the picture in insoluble gelatine with its coating of transfer ink. It now only requires to be dried and transferred to the stone for printing in the usual way.

In printing the illustrations for a catalogue or book, the letterpress, or type portion, can, if necessary, be transferred to stone in much the same way by "transfers" being pulled on transfer paper, and the whole "laid down" and printed at one and the same time.

Photo relief etching is a term applied to a picture in relief on metal, which can be used like a woodcut in the ordinary printing press.

Reproductions of Line Drawings.

Photography is very generally employed in the production of line drawings. To produce blocks of these for the purpose of letterpress printing the image must be produced on zinc from a reversed wet-plate negative, giving, of course, a positive upon the zinc, but the reverse way to the drawing. The mechanical tint, or stipple, is added afterwards if required. The plate is now rolled up, and slightly warmed before placing in the acid bath or etching solution. It is then well rinsed under the tap, and dried with gentle heat upon a hot plate, and gummed in. After it has been allowed to cool, the gum is removed with a sponge. The plate is again "rolled up," and the surface coated with powdered resin and again subjected to the etching solution. The operation of "rolling up," warming down, dusting with resin to protect the sides of the lines, is repeated until the plate attains sufficient depth. The whole of the resin is then washed off, and the removal of the "steps,' or shoulder, is effected by a series of acid baths in much the same way as the depth is attained, with the exception that the resin is omitted.

Collodion for wet-plate photography, which I understand still maintains its stand for copying, was, as most of you are doubtless aware, introduced by Archer in 1850.

It is desirable, in order to procure the best results, that the subject be drawn larger than is actually required, and bolder in proportion.

I have also the pleasure to snbmit a specimen of another system, interesting on account of its producing somewhat similar results without the aid of photography. Here is a copper plate from which a "transfer" has been taken and transferred to zinc direct. The zinc plate is ready for etching in a similar way to the method just described. I also can show the finished block and impression from it. I have mentioned the production of lace for lithographic printing, but lace may also be illustrated by the aid of zinc blocks such as I have described. In the case of white lace the piece to be photographed is fastened to black material which does not "give off" any light; consequently the result is a beautiful reproduction, with sufficient detail to show the pattern. Black lace is made to adhere to ground glass and photographed against the light, that is, the ground glass is suspended in the line of light between, say, the window and the camera, the lace towards the lens.

So much for line drawings, but by far the more artistic blocks are designed by the term "half-tone blocks." These are specially suitable for portraits, landscapes, and architecture. The processes by which they are produced may be very simple when you know them, but they are not publicly known, and I am sorry I cannot do more than show you a specimen, the start and the finish, as I may call them.

Engraving Processes.

I read, however, that some modifications of the methods patented by Mr. Fox Talbot in 1852 and 1858 are understood to be in use. He called his process photoglyphic engraving. Talbot got the image with bichromatised gelatine. The necessary reticular grain was given to the plate in two ways. By one of these he covered it after development with a fine deposit of resin. It is then ready for the etching solution. By the other method he took fine muslin or netting, and applied it by mechanical pressure to the plate, which covered it with fine cross lines. Goupil, of Paris, has a process which is believed to be worked upon the plan of forming a gelatine image, and then electrotyping it; but, as I have said already, the patentees of the various processes do not allow information to leak out if they can help it, and most producers have chemical secrets known only to themselves, though general principles may apply to all the methods.

Most of you are familiar with the lettering, as it is called, on the covers of bound books. The designs for these are usually cut in brass, from drawings on paper; but, since the application of photography, zinc blocks are now being made which bid fair to supersede the older and more expensive brass blocks. The metal for these is rendered extra hard to resist the heat necessary in the process of gold blocking.

All process blocks can be duplicated to any extent by electrotyping or stereotyping at a low cost, so that one may readily perceive the advantage to be derived by advertisers wishing the same illustration to appear simultaneously in, say, fifty periodicals or newspapers. The cost of fifty original blocks would, of course, be practically prohibitive.

Zincography.

The public, then, reap a benefit by the production of the kind of blocks that I have attempted to describe, because attractive books, newspapers,

and periodicals are produced at a figure which would be well-nigh impossible if the old system of wood-engraving were resorted to. Zincography, in its development, has naturally told unfavourably upon many wood engravers; but these, again, in many instances, have linked this department with their original profession, and really, for first-class work, steel engravings and wood blocks of high quality hold their own, though for commercial purposes people will not pay the high prices demanded for them. But then, again, it is quite impossible to employ photography on some subjects, and a choice has to be made of some other method of illustration.

One reason of the popularity of "zincos" is that they can be worked with the type, ensuring, of course, a saving in the printing, the whole being done in one operation, instead of two or more, provided, of course, the type and block are to be printed in the same colour.

In the illustration of books and newspapers it is, of course, most desirable that the reproduction of the photographs should be made as perfect as possible, and in this connexion, before concluding, I must acknowledge my obligation to Messrs. Swain & Son, of Farringdon-street, not only for valuable aid in the technical parts of my paper, but for the skill and care exercised in producing, at my request, the excellent specimens I have been privileged to submit.

I cannot pretend to have exhausted the subject before us, but I trust I have said enough to show you the utility, if I may be allowed the term, of the Photographic art to commercial purposes. The application of the art in the way I have attempted to demonstrate has done very much to raise the tone of publications generally, and to educate the taste of the people who read them. It has also contributed largely to replace the crude and occasionally vulgar illustrations of bygone days, and it enables authors and publishers to put into the hands of readers of even the cheapest literature artistic and truthful representations of persons, current events, and matters of interest generally. J. H. ALABASTER.

LANTERN SLIDES BY PRINTING OUT.

BEFORE the Putney Photographic Society, on February 6th, Mr. W. E. Woodbury, of the Paget Company, gave a demonstration of making lantern slides by printing out.

Mr. Woodbury said he understood that making lantern slides by contact had already been demonstrated before the members earlier in the season; he would therefore confine his remarks to the manipulation of the new printing-out plates, and to making slides by reduction in the camera, with such apparatus as every photographer already had in his possession, or could readily make for himself. He would also show the method of working the printing-out opals, recently introduced by the Paget Company, which was very similar to that required for their printing-out lantern plates. He said that the treatment of the plates and opals was essentially a daylight process, in many respects similar to that in use for gelatino-chloride or albumenised papers. The first point to which he called attention was that the difference between the coated and uncoated sides was not great; it should therefore be remembered that the plates and opals were placed in the boxes face to face with a piece of chemically pure tissue paper between. If by chance they should become disarranged, the glass side could generally be distinguished by small streaks or patches of the emulsion accidentally left on, and, if these should not be sufficiently obvious, the surfaces might be breathed upon slightly, when the glass side would immediately show by the condensation of the breath, the coated side remaining unaltered.

The printing was generally done by daylight, the plates and opals being placed in the frames, and afterwards examined in a subdued light. In this connexion he said it would be obvious that the examination of the rigid glass would necessarily differ from that of paper, which could be bent back and replaced without difficulty. As regards the lantern plates there was no difficulty, as the emulsion was so transparent that density could readily be judged from the back. When one half of the frame was opened in the usual manner, the opals being too opaque for the image to show through, it was necessary to lift them off the negatives so as to be able to look at their front surfaces, and special means for replacing them in correct register with ease and certainty had to be resorted to. Mr. Woodbury said this could be done in three ways. First, the negative was placed in an ordinary printing frame and wedged firmly in position, the opal was put in contact on the top, and care taken that it was firmly placed against one side and one end of the frame, of which a note should be made; with ordinary care the opal could be taken up and replaced correctly without difficulty. Secondly, a piece of cardboard twice the width and of a length equal to a plate one size larger than the negative to be printed from, is folded across the middle, and apertures of the proper size for the negative and opal cut out opposite each other; the negative is gummed in one of these openings, the opal in the other, and then folded together face to face, and placed in a suitable printing frame with a plain glass in front. For a half-plate negative the cardboard should be $13 \times 8\frac{1}{2}$ inches, which, when folded, would measure $6\frac{1}{2} \times 8\frac{1}{2}$, allowing about an inch margin all round the negative, and would fit in a whole-plate printing frame. The description looks somewhat formidable on paper, but the whole operation was very easily performed, and answered its purpose admirably. It should, of course, be remembered that the same cardboard frame may be used repeatedly. Lantern-slide binding slips are conveniently used for holding the negative and opal in place. The third method consisted in the use of a special printing frame designed by Messrs. Paget, and which they will shortly place on the market at a very moderate cost. Each frame is arranged to take two sizes of negatives; for instance, half and whole, or quarter and half plates, &c. The negative is securely clamped in the lower portion by turning a cam, which is locked in any position by means of a screw; the opal is similarly held in the upper portion or lid of the frame. The lower portion carries four brass studs fitting accurately into corresponding sockets in the lid; on being lowered on to the frame the studs enter the sockets, and the two parts are thus always held in proper register with each other. By the use of this frame the last trace of difficulty disappears, and the opals and plates may be examined as readily as paper prints.

The opals and plates are printed somewhat more deeply than will ultimately be required. A little practical experience will soon enable the operator to judge the correct density. The same rules apply as to silver prints generally. Thin negatives should be printed in a weak light, hard ones in sunlight. Mr. Woodbury stated that good results could be obtained on these plates from negatives with a lack of pluck, which would place them out of court with most of the ordinary rapid brands. It is almost unnecessary to add that this is a great desideratum for those who have developed their negatives with a view to obtaining soft and delicate prints, or who may have failed to get the necessary density when using some of the many new developers. Such weak negatives have generally been disappointing for lantern work, and a plate producing slides which will compare favourably with the prints taken from the same negative will be hailed with delight by many good workers, perhaps more particularly among the growing ranks of those who devote themselves to stereoscopic photography. The size of stereoscopic negatives is convenient for making slides by contact. Each negative also gives two chances against spots, scratches, and other defects, as a slide may be made either from the right or left half. The prints composing the stereogram should, however, be soft, and of as delicate a gradation as possible. This requirement has hitherto to some extent militated against the successful use of stereoscopic negatives for lantern work, as lantern plates generally give the best results with rather plucky negatives inclined to be hard when printed in silver. When printed out, the opals and plates are ready for toning. Mr. Woodbury said that any of the usual baths will be found to answer. The Company issue the following formulæ:—

Combined Toning and Fixing Bath.

No. 1 Stock.

Hyposulphite of soda	20 ounces.
Alum	5 ,,
Sulphate of soda (not sulphite)	14 ,,
Water to	1 gallon.

Dissolve the hypo and alum each in about one quart of hot water, mix and then, add sodium sulphite which has already been dissolved, making up to one gallon with remainder of water. The mixture should be left for some hours to allow precipitate to settle, when the clear solution may be poured off or filtered, and is then ready for use. It will keep indefinitely.

No. 2 Stock.

Chloride of gold	15 grains.
Acetate of lead	64 ,,
Distilled water	8 ounces.

Dissolve the acetate of lead in the water and add the gold. A heavy precipitate will form, which should be shaken up when any is to be poured out. It redissolves when added to No. 1 Stock. For use mix eight ounces of No. 1 with one ounce of No. 2. When this bath is used the plates and opals should *not* be washed *before* toning.

Separate Toning Bath.

Sulphocyanide of ammonium	30 grains.
Chloride of gold	2½ grammes.
Water	16 ounces.

The plates and opals must be very thoroughly washed for at least fifteen minutes in running water to ensure even toning. For deeply printed images Mr. Woodbury recommended the combined, and for correctly or slightly under-printed pictures the separate bath. He also pointed out that in the combined bath toning proceeded very evenly, and could be stopped at any stage, care being taken, if the plate had not been in the bath at least fifteen minutes, that fixation should be completed in a separate plain hypo bath. Unless very carefully washed, prints would tone unevenly in the separate bath up to a certain point, and it might be found necessary to carry the toning somewhat further than intended. For warm tones, therefore, the combined bath would be preferable, and the separate for the colder shades.

He then proceeded to print some lantern plates and opals by means of the Platinotype Company's oxy-magnesium lamp, the operation being fully performed in a few seconds; he then toned some of each in the combined and separate baths, the manipulation throughout being of a simple

nature, and such as every photographer is accustomed to when toning silver prints. The results were highly successful, and they, as well as a number of finished lantern plates and opals, with glossy and matt surfaces, were handed round and greatly admired by the members. Mr. Woodbury then proceeded to make a lantern slide by reduction on the Paget Company's rapid lantern plate; the negative was half-plate size, and of average density, and of a good colour without yellow tinge. It was placed in a suitable frame, placed at right angles to an ordinary camera, which could be moved longitudinally on a board fitted with guides; the image was focussed by means of a couple of candles placed behind the negative. The lantern plate was put into the dark slide, and a ground glass placed about two inches behind the negative in order to diffuse the light; the lens worked at *f*-10, and twelve inches of magnesium ribbon was burned at a distance of about six inches from the ground glass, being moved about as evenly as possible during burning. The exposure proved to have been correct, and the slide was in every way successful; elaborate apparatus was therefore unnecessary, the chief point being that the light from the burning ribbon should be screened so as not to enter directly into the lens.

MR. H. M. SMITH ON "ENLARGING."

Before forty-three members of the North Middlesex Photographic Society and several visitors, on the 13th inst., Mr. H. M. Smith, of the Eastman Company, gave a demonstration of "Enlarging."

He commenced with the subject of large cameras and direct prints *versus* small cameras and enlargements, and, after discussing the various *pros* and *cons* of weight, portability, expense, and excellence of results, said he had come to the conclusion that he would use nothing but small-sized cameras and enlarge. He, in fact, went farther, and said he now used nothing but a hand camera for outdoor work. It was the greatest mistake possible to suppose that a hand camera was only suitable for snap-shots; when it could be used on a tripod, as most of those now on the market could, he maintained that work could be done with it in every way equal to that done with the ordinary camera, and he had made many enlargements from such negatives which had raised considerable discussion among able photographers as to whether they were enlargements or direct prints, most people taking them for the latter.

He then dealt with the manufacture of bromide paper, explaining the old method of coating by hand, and that now generally practised of coating a roll of paper about a mile long by forty-two inches wide by passing it through a trough containing emulsion, then over iced rollers to cool, whence it was carried to the roof of the building, where it hung in festoons of about thirty feet each to dry. The paper was thus prepared much more perfectly and cheaper than by the old method, as nine miles of such paper could be turned out in twenty-four hours. The paper was packed in dozens, eleven sheets facing one way, and the twelfth the reverse, thus enabling the user at once to see which was the film side. He also referred to the absence of glaze on the surface, making it very suitable for working on with colours.

Passing, then, to the actual enlarging he described the various methods of daylight and artificial light enlarging, but recommended amateurs to stick to daylight, as giving the best and most even results. The best way to find the proper exposure was to make a trial on a small piece of paper immediately before exposing on the large sheet, and modifying that according to the result shown by the trial. He was of opinion that the ferrous oxalate developer was still the best for bromide paper, and the formula given with their paper could be relied upon. He then developed in succession three prints of the interior of Salisbury Cathedral, one correctly exposed, the second under-exposed, and the third over-exposed, using the normal developer for each, and showing what the result of under and over-exposure was, at the same time explaining how these errors of exposure could be corrected by strengthening the developer by adding more iron for the under-exposed paper, and weakening it for the over-exposed.

Replying to questions, Mr. Smith said he did not recommend magnesium ribbon as an illuminant, because one could never tell exactly what condition the ribbon was in, and this would cause considerable irregularity in the illumination. The household gas, too, was not suitable, on account of the prolonged exposure required, which would be found somewhat troublesome. The relative speed of the Eastman paper was that the "extra-rapid" paper was three times faster than the "permanent." Starch paste or a gelatine mountant was the medium used by the Company for mounting their enlargements, but the latter was not so suitable as the former, on account of the quickness with which the spirit evaporated, causing it to dry before the print was in proper contact with the mount. Paper had been kept as long as four or five years after manufacturing before exposing, and yet was found in perfect condition. He did not recommend toning with uranium for sepia tones, because the deep shadows were liable to bronze, giving anything but a pleasing effect.

ROTHERHAM PHOTOGRAPHIC SOCIETY'S EXHIBITION.

On Tuesday and Wednesday, February 7 and 8, the Rotherham Photographic Society held its fourth annual Exhibition in the St. George's Hall. Compared with previous efforts, a marked improvement was noticeable in the quality of the members' work displayed, and in the general arrangements; while in the matter of public support accorded the promoters must have reason to feel encouraged. Lady Albreda Fitzwilliam performed the opening ceremony, in the presence of an influential assembly of townspeople, an appropriate introductory speech being delivered by Dr. Baldwin, the president. Mr. G. W. Chambers, J.P., D.L., moved the vote of thanks to her Ladyship, and the Rev. W. Blazeby, B.A., in seconding the proposition, observed that the present exhibition was even finer than the one held twelve months ago. He was glad the Rotherham Society, in one department, was pursuing a very good course, namely, preserving records of old buildings and old streets which were gradually passing away. He was glad, too, the members were paying some attention to the churches of the district.

The Exhibition has many attractive features. Lady Albreda Fitzwilliam, the Hon. Mabel Fitzwilliam, Miss Crossley (Maltby), and Rev. J. Whitehead, Congo Missionary, and formerly of Rotherham, each sent photographs. The members contributing were Dr. Baldwin (President), Mr. E. Isle Hubbard, Mr. G. T. M. Rackstraw, Mr. W. H. Haywood (Vice-President), Mr. J. Leadbetter, (Hon. Treasurer), Mr. H. C. Hemmingway (Hon. Secretary); Messrs. W. Firth, W. Mason, W. H. Shephard, A. T. Cocking, J. W. Whittington, J. W. Baker, J. Caseldine, J. Clarke, J. W. Clements, A. Feirns, and J. Sykes. There had been some attempt at "selection," and the result was appreciated. As to processes, it was apparent that the old style of silver printing had been replaced by the gelatino-chloride papers, and various tones, whether intentional or otherwise, were illustrated. Platinotypes were very few in number, and there was not a single specimen of carbon printing. Numerous gelatino-bromides of good quality found places. The loan collection of prints was extensive and interesting. Mr. R. Keene, of Derby, sent a number of choice platinotypes; Messrs. Elliott & Son, of Barnet, exhibited the "Wave" picture; the Autotype Company lent a number of reproductions, and the Great Eastern Railway placed at the disposal of the Society the very beautiful series of *Norfolk Broads* views. Other friends who rendered help were the Eastman Photographic Materials Company, Limited, Messrs. J. Martin & Company, and Mr. J. Leadbetter. Each evening there was a lantern display, the "Peak and Dale scenery" slides of a contemporary being followed by slides prepared by the members. Musical selections were also introduced with much appropriateness.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

The third annual meeting of the National Association of Professional Photographers was held in Manchester on Thursday, February 9, Mr. Thomas Fall (London) in the chair.

Mr. Fall briefly reviewed the progress of the N.A.P.P. since its commencement, and strongly emphasised the necessity of having one representative of purely professional society. The early experiences of the N.A.P.P. had resembled those of all new associations, and had included great difficulties, but the worst were now past. The Council proposed to push the social element, and strongly recommended an effort to affiliate with some existing or projected body, preferably in London, by means of which, while holding their own purely professional meetings on a special meeting night, they could also arrange to meet one or more provincial members whenever they might be in London. The proposed New Central Club seemed likely to offer exactly the advantages they wished for; and they, as a body of 150 representative professionals, could form a very strong and helpful section of any photographic society they joined.

The Council's report and suggestions were as follows:—

"In presenting this the second annual report, the Council congratulate the members on the increase of the subscribers from 84 at the first annual meeting to a total of 145.

"The Council suggest that a certificate of membership be issued to the members of the N.A.P.P.; that the members generally be invited to send to the Secretary designs in competition for such certificates, the same to be reproduced in one of the permanent processes; and that, after present date, all persons desiring to become members must be duly proposed and elected at the ensuing Council meeting.

"Propose that Mr. Fall be requested to act as President for the ensuing year.

"The Council have accepted the resignation of Mr. Richards as Hon. Secretary with regret, and desire the members to express their hearty thanks for Mr. Richards' invaluable assistance to the N.A.P.P.

"That Mr. Warwick Brooks, Manchester, be requested to accept the office of Hon. Secretary.

"The Council view with satisfaction the proceedings taken to inform the public of the facts of the free portrait swindle, and express their thanks to the Editors of *Truth*, of the *Practical Photographer*, and the press generally for their assistance in exposing these frauds.

"The thanks of the Council are conveyed to the Editor of the *Spy*, Manchester, for his fearless exposure of practices discreditable to photography in Manchester.

"Subscribers to Guarantee Funds have been called on for a first half of the amount kindly promised by them. Thirty-three pounds has been paid over for the working funds of the N. A. P. P. by these gentlemen, chiefly members of the Council.

"Up to present time, the expenses of the Council attending meetings in London, Edinburgh, Manchester, and Birmingham have been borne by the members of the Council.

"A number of members have not yet paid 1893 subscriptions, and the Council request that the same may be paid as soon as possible.

"The Secretary has visited Newcastle, Glasgow, Edinburgh, Hastings, Dover, Eastbourne, and other towns, to advance the interests of the N. A. P. P., without any cost to the funds.

"Council record their indebtedness to President (Mr. Fall), Mr. Whitlock, and to the press."

Several members supported the Council's suggestions, which were all carried.

It was decided to hold the next annual meeting in Birmingham.

Our Editorial Table.

The Professional Retouching Knife.

It is the belief of Messrs. Percy Lund & Co., who are the publishers of this implement, that it will ultimately become as indispensable to the retoucher as the retouching pencil. As to this we cannot offer an opinion, but we shall endeavour to give such a description of the "knife" as to enable those readers interested in retouching to arrive

at a conclusion each for himself. Imagine, then, one of those handy pencils so much in use by retouchers, in which the lead moves loosely in the wooden barrel, subject to being projected at the point, and pinched there by a turn of the nozzle; but in place of the lead a piece of hardened steel wire is substituted, one end of this being ground to a triangular point, and the other made flat with a bevelled point, as shown in the cut.

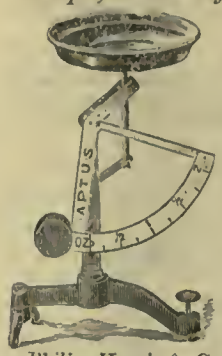
We have also on our table the *Idler* (Chatto & Windus), in which we find a well-written sketch of George Grossmith, with numerous illustrations, mainly characteristic portraits by that clever entertainer; the continuation of "Novel Notes," by Jerome K. Jerome; "My First Novel," by Miss Braddon, and many other articles more or less copiously illustrated by process blocks. *Great Thoughts* (A. W. Hall) maintains its high position in cheap serial literature. When a portrait of Dr. Phillips Brooks, with a sketch of his life and selections from his writings, were given, who would have imagined that, ere the February issue could have been in the hands of its readers, the talented Bishop should have retired from his terrestial labours? This renders the number doubly interesting. Other portraits are those of Commander Lovett Cameron, R.N., Rev. Hugh Stowell Brown, and W. L. Thomas, art director of the *Daily Graphic*, with T. Heath Joyce, its senior editor. These latter accompany an interesting account of the paper just named, including that of its photographic department, where the drawings are converted into the blocks used in its pages. The *Picture Magazine* (George Newnes, Limited) presents a collection of humorous and other pictures, many of them portraits of well-known writers, and others of scientific interest, collated from native and foreign illustrated journals.

We have also received the "Results of Meteorological and Magnetical Observations for 1892, at Stoneyhurst College Observatory, and St. Ignatius' College, Malta," compiled by the Rev. W. Sidgreaves, S.J., and Rev. J. Scoles, S.J., from which we learn that the new fifteen-inch refractor telescope to the memory of the late Father Perry is expected to be ready before the end of February.

Catalogues.

Ross & Co., 111, *New Bond-street, London, W.*—This forms a comprehensive catalogue of sixty-four pages, and particularises lenses, chemicals, apparatus, and photographic appliances of various kinds. It also treats of enlarging apparatus, microscopes, with their multifarious requisites, including object-glasses, for all of which this firm has long borne a high reputation. Telescopes, binoculars for field and theatre, meteorological, surveying, drawing, and nautical instruments, with other like things, form a compendium fitted to prove extremely attractive to the photographer and man of science.

Sharp & Hitchmough, 101, *Dale-street, Liverpool.*—In this closely compressed catalogue of sixty-four pages we find everything that can conduce to the most exigent requirements of the professional or amateur photographer, many of the articles being the special productions of the firm, although those of numerous other makers are included. The "Aptus" chemical balance seems a very handy instrument to have standing on one's table. We give a cut of it, from which it will be seen to possess weighing capabilities up to two ounces. Right certain we are that no one could make such a balance for himself for two shillings, the exceedingly low price at which we find it entered in this catalogue.



Philip Harris & Co., 144, *Edmund-street, Birmingham.*—A varied and comprehensive stock of cameras, shutters, lenses, plates, lanterns, and other things are here set forth. *Inter alia*, we find a bichromate battery of five cells intended for the dark room, the lamp of five candle power being fitted with a removable chimney of ruby glass. Included in this catalogue are directions for working the platinotype process by both hot and cold developing.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 2566.—"Improvements in or relating to Apparatus for the Exposure, Separation, and Storing of a Pack or Series of Photographic Films." Complete specification. J. T. Clarke.—*Dated February 6*, 1893.

No. 2663.—"Improvements in Cabinets for the Reception of Photographs or other articles." A. Jepson.—*Dated February 7*, 1893.

No. 2707.—"Improvements in and relating to Photographic Retouching Devices." Complete specification. A. S. Harry.—*Dated February 7*, 1893.

No. 2747.—"A Chambered Roller with the Chambering carried parallel right through, and as a Through-draft Roller applied to Photographic Burnishing Machines." L. Marion, H. Guibout, G. Bishop, F. Bishop, and J. P. Kirk.—*Dated February 8*, 1893.

No. 2926.—"Improvements in Photographic Apparatus." J. E. W. Erdesley.—*Dated February 10*, 1893.

SPECIFICATIONS PUBLISHED.

1892.

No. 5056.—"Photographic Camera Stands." Martin.
No. 18,230.—"Photographic Camera." Wright.
No. 23,315.—"Photographic Films." Clarke.
No. 23,487.—"Photographic Cameras." Communicated by Kemper. Boult.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 20.....	Camera Club	Charing Cross-road, W.C.
,, 20.....	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 20.....	Fillebrook Athenæum	Fillebrook Lecture Hall.
,, 20.....	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 20.....	Hastings and St. Leonards	
,, 20.....	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 20.....	Richmond	Greyhound Hotel, Richmond.
,, 20.....	South London	Hanover Hall, Hanover-park, S.E.
,, 21.....	Birmingham Photo. Society ...	Club Room, Colonnade Hotel.
,, 21.....	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 21.....	Exeter	City Chambers, Gandy-st., Exeter.
,, 21.....	Hackney	206, Mare-street, Hackney.
,, 21.....	Keighley and District	Mechanics' Institute, North-street.
,, 21.....	North London	Canonbury Tower, Islington, N.
,, 21.....	Paisley	9, Ganze-street, Paisley.
,, 22.....	Bath (Annual)	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 22.....	Burnley	Bank Chambers, Hargreaves-street.
,, 22.....	Leytonstone	The Assembly Rooms, High-road.
,, 22.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 22.....	Southport	The Studio, 15, Cambridge-arcade.
,, 22.....	Stockport	Mechanics' Institute, Stockport.
,, 23.....	Camera Club	Charing Cross-road, W.C.
,, 23.....	Glossop Dale.....	
,, 23.....	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 23.....	Hull.....	71, Prospect-street, Hull.
,, 23.....	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 23.....	Liverpool Amateur.....	Percy-buildings, Eberle-street.
,, 23.....	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 23.....	Oldham	The Lyceum, Union-street, Oldham.
,, 24.....	Cardiff.....	
,, 24.....	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 24.....	Holborn	
,, 24.....	Maidstone	"The Palace," Maidstone.
,, 24.....	Swansea	Tenby Hotel, Swansea.
,, 24.....	West London.....	Chiswick School of Art, Chiswick.
,, 25.....	Hull.....	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

FEBRUARY 14,—Annual General Meeting,—The President (Captain W. de W. Abney, C.B., F.R.S.) in the chair.

THE AFFILIATION SCHEME.

The Hon. Secretary announced that the following societies had that day been admitted to affiliation by the Council:—The Leytonstone, Greenwich, Southport Social, West Kent Amateur, Brechin, Midland Camera, Hampstead, Birkenhead, Rotherham, and Woolwich.

THE ANNUAL REPORT.

The Annual Report was then read by the Hon. Secretary, of which the following are extracts:—

"During the year ending December 31 last, thirty new members have been elected into the Society, and we have lost sixteen by death, resignation, and other causes. The following table shows the changes in the number of members that have taken place:—

	Honorary Members.	Life Members.	Ordinary Members.	Non-resident Members.	Totals.
On January 1, 1892 ...	5	64	356	14	439
During 1892, elected	0	2	28	0	30
" " died.....	0	1	2	0	3
" " resigned or lost sight of ...	0	0	13	0	13
On January 1, 1893 ...	5	65	370	13	453

"The Exhibition at the Gallery in Pall Mall was conducted in a rather different manner from those held before, in that the exhibits were classified by the Judges before the Hanging Committee entered upon their duties, and the process of selection was much more rigorous. In round numbers, only about two-thirds of the photographs sent in were accepted for hanging.

"The number of exhibitors whose works were accepted was 202, that is more than we have had since the year 1887. The gradual decrease in the total of members exhibiting is compensated for by the non-members. There were twenty-eight foreign exhibitors, namely, sixteen sending from America, four from Germany and Austria, two from Switzerland, and one each from Australia, the Cape of Good Hope, India, France, China, and Japan.

"There were 166 lantern slides and forty-five apparatus exhibits.

"The Exhibition was open three evenings in each week, and through the courtesy of affiliated and other societies, and of friends, as well as of some of our own members, there was no lack of slides for the lantern shows. An extra evening was as usual devoted to the benefit of the Photographers' Benevolent Association.

"The admissions to the Exhibition show an increase of 20*l.* 1*s.* 3*d.* over last year, but there is a slight decrease on wall space and catalogues. The expenditure shows a decrease of 39*l.* 11*s.* 5*d.*, and allowing for some advertisements outstanding the loss on the Exhibition will be about 45*l.*, as compared with 90*l.* last. The Council have arranged with the Council of the Royal Water Colour Society for the next Exhibition.

"With regard to general finances, the entrance fees and subscriptions are less this year than last, as only two new members have paid the life subscription as against six last year. The sum of 22*l.* 19*s.* 10*d.* has been expended on the library, and 3*l.* 2*s.* on purchase of photographs. 141*l.* 11*s.* 6*d.* has been received from the guarantee fund on account of 1891, and as this scarcely balances the account for 1892, it will be necessary to again call upon the fund for the same amount.

"Several Committees have been at work during the year, and, as the result of their recommendations, the Council have effected economies in the management of the Society, and a revised series of 'laws' have been prepared, which are about to be submitted to the members. Nearly 3000 circulars have been issued to members of various scientific societies and others, setting forth the aim and work of our Society, and inviting them to join us. The immediate pecuniary result of this has not been large, but it has been considerably more than sufficient to defray the cost of the undertaking. The introduction of mineralised methylated spirit has been duly considered.

"A specification of the Society's lens standards, as added to and completed during the previous year, has been published, and copies of it can be had by any one who applies for them.

"The Council have begun to gather together a permanent collection of representative photographs, &c., by endeavouring to secure some of the exhibits that have been medalled or possess especial interest. In this they have met with a most hearty and generous response from those upon whom we must depend for success in the matter.

"The library has been largely increased during the year. Sixty-six volumes have been presented to the Society, about 108 have been added by purchase under advantageous circumstances, the serials for the year add fifty-two volumes, and besides these a considerable number of unbound pamphlets, &c., have been received. The number of serial publications arranged for by exchange with our own *Journal* has been increased from twenty-four to fifty-three, and it is hoped that in the near future this number will be still further augmented by important additions.

"The museum has been enriched by a copy of Fox Talbot's *Sun Pictures in Scotland*, a set of Daguerreotype apparatus, some calotype negatives, and sundry smaller but valuable items.

"The affiliation scheme which was brought forward in 1891 has been developed, and during the year fourteen societies have been received into affiliation, so that the present total is thirty. Numerous meetings of delegates have been held, and although much time has been occupied in arranging the procedure, and in discussing the most promising and useful fields for activity, the progress has been satisfactory, taking into consideration the novel character of the movement, its wide scope of action, and the absence of any precedent for guidance. A number of sets of lantern slides are already in circulation, including most of those sent for competition to the Exhibition, and several lectures or papers, with explanatory illustrations or examples, are also available. The programme decided upon for the present session includes a series of lectures on *Photogravure*, with a demonstration of the practical working of the process. Although the direct advantages arising from the movement have as yet hardly had time to become apparent, there is a hopeful prospect that it will not only benefit photography, but will strengthen the Society."

The adoption of the report was moved by Mr. T. Sebastian Davis, who took occasion to dwell upon the increased usefulness the Society was likely to have on account of the institution of a library and the appointment of an Hon. Librarian, and expressed a favourable opinion of the affiliation scheme. The motion having been seconded by Mr. W. England, the report was adopted.

The Scrutineers announced that the following gentlemen had been elected Members of the Council for the following year:—*President* Captain W. de W. Abney, C.B., F.R.S., D.C.L.—*Vice-Presidents:* Messrs. James Glaisher, F.R.S., Andrew Pringle, J. Spiller, and Sir H. Trueman Wood.—*Ordinary Members of Council:* Messrs. W. Ackland, G. L. Addenbrooke, T. Bolas, F. P. Cembrano, jun., E. Clifton, A. Cowan, T. R. Dallmeyer, T. Sebastian Davis, W. E. Debenham, P. H. Emerson, W. England, T. E. Freshwater, Colonel J. Gale, Mr. F. Hollyer, Dr. G. Lindsay Johnson, Messrs. H. Chapman Jones, Alex. Mackie, J. W. Swan, J. Traill Taylor, Leon Warnerke.—*Treasurer:* George Scamell.

Votes of thanks were passed to the Auditors, Scrutineers, the Hon. Treasurer, the Hon. Secretary, the Assistant Secretary, and duly acknowledged by those gentlemen.

In acknowledging a vote of thanks for his services during the past year, passed by acclamation, on the motion of Mr. J. Spiller, seconded by Mr. Sebastian Davis,

The PRESIDENT said he was much gratified at the vote. It was a pleasure to him to have presided over the meetings of the Council and the Society. He had felt it almost a duty to accept nomination on account of certain matters that transpired during the late Exhibition, and because he wanted it seen that the insinuations of a certain publication were unfounded. He had always met with the greatest cordiality from the Council and members, and for that reason he was induced to accept the nomination for the Presidency, as well as to show that the insinuations he had referred to were absolutely unfounded, so far as he was personally concerned.

The meeting, which next proceeded with the discussion of the revised rules, was adjourned when only about half the rules had been considered.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 9,—Mr. A. Haddon in the chair.

THE ASSOCIATION'S TECHNICAL LECTURES: NO. 1, "THE LENS."

The CHAIRMAN, in calling upon Mr. J. Traill Taylor to deliver his promised lecture on the photographic lens, said that it would form part of a series to be subsequently published in book form. Several promises for other lectures had been received, and it was hoped that the book, when published, would form a better work of reference on photography than they had at present. When a man undertook to write on photography, it was impossible for him to be thoroughly conversant with every branch of the subject; and, generally speaking, what he gave was simply a *résumé* boiled down from other works. Here they would have masters in different subjects, who would give the results of their experiences, so that in that way they would obtain a far better knowledge of the subject when they came to study the book than would otherwise be the case.

Mr. TAYLOR, in opening his address (which he frequently illustrated by referring to and exhibiting a considerable number of ancient and modern lenses that he had brought with him), said that the early opticians had great difficulties to contend with in the colour, &c., of the glass, the crown element being sometimes formed of deep green bull's-eye, and the flint of the bottom of a tumbler. He showed a large aperture portrait lens of this nature by Thomas Davison (who had by some been termed the inventor of the compound portrait lens), which, though it stopped a large amount of light, produced most charming pictures. Having noted the important parts which Guinand and Bontemps had played in the production of glass free from striæ, he said that in pre-photographic times the uses of lenses in combination for observatory purposes was well known, as well as their property of forming images over a moderately flat field, and he exhibited a specimen of an achromatic lens in use previous to the introduction of Petzval's combination. Alluding to its large size, he said in the olden times they used sensitised sheets of paper of large dimensions, and the lenses were of large diameter and long focus. Lenses of that class necessarily distorted, according to their diameter—the larger the area of the lens the greater the distortion. The orthoscopic lens was introduced to cure the distortion of the single lens, but was soon found to have a distortion of the opposite character. Having indicated the property of this lens of giving a larger image than any other lens of similar focus and discussed its other properties, Mr. Taylor said he regarded that lens as the lens of the future, and described how he had obviated the pincushion distortion which it gave by placing a thick piece of plate glass near to the ground glass of the camera. In 1869 he extended the application of the orthoscopic principle by employing as an objective an ordinary opera glass, which was strictly analogous to the orthoscopic lens, a system which had since been adopted by two eminent opticians in the modern tele-photo lens. *Apropos* of this, he showed two lenses respectively magnifying and diminishing when examined individually, and which when placed in contact formed plain glass incapable of giving an image; but when separated, and in proportion to the degree of separation, they became in effect a combination of long or short focus. Passing on to the next branch of his subject, "Simple Glasses as Image-formers," he said that numerous fine sharp photographs were taken with the despised plain spectacle glass, which should be of a meniscus form. He passed round some stereoscopic pictures taken in a hand camera by the aid of such lenses by Mr. Henry Sutton, the sharpness of which he characterised as remarkable. The first combination by which distortion was prevented was that of Cundell, which was introduced for a totally different purpose. It consisted of a pair

of meniscus lenses mounted apart, with a stop between them. He had compared the lens with lenses of the rapid rectilinear type of the present period, and found them nearly, although not quite, the same as regards the elimination of colour. Mr. Taylor concluded his discourse (which was largely of an introductory nature) by reference to the globe lens of Harrison & Schnitzer, Goddard's single lens (the precursor of a modern single lens which gave freedom from distortion), and a plea for the use of supplementary lenses for altering the foci of existing objectives, the chief point being always to have the back lens the shorter focus of the two. Something was wanted in photography analogous to Wray's microscopic lens, in which an adjustment of focus from four to six inches was obtained by rotating a collar in the jacket.

At the conclusion of the lecture, which dealt with many other phases of the subject, the CHAIRMAN said Mr. Taylor had given a great number of hints as to how amateurs might work in an experimental direction, and moved a vote of thanks to him, which was carried. The subject is to be resumed on a future occasion.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE SPEED-TESTING CONTROVERSY.

To the EDITOR.

SIR,—

"Those who in others' quarrels interpose
Oft will wipe a sanguinary nose."

Anxious to avoid this unpleasantness, I am, nevertheless, desirous (with, I doubt, not many others) that some one, either the illustrious scientists themselves or a capable exponent, should enlighten us outsiders about their method, and that they should do it in simple language.

I do not think, Sir, that this is an unreasonable request. The time has gone by when photographers will consent to use a set of arbitrary numbers as exposure factors, nor are they willing to accept any system which does not permit of examination and verification in their own studios. This, unfortunately, appears to be the present position of the Hurter & Driffield system of estimating speed in dry plates, and it cannot be the final one.

To be assured that we cannot detect an error of twenty-five per cent. in exposure, or to have a series of negative interrogations jerked at us (*vide* last week's correspondence), is not the assistance we seek.

Information is our cry. A clear and explicit account in plain words of the system, the theories that underlie it, and the method of working it and testing the plates, is what is asked for on behalf of us all by—Yours, &c., IGNOTUS.

February 13, 1893.

To the EDITOR.

SIR,—In reply to Mr. Cadett's letter in your last, I can fully bear out (from experimental tests) Mr. Williams' comments *re* speed of plates.

Mr. Cadett's communication consists principally of condemning that gentleman's methods of procedure, and informing him that his tests are no good, and that it is utterly impossible to arrive at a decision by comparative camera tests, after which sweeping condemnation he is compelled to admit the very thing which Mr. Williams had already proved, viz., that the numbers were fictitious, and consequently misleading. Mr. Cadett admits to two of the numbers being twenty-five per cent. wrong, yet goes on to say, "Several people told us the plates worked well to the *marked speeds*." Did these several people know what they were speaking about? Because, if so—*and evidently Mr. Cadett has faith in their assertion, or he would not have quoted it*—then I maintain that Mr. Williams scores again; for is it not further proof that either the Hurter & Driffield system is a fallacy, or that those using it do not understand it? Hence it follows that the numbers as at present used are a delusion and a snare.

I will conclude by saying that I do not know, even by sight, either of the gentlemen named; I therefore have not any party feeling in the matter.—I am, yours, &c., ARCANUM.

February 14, 1893.

To the EDITOR.

SIR,—Permit me to reply to the letters in your issue of 10th inst. To Messrs. Hurter & Driffield I beg to say that I have checked my estimates of percentage differences by giving augmented exposures to the sluggish plates, so as to get identical negatives, thus proving, generally, the accuracy of my estimates. My estimates are upon the finished negatives, not upon prints.

To the writers who have taken exception to my remarks, I desire to recommend a reperusal of the last paragraph of my article on page 70. Except incidentally, I have merely expressed my opinion of the Hurter & Driffield system without going into details, and I have endeavoured to keep two distinct subjects separate; the experiments were directed solely to ascertaining whether the various speed numbers were borne out in actual practice.

My conclusions having now been made public, I am prepared to abide by my experiments, and I will stand or fall on the question of their accuracy. Further, I will submit the whole of the results, together with a number not published, to any properly appointed juror or jury to be agreed upon—disinterested photographic experts—and to them I will describe, in fuller detail than is permissible in these columns, the whole series of experiments, and I will repeat in their presence, under proper conditions, any of the experiments submitted.

In conclusion, allow me to thank Messrs. Hurter & Driffield, and Messrs. Marion & Co. for the temperate and courteous tone of their letters.—I am, yours, &c., G. F. WILLIAMS.

February 14, 1893.

MESSRS. ELLIOTT & SONS' EXPOSURE TABLE.

To the EDITOR.

SIR,—In Table 2 of our exposure table a slight printer's error has occurred, and which we regret we overlooked. The three first columns, headed respectively *f*-6, *f*-8, and *f*-11, should have been headed *f*-8, *f*-11, and *f*-16.

Thanking you in anticipation for inserting this correction.—We are, yours, &c., ELLIOTT & SON.

Park-road, Barnet, Herts, February 10, 1893.

ELIMINATION OF HYPO.

To the EDITOR.

SIR,—In reply to the question that Mr. Cosmos puts to me in the last number, I would say that I think it is better to recommend acid alum rather than peroxide of hydrogen for the use of photographers when treating gelatine plates for the elimination of the traces of hypo remaining after the usual washing. Peroxide of hydrogen is not only an extra reagent for the photographer, and a somewhat expensive one, but it is of very uncertain strength as commercially supplied, and loses strength by keeping. I have found freshly opened bottles to contain only about a third the nominal amount, and bottles that have stood by a few months only about one-tenth. This diminution in strength is not obvious, and therefore I hesitate to recommend the reagent for general use.

My remarks concerning the need for eliminating hypo from gelatine plates to fit them for intensification apply to plates that have been well fixed in plenty of fresh hypo, and have been washed as usual for two or three hours. I doubt whether prolonged washing would *wash away* the remaining hypo. The combined action of air and water would perhaps destroy it, but its destruction in this way would be not only tedious, but uncertain, whereas by the use of acidified alum its decomposition is fairly rapid and certain. The stains that I have referred to in this connexion are not colour stains, but deposits of mercury salt where they should not be.—I am, yours &c., CHAPMAN JONES.

Royal College of Science, London, South Kensington, S.W., February 13, 1893.

FILLEBROOK ATHENÆUM EXHIBITION.

To the EDITOR.

SIR,—I shall be much obliged if you will allow me to communicate, through your columns, to the numerous readers interested the answer to a question of some importance which has arisen in connexion with the rules of the above Exhibition.

The point was, "Can one exhibitor take more than one medal?" and the decision of the Committee is that one medal only may be awarded to an individual exhibitor, but it may be either for a single exhibit or for a series, according as the Judges may determine.

May I take this opportunity of asking intending competitors to send in entries as soon as convenient, to save a rush of work at the last moment?—I am, yours, &c., JOSEPH W. SPURGEON.

Leytonstone, Essex, February 14, 1893.

STUDIO HEATING.

To the EDITOR.

SIR,—In your JOURNAL of January 20th, 1893, you have from the pen of Mr. G. Watmough Webster, on "Studio Heating," an able and, what is more valuable, a most practical article. If Mr. Webster would give us a little of his experience on studio building in your pages, he would confer upon me just now, and doubtless upon many others, one of the greatest boons ever offered to puzzled photographers. When about to build a new studio, what is the best kind of glass to use, and, above all, how to glaze so as to make it proof against leakage? What is the best principle to construct the side light and glass roof, north light, say size of studio thirty feet by fifteen feet.—I am, yours, &c., H. L.

February 4, 1893.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

F. G. HILL.—Your eyes are alright.

W. WENBORN.—Probably the bath you are using is not suitable for the paper.

HENRY HOLMAN.—Received. We presume the examples of your poetical skill are not intended for publication.

F. STEWARD.—A lens of about nine inches equivalent focus will enable you to take three-quarter-length cabinets in a room fourteen feet long.

O. B.—1. The darkened silver nitrate would be unsuitable for emulsion work. 2. To recrystallise silver it is not imperative that it be dissolved by the aid of heat.

GEORGE BLAKE.—There are firms, we believe, trading under the names of Mezzotype and Mezzotint companies. Try and select some less hackneyed term as a distinguishing trade designation.

JET.—1. Mr. W. I. Chadwick, of St. Mary's-street, Manchester, will supply you with a book on the magic lantern. 2. Many authorities hold that better illumination can be obtained with the mixed jet.

W. KERSHAW—1. If some gum be added to the water colour, it will dry as glossy as the print. Spotting colours are advertised that can be burnished if required. 2. Add the sediment to the residues, then any precious metal there may be in it will be recovered.

W. A. T.—1. Caramel mixed with dextrine is, perhaps, the most suitable backing you could employ. 2. Castile soap is the best lubricant. Dissolve two grains to one ounce of alcohol. 3. Either white or blue blinds may be the better, according to the aspect of the light. 4. The lens should point rather below the head.

E. H. D. says, *apropos* of his experience with Solio paper: "After toning, the prints are placed separately in a dish of salt and water as they tone, but they go on toning in this state, so that the first prints of a batch are more toned than the last. The prints are covered more or less with a white deposit before toning; those last toned show it most. This generally, but not always, fixes out."—He asks how this can be avoided. Will some experienced reader reply?

D. JACOB says: "I am much troubled with the sun in my studio, which faces nearly south. In the summer I can stop it out by drawing down thin white blinds, but at this time of year the blinds make the light too slow. Can you tell me of anything that would stop out sunshine, but yet admit a good light? Ground glass would, I know, be best, but it would cost more than I can afford these hard times."—Make up some thin starch paste and mix some whiting with it. Then stipple the glass over with that. It will stop out the rays of the sun, and can easily be cleaned off at any time.

K. K. writes: "It is a great nuisance at this time of year to get negatives dry when they are wanted to be printed from quickly. If heat be applied, there is the danger of the film running, and if they are put away to dry of themselves it sometimes takes twenty-four hours. Surely there ought to be a remedy for this?"—There is. If the negatives be placed in strong alcohol—methylated will do—for ten minutes or so, they may be dried before the fire. The spirit abstracts the major portion of the water, hence sufficient is not left to cause the gelatine to run when only a moderate heat is applied.

DISTEMPER says: "1. Would you kindly inform me of the best formula for intensification with corrosive sublimate. 2. I should also feel extremely grateful if you would favour me with information as to how to mix colour for painting backgrounds in distemper, and where to obtain same."—1. See p. 788 of the ALMANAC. 2. Mix whiting and lampblack together to the tint desired in water, to about the consistence of thick cream. Then add double size (melted), and well mix. The quantity of size should be about one-third of the bulk. A little Venetian red may be added to warm the tint if desired. The colour should be applied cold. The materials can be had at any oil-shop.

BROMIDE writes as follows: "I have a series of local views on sale in this town. One of the tradesmen, a dealer in fancy goods, has bought a collection of them, and I now understand that he intends having them, with others, reproduced by some cheap process, and to sell them in book form at 1*s.* per dozen views. Can he legally have the views reproduced which were taken by myself? I still have the negatives in daily use. Is it necessary to copyright them? If so, what would be the cost per negative, and how could I get them done? It seems rather hard, after taking the views, to have some one else reap the benefit of their production."—If the pictures are not copyright, any one can copy them. The cost of making a photograph copyright is one shilling, but it must be done personally at Stationers' Hall. Our publishers will do the needful for one and sixpence in stamps with a copy of the photograph. In future, we recommend you to make the pictures copyright before copies are issued. You will then have a remedy against pirates.

PHOTOGRAPHIC CLUB.—February 22, Monthly Lantern Meeting.

WEST LONDON PHOTOGRAPHIC SOCIETY.—February 21, Technical Social Meeting.

BLACKHEATH CAMERA CLUB EXHIBITION, March 3 and 4.—Intending exhibitors are informed that entry forms should be sent in by the 22nd inst.

PHOTOGRAPHY is represented on the newly elected Council of the Royal Microscopical Society by Mr. E. M. Nelson, Mr. T. Charters White, and Mr. James Glaisher.

MR. FRANK HOWARD, of Wallingford, Berks, has accepted the post of Hon. Critic to the Lantern Slide Exchange Club (Hon. Sec. A. J. Richardson Summerville Dore, Sheffield), in place of Mr. A. R. Dresser.

WE regret to learn of the death from consumption, on February 5, of Mr. A. W. Scott, of Weston-super-Mare. Mr. Scott was the inventor of the "Verak," the patented Saturator which bears his name, and devoted much attention to lantern matters, and he was besides a frequent contributor to this JOURNAL and its ALMANAC.

GRATING PHOTOGRAPHS.—Mr. John Robertson, Dundee, has sent us specimens of a class of work which he finds to take well with his customers. These are bromide proofs printed with the interposition of a line grating between negative and paper, which imparts precisely the effect of a Meisenbach picture. The same effect can, as Mr. Robertson observes, be produced in platinum, carbon, or silver.

DEVELOPING PRINTS.—By this term we do not mean bromide prints, but those intended to be printed out in the frame. Mr. J. H. Smith, Bowbridge, has sent us some excellent specimens, which were produced within half an hour on "P. O. P." He prints until the details are just visible, completes the printing by a developing agent (not communicated), tones in a sulpho-cyanide bath, and conducts the other operations as usual. The specimens, as we have said, are excellent.

MR. P. EVERITT writes in reference to his paper on *The Calculation of the Angle of View* in our last issue: "In the foot-note to the first diagram you have substituted H for K as designating the correct station point or focus. The second diagram is printed with top to right side, consequently the scale of focus runs from top to bottom. The scale of inches distance, between centre of vision and extreme corner of plate, must be read from left to right. The engraver has also incorrectly numbered the latter scale, which should start with two inches and be increased by two for each space to the left. It would also have been better had the engraver numbered the lines running from right to left instead of the half distances between them. Each line represents two inches addition to the focus, starting from O at the top right-hand corner."

CAMERA CLUB.—The 1893 Conference will be held in the theatre of the Society of Arts, by kind permission of the Council, on Wednesday and Thursday, April 12 and 13, under the presidency of Captain W. de W. Abney, C.B., D.C.L., R.E., F.R.S. The following is a preliminary outline of the programme:—Wednesday, April 12, Conference at the Society of Arts, 18, John-street, Adelphi, to be opened by the President, at three o'clock. Papers to be read from three o'clock to six o'clock in the theatre. Seven o'clock, Annual Club Dinner for members and friends. Thursday, April 13, three o'clock, renewal of Conference in the theatre, Society of Arts; papers to be read from three o'clock to six o'clock. Renewal of Conference at eight o'clock; papers and discussion from eight o'clock to ten o'clock. Friday, April 14, eight o'clock, exhibition of lantern slides in the theatre. Special tickets for this Exhibition. All photographers are cordially invited to take part in the Conference. The meetings at the Society of Arts are open to ladies.

THE CRYSTAL PALACE NATIONAL PHOTOGRAPHIC EXHIBITION, 1893.—The directors announce that the National Photographic Exhibition will be held in the nave, commencing Monday, April 10, and closing Saturday, April 29. Alcoves and screens will be placed in the nave as usual, thus ensuring an equally prominent position for each exhibitor. A gold medal will be awarded for the best alcove, and a silver medal for the best complete screen. All classes for photographs will be open to professional and non-professional photographers. A special class will be devoted to the work of lady photographers. A silver medal will be awarded to the best exhibit in this class. The National Challenge Cup for the best collective exhibit by a recognised photographic society will be offered for competition; and in addition diplomas will be awarded by the Judges if, in their opinion, any society or societies show work of sufficient merit. It has been arranged to have a section entirely devoted to photographs having received first and second awards at any recognised photographic exhibition. Carriage will be paid both ways on all exhibits in this section. The Opera Theatre will be set apart each evening for the exhibition of lantern slides, competing and on loan; these will be projected on the large screen. The south nave will be reserved for photographic apparatus, materials, demonstrations in practical photography, photo-mechanical processes, &c. All correspondence and inquiries must be addressed to Henshaw Russell, Manager, Crystal Palace, London, S.E.

*** Owing to extreme pressure on our space, several Reports of Societies, Letters, Answers to Correspondents, and other communications, are unavoidably held over. All these, if possible, in our next.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1712. Vol. XL.—FEBRUARY 24, 1893.

PHOTOGRAPHING STAGE SCENERY.

Whenever a new piece is to be produced at the principal London theatres it is a matter of importance with the conductors of the illustrated journals—which have recently increased to a large extent—as well as the numerous daily and weekly newspapers that occasionally illustrate their articles with sketches, that arrangements be made for obtaining illustrations of the principal scenes, characters, and situations in the piece, so that they may appear almost, if not quite, simultaneously with the notices of the critics. These illustrations are sometimes derived from sketches made by artists during the rehearsals, and now and then on the occasion of the *première;* but modern theatrical managers do not take kindly to the presence, during the rehearsal of a piece, of outsiders, particularly if they are connected with the newspapers, and thus as a rule other means must be found for supplying them with sketches. We believe that in this respect photography is called into service.

The appearance of highly finished drawings of the scenes and characters of a play in a newspaper within very few hours of the fall of the curtain has possibly often excited admiration for the remarkable readiness and skill of the artists and engravers; but all cause for wonderment vanishes if, as is sometimes the case, the rough sketches, from which those finished drawings were made, are in the hands of the newspaper artists some days before the production of the play. It is here that photography steps in. Photographs of the scenes are taken, and prints from the negatives supplied to the artists, who thus obtain the most reliable form of sketch from which to work. Photographs of this sort need not, of course, be exposed with any degree of nicety. All that is required is a negative that will give a print with sufficient vigour to yield the necessary outlines, and some discrimination in the lights and shades.

As regards the figures in the scenes, the fact that the character dresses may not arrive until a late moment, or that it is left to the final rehearsals to arrange the exact situations and groupings, combined with the circumstance that the dresses to be worn in the play are not worn during the rehearsals, would seem to occasionally interpose difficulties in obtaining completed photographs of the scenes in ordinary cases; but we believe that at the principal theatres provision is made for the photographers to have an opportunity of taking the entire scene, as it will appear in the public performance, with a view to the convenience and assistance of the artists, at a dress or final rehearsal.

Photographs of this description must necessarily be taken under disadvantageous circumstances and with the shortest possible exposure. We believe that a special magnesium flash-lamp is used, as to the powers of which some idea may be formed from a remark of Mr. Milner (a gentleman who, we believe, has had much experience in this class of work), made at a meeting of the London and Provincial Photographic Association a few months back. He stated that, using a lamp of this kind, he had exposed a plate on a scene at the Adelphi Theatre with the lens at *f*-32, and had obtained a fairly well-exposed picture in three seconds, the lamp consuming three or four drachms of magnesium in that time, and the flame being very large. No doubt the ordinary illumination of the auditorium assists in such cases in materially diminishing hard results.

We remember, some years ago, being in company with a friend who was taking a crowded scene on the stage of a London theatre, the only illumination employed being that of the house at its full. Working under the most favourable circumstances of rapidity as regards lens and plate, and with, if we remember aright, an exposure of about a minute and a half, tolerably well-exposed negatives were secured. The actors and actresses, of whom there were forty or fifty on the stage, kept remarkably still, and the results were such as to allow of reproduction, although they were not, of course, by any means well exposed. Ordinary plates were used.

The lighting of stage scenes and characters for effects to be appreciated simply from the auditorium is not always desirable from the photographer's point of view, the relative actinic power of the more or less yellow light from footlights, auditorium, stage, and of the limelight, especially if the latter be concentrated, being such as to operate against a harmoniousness of lighting in the photographs. In photographs of stage scenes that are intended for reproduction we are informed that this difficulty is overcome by the collaboration of the photographer with those whose duty it is to attend to the stage lighting, the photographer being then able to obtain his own effects. But in such cases the exposure of the plate must necessarily be approximated to correctness, and, as without the characters time is immaterial, by the absence of the latter the necessary length of exposure can be given.

With a photograph of a scene minus the figures, the actors, we believe, give the photographer special sittings in character, either singly or in groups. These portraits are taken accurately to scale, so as to harmonise with the dimensions of the scene itself, and combination negatives are then made of the background and figures. It is in this way, we believe, that some of the most widely circulated photo-mechanical reproductions of scenes from recently produced plays have been prepared.

AMATEURS' BACKGROUNDS AND ACCESSORIES.*

II.

That fairly experienced landscape-workers fall into serious errors when called upon to execute a portrait was impressed upon us a short time ago when we picked up the portrait of a lady executed by an amateur of several years' standing. The portrait was *carte-de-visite* size, and the head and portion of bust occupied the lower inch or so of the picture—an interior. The face was admirably lighted, and the exposure had been just right, and, so far as that part of the business was concerned, we should say it was an excellent portrait. But the background was formed by an ordinary sideboard, of course much out of focus, but just sufficiently sharp to show that the handles of the drawers appeared to be about a foot above the lady's head, showing that the operator—who, by the way, is a fairly tall man—had used the camera stand at the same height he would have done for a landscape, which, of course, necessitated the camera being pointed down on to the sitter in such a manner that objects on the same level as her face, but further away, appeared much higher. The general effect was grotesque in the extreme, but the artist was unable to see where the fault lay.

In order to avoid such mistakes, we strongly urge the employment of a plain background wherever there is any difficulty with the natural surroundings, either indoors or out. In fact, we should say for indoor work make it a regular practice, for it is so seldom the arrangements of an ordinary room admit of a full-length figure being properly lighted for a short exposure. We are alluding now, of course, to all cases where the source of light is a single window of ordinary size, and which is utilised in conjunction with a reflector. Of course, when there is more than the one window, or one of more than ordinary size, the circumstances may be very greatly altered, and full-length figures, or even groups, may be successfully attempted; but in the majority of instances it will be preferable not to attempt more than the bust or half-length, and to use a plain background.

Even then the average amateur will often persist in his tendency to do what is not right. There are backgrounds and backgrounds, and we have used ourselves, and seen used by others, a great variety of makeshifts, such as blankets, sheets, table-cloths, and even newspapers. The last, in the hands of a clever and resourceful operator, we once saw do duty in a case of emergency, and it was difficult in the negative to detect any signs of it, so skilfully was it worked. But many an amateur would have succeeded in rendering every letter it contained tolerably legible by bringing it as nearly as possible into the same plane as the sitter; we have actually seen under such circumstances the pattern of a damask table-cloth almost as perfectly rendered as if that had been the intention, instead of a portrait. In the same way the texture of the blanket, once a favourite makeshift background, can be made painfully prominent in a photograph, especially when used indoors with a strong side light falling upon it.

There is little real necessity nowadays for such expedients, unless it really be in a case of emergency, as proper backgrounds are to be obtained from almost any of the dealers at so low a price that no amateur who does anything at all in portraiture need be without one. If, however, there be any so placed as not to be able to procure a proper background, we should recommend, in preference to any other substitute, a sheet of unbleached calico in its natural condition. This can be obtained almost anywhere in widths up to seven or eight feet, which will be quite large enough for any requirements. For indoor work especially, the light colour will be a great advantage, as the amount of light that falls upon the background when placed a foot or two from the window and at right angles to it is small as compared with that that reaches the sitter, and consequently its colour is apt to be rendered much darker than is desirable.

After having secured a satisfactory background, there still remains the necessity for keeping it in proper condition. It is scarcely needful to say that it must be kept perfectly clean and free from stains, but perhaps it may be well to remind some that it is equally necessary to avoid creasing the material, as perhaps nothing so completely betrays a background. In the strong side light of an ordinary room, and to a less extent even in the open air, every smallest wrinkle or crease will be distinctly rendered in the photograph, so that every effort should be made to prevent them.

The best way of effecting this is, of course, to have the calico or other material stretched permanently on a frame; but this plan is liable to objection on the ground of the inconvenience of storing so bulky an article when not in use. Another method, however, almost equally effective, so far, at least, as preventing the creases making themselves visible, consists in having a light framework made to take to pieces like the portable lantern screens, and, in fact, to stretch the background on this when required in precisely the same manner. It will occupy but little space when not in use, and is easily and rapidly put up when wanted. The only other plan is to keep the background upon a roller like a map, and to suspend it when in use from suitable supports, with a sufficient weight attached to strain out any creases.

Few, we imagine, who have once experienced the difference that a good background makes in a portrait would willingly revert to the slipshod system that prevails in too many quarters, and to those who have not yet made the discovery we offer the advice, to try it.

* Concluded from page 99.

Studio Building.—In response to our querist, "H. L.", in last week's Journal, Mr. Watmough Webster has promised to give us, shortly a paper describing his experience of studio building, though he doubts his being able to put the matter "in a nutshell," as "H. L.," in a second communication to us, suggested he might be able to do.

The Proposed New Central Photographic Club.—We give elsewhere some official details of the proposed new central photographic club, the provisional committee of which contains the names of several gentlemen whose adhesion to the scheme augurs well for its success. That a club of the kind is needed in London may be gathered from the remarks in the report of the Council of the National Association of Professional Photographers, which we printed last week, in which it is stated that such a club would be a *desideratum* to many of its members. We wish the projected club every success.

The Photographic Society's Affiliation Scheme and Lectures.—We congratulate the Photographic Society of Great Britain, and the forty or more societies affiliated to it, on the large and interested audience at the first of the two lectures on "Photogravure" by Mr. Denison, of Leeds, last Friday at Bloomsbury Hall. Mr. Denison's paper and demonstration, if not new in substance, was a model of lucidity, and what a paper intended for photographers inexperienced in the process should be. We hope this movement will prove to be the nucleus of a technical photographic institute, as suggested last year by Professor Meldola.

Test for Tartaric and Citric Acids.—As these two substances, the latter especially, are of considerable importance in photographic technics, a delicate means of discovering their presence when suspected will naturally be of value. M. L. Crismer, in the *Bulletin Société Chimique*, has recently given a new mode of doing this. If powdered citric acid is mixed with an equal weight of twenty per cent. solution of molybdic acid, and a few drops (ten or fifteen per cent. in bulk) of pure dilute peroxide of hydrogen, and heated for three minutes in a water bath, shaking frequently meanwhile, a pure yellow colour is produced if no tartaric acid be present. But if there be any of the latter substance, even so small a quantity as ·2 per cent., a very distinct blue colour is perceptible.

Pure Glycerine.—According to Dr. J. Lewkowitsch, in a paper read at the Leeds Pharmaceutical Congress, pure glycerine is a far rarer substance than is usually supposed. As a matter of fact, a large proportion contains arsenic. This impurity cannot, as usually supposed, be removed by distillation; and indeed, once a sample contains this substance, the learned doctor is unable to point out any practical process for freeing it from the objectionable contamination. Then, again, so-called chemically pure glycerines contain notable quantities of "organic impurities, either fatty acids, &c., or so-called polyglycerols, under which name I may summarise all those substances having a higher boiling point than glycerine itself." He gives a table containing results of his examination of eight samples of so-called pure glycerine. They contain from about one-fiftieth to one-tenth per cent. of objectionable matter.

"A New Hypo."—According to the Vienna correspondent of the *Paris Photographe*, the days of sodium hypo as a fixing agent are numbered, ammonium hyposulphite being about to be introduced for that purpose. The new "hypo" obviates long washing, is a white substance, dissolves rapidly and well in water, forming a colourless solution. At the same degree of concentration as sodium hypo, ammonium hypo, he says, fixes more rapidly than the former, while the time of washing is reduced by one-half. The new bath, however, throws down a deposit after a few hours, but only needs filtration to restore it to its pristine power. To these vague details of the new hypo the same gentleman adds the information that, so far, it is only a laboratory product, and costs from eight to ten francs a kilogramme. Six years ago, however, hydroquinone cost 400 francs the kilogramme, now it is only 40. Manufacturers hope soon to supply ammonium hypo at the same price as sodium hypo.

A Living Negative.—The recently issued *Proceedings of the Royal Society* contain an article by Mr. H. Marshall Ward, F.R.S., on the action of light on a particular form of microscopic life, the *Anthrax bacillus*, in which the luminous rays are shown to possess a most powerful fermicide property. A series of remarkable experiments are shown, the one possessing most interest, being a veritable living negative. Our readers are aware of the methods employed by microscopic experts in the examination of microbes. A plate of gelatine is prepared in a special manner and impregnated with matter known or suspected to contain certain organisms. After a time, the spores or germs multiply and form colonies, which give rise to a change in the gelatine medium, and so render their presence readily observable. Mr. Marshall Ward prepared one of these cultured plates with *anthrax* spores, and taking certain precautions, indicated by previous experiments, against liquefaction of the entire surface, exposed it to sunlight with a mark over it. In this opaque mask or screen he cut out the letter E, and exposed it to sunlight on Cooper's Hill from 9.30 a.m. on Wednesday, November 30, till 3.30 p.m. the same day, when the plate was removed and kept in a gentle heat till the following Friday, on which day it was examined. The sunlight had killed every trace of *anthrax* where it had access to, and the result was, in Mr. Marshall Ward's words, "The letter E stood out sharp and transparent from the faint grey of the rest of the gelatine." It is not in our province to point out the remarkable results this discovery may lead to, but it is well worth placing on record the first example of a gelatine negative composed of living organic beings.

Latent Images.—At the end of last year we gave our readers a short abstract of a paper by Mr. W. B. Croft on latent non-photographic images, or, as he termed them, Breath Figures. We again refer to the subject, indicating as it does a direct bearing on photographic theory and practice, as it has become a topic of interest, and has led to a special correspondence in the pages of our contemporary, *Nature*. One of Mr. Croft's references was to the image often seen on the inner side of the covering glass of a picture that has been framed and glazed for some years. His explanation is that possibly heat and light have loosened fine paint particles, and these have been drawn up to the glass by the electricity made in rubbing the glass. His final impression is that most of the phenomena cannot be drawn out from the unknown region of molecular agency. One of his inferences is to a blind with embossed letters having left an image on the window near which they lay, though not in contact with the glass. In a further communication a similar effect is described as having been seen by him, as also by another observer, of the words, "coffee-room," set off in the same remarkable manner. Mr. W. T. Thiselton Dyer writes (to *Nature* only) describing an effect similar yet different, that seems to suggest explanations for some hitherto unexplained photographic abnormal appearances. At Victoria Station is a shallow box with glass sides, into which boards are let down with station names painted in white letters on a blue ground, "INNER CIRCLE" being the most frequently used board. One night he observed the box empty, but to his astonishment the words "INNER CIRCLE" were to be seen in quite clear letters on a dark ground. The only explanation he could think of is one which, in a modified form, might account for the imprinting of the subject of an exposed plate on another adjacent unexposed one. It is "(i.) that the light of the lamp had produced some molecular change in the paint coating of the notice-board; (ii.) that this had affected differently the blue and the white paint; (iii.) that the same cause had set up some different electrical condition of the board or the glass; (iv.) that a bombardment of particles of the blue paint had taken place on to the glass, to which they had adhered; and that (v.) the particles so adhering by dispersing the light produced the effect of the pale illuminated ground, while the dark spaces occupied by the letters, being relatively clean, stood out dark."

ON THINGS IN GENERAL.

ONE of the most amusing discussions that have been reported in these pages for some time past is that upon Mr. Haddon's most useful table on angles of view in this year's ALMANAC. Mr. Everitt's comment, taken alone as a sort of elementary disquisition on trigonometrical functions, would be interesting of itself, but, taken as an attack on Mr. Haddon's rule, entirely fails, for a very simple reason. To prove the latter gentleman to be in the wrong, Mr. Everitt takes his general and gives a false particular instance, and on these premisses complacently shows the absurdity of the quoted table. If any one will take the trouble to refer to Mr. Haddon's paper, he will find its title to be *Angle of View Included in a given Plate by a Particular Lens* It is to be observed that a plate, and not a negative or view, is referred to, and the concrete example of the abstract principle is a false one. Any unprejudiced reader will take it to be meant, or any one who wishes to know what angle will be covered when using plates of a certain size. Mr. Haddon was not called upon to state that the axis of the lens was assumed to be coincident with a normal from the centre of the plate, any more than that the lens was supposed to be used with its own proper hood and with its anterior surfaces opposite to the view. Something has to be assumed always in a paper for non-mathematical readers, just as Mr. Everitt himself, in his diagrams, assumes that in the supposititious lens of his hypothesis, the hood was large enough not to interfere with the possible field of view. I recommend every reader of the ALMANAC to take no notice of the objections passed to the paper, but to act on the plain common-sense indications he will obtain from reading it. There is one precaution he must take, he must take the cap off the lens or the angle included will be a negative one; and, further, he must not stand on his head when treating it, or the figures will be transposed.

While upon optical topics, it may be pointed out that, in the discussions on tele-photographic lenses, one point seems to have been

entirely lost sight of, though affecting the apparent effect of architectural views to an important degree. It is that, when a large view of a very distant building is taken by a lens of this type, all ordinary linear perspective effects are lost. A wide-angle lens is often accused of giving exaggerated perspective. One of these necessarily narrow-angle instruments gives no perspective at all, at least none that can be perceived with the unaided eye. If we are to take Mr. Dallmeyer's paper with no assumptions or postulates at all, *à la* Everitt, we shall find that we can pick holes in his paper read at the South London Society. He says, quoting Le Conte, "Parallel lines of all kinds, such as railway sleepers, bridge timbers, &c., converge more and more to a vanishing point." Of course, it is assumed here that the parallel lines are in a plane at an angle to the picture plane. I can most heartily endorse all that the writer says about the extremely interesting nature of the study of vision, and Le Conte's work is sufficiently popular to be understanded of the people. Helmholtz also writes most delightful and popular articles on the subject. His great work on physiological optics, to be had in German or French, is "caviare to the general;" but in the first volume of his series of popular lectures will be found an article on the eye, so full of information and non-technical language, that the book would be cheap if bought for that lecture alone. There is an English translation of the set published some years ago by Longmans.

Mr. Alexander Watts suggestion of the earthenware ground utensils for development is very good so far as it goes. "Cosmos" has shown one disadvantage it possesses, but another still more important is the large amount of solution they require. I have tried them for fixing, where, of course, the amount of solution is of little consequence. Those in my possession, capable of holding a dozen and a half plates, measure $9\frac{1}{2} \times 5 \times 7$ inches, that is, about 332 cubic inches, just under one-fifth of a foot: and, as a foot is about six and a quarter gallons, it will be seen that decidedly more than a gallon of solution is required for eighteen plates.

Such articles, and the correspondence involved, as those upon valuation of businesses, are of great practical value. Many an amateur decides to take up photography professionally, and, with no data such as those I refer to available, might easily lend himself or get led astray in the estimate of the value of a young business. There is no doubt that the question of goodwill is a very thorny one; often there is no real goodwill, and as often it is non-transferrable. But one aspect of the question should be borne in mind when forming a judgment. It is that, although there may be no goodwill, the fact that there is a stand obtainable, and a studio ready to enter, constitute a valuable consideration. Many a man who would like to start a business in a particular neighbourhood finds himself unable to find suitable premises perhaps for years; cases are not infrequent where goodwill of a particular shop has been bought simply to obtain premises and the purchaser starts a business of an entirely opposite character. I cannot but call attention to the letter by operator on this topic, for his data are very misleading. Fifteen shillings a week a piece for printer and reception-room attendant could not obtain nor be expected to obtain efficient workers—it is less than labourer's pay. Then, again, in his figures he estimates 375*l.* for cabinets at fifteen shillings a dozen; that amounts to five hundred dozen, for which he provides five thousand mounts! Finally, in a business of the size assumed, one would think the principal himself could do all the "operator's" work to save that salary. However, from whichever point of view it is looked at, such discussions are of decided benefit.

FREE LANCE.

A NEGLECTED DEVELOPER.

IT is now about twenty years since, soon after its discovery by Schützenberger, that hyposulphurous, or hydrosulphurous acid, as it was called by its discoverer, was first suggested as a possible developing agent; but it was not until early in 1877 that, under the name of the "hydrosulphite developer," it was put forward in a practical form by the late M. Samman, a civil engineer, of Paris.

The hyposulphurous acid of Schützenberger must not be confounded with the compound previously known under the same name, and which, in combination with sodium, forms the familiar "hypo" of the photographer. Up to the time of Schützenberger's discovery, chemists had been in some doubt as to the precise composition of hyposulphurous acid, then so called; its formula was generally written down as $H_2S_2O_3$, but for various reasons, which need not here be specified, many chemists regarded it as having the formula $H_2S_2O_3H_2O$, which, simplified, may be written as $2(H_2SO_2)$. The German chemist referred to showed, however, that his new acid had the formula H_2SO_2, and this set the matter at rest, and it was then recognised that the newer compound was more consistently to be designated "hyposulphurous" acid, while to the older, and hitherto known under that name, the title "thiosulphuric" acid was given.

Schützenberger's acid is formed by the deoxidation, by means of metallic zinc, of liquid sulphurous acid, while the older compound is formed by its sulphuration. The following formulæ show the precise relations of the three acids to one another:—

Hyposulphurous acid	=	$H_2S\ O_2$
Sulphurous acid	=	$H_2S\ O_3$
Thiosulphuric acid	=	$H_2S_2O_3$

The first-named is formed by acting on liquid, or rather aqueous, sulphuric acid with metallic zinc, which, in dissolving, abstracts one atom of oxygen, forming a yellow liquid possessing much greater decolourising and reducing power than sulphurous acid itself. It is, however, a very unstable preparation, and a preferable way to utilise its reducing action is in the form of its sodium salt. This, in conjunction with pyro, was, in fact, the hydrosulphite developer of M. Samman. A concentrated solution of sodium bisulphite is poured into a flask or bottle containing granulated zinc or zinc clippings, and allowed to stand for half an hour. The zinc dissolves, giving rise to the new acid, and the solution then contains, in addition to sodium hyposulphite (not thiosulphate), zinc-sodium sulphite, the former of which is really the active agent. This compound solution, mixed in equal proportions with a four-grain solution of pyro, constituted the developing solution which was remarkable for the regularity, beauty, and cleanness of its action.

At the time of its introduction gelatine plates were practically unknown, and the early experiments were made with collodion dry plates. With these it was found that a better though less energetic action was attained if, instead of the bisulphite, neutral sodium sulphite was employed, or the former salt neutralised, or partly so, with sodium carbonate. Later on M. Samman modified his formula, and in the ALMANAC for 1878 gives one in which the sulphite and bisulphite are combined, and instructions given to neutralise the free acid of the latter—in other words, to convert it into sulphite. It may be added that a solution of ordinary hypo, treated in the same manner with zinc, exhibits developing power, but, as might be expected, its fixing action is both more energetic and more rapid.

It should be noted here that, although the solution formed by the action of zinc upon the neutral sulphite possesses devoloping powers when mixed with pyro which the plain sulphite does not, it contains no zinc in solution, as may be proved by testing it with sulphide of ammonium. Its developing action is, however, much less energetic than when the bisulphite of soda is used, and was at first supposed to be due to alkalinity of the sulphite; but such is not the case, as it may be slightly acidified after decanting from the zinc without losing its power. To acidify the sulphite before pouring on to the metal would be equivalent to using a small proportion of bisulphite.

The solution, as has been already stated, attains its full energy after half an hour's contact with the zinc, when, if decanted, it commences at once to lose its newly derived power, reverting to the state of sodium bisulphite, the zinc being thrown down as a white powder. This change occurs with less rapidity after the pyro has been added, owing, no doubt, to the absorption of oxygen by the pyro instead of by the hyposulphite. In fact, the pyro and hyposulphite solution remains clear, and without deposit, for many hours. This peculiarity was noted in these pages at the time, but it remained for the late Mr. Herbert Berkeley, some years later, to apply the alkaline sulphites for the purpose of keeping the developing solution clear and preventing discolouration of the gelatine film.

As has been said, the early application of this developer was in connexion with dry-collodion plates, for which it proved most

suitable. The character of the image was entirely different from that produced with the ordinary alkaline pyro, partaking more of the pure metallic appearance of the wet plate. This characteristic rendered it especially suitable for transparency work, and even now without any modification it can be heartily recommended to the users of collodion emulsion. It is extremely easy of preparation, all that is required being a wide-mouthed bottle three parts filled with scraps of zinc, preferably in the form known as "granulated," granulated zinc being obtainable for a few pence a pound at any chemist's. Into this bottle a strong solution of bisulphite of soda—200 grains to the ounce of boiling water, allowed to cool after solution—is poured, and simply allowed to stand for half an hour or so, when it is ready to mix with the pyro solution. When done with, the solution should be poured off the zinc into a separate bottle and well corked, and in a few hours the zinc it contains will be precipitated, and the solution will have returned to much its original state, and may be used again. The zinc bottle should be rinsed out with clean water, ready for use when wanted again.

Metabisulphite of potash may also be used, and if found too energetic, that is to say, if it causes fog, a little carbonate of soda may be added until the smell of free sulphurous acid is greatly reduced. It may be noted that this developer does not owe its power to alkalinity, as it is more energetic when the sulphurous acid is used in the free state.

But, turning to gelatine plates, unfortunately the hydrosulphite developer does not specially recommend itself, at least in its original form. It is with the intention of making the cause of this clear that I have dwelt at such length on the chemistry of this curious compound, which, as I have shown, in the course of oxidation, deposits an insoluble basic salt of zinc. In conjunction with collodion plates this mattered little if it occurred at all, as the deposit formed only on the surface of the film, and was easily removed by washing or by other means. Not so with gelatine, however, for apparently by some special attraction exerted by the gelatine not only does this precipitation occur to a much greater degree, but the precipitate is formed in the pores of the gelatine as well as on the surface. From the latter it is easily removed by washing and friction if necessary, but from the body of the film it is not so easy to dislodge it, and the consequence is an unpleasant veil of a pinkish white shade that especially unfits the solution for transparency work, if not indeed for negatives.

W. B. Bolton.

(To be concluded.)

RETOUCHING AND VARNISHES.

As a retoucher of many years' experience, and having—no doubt as many others have done—occasionally had *failures*, which I invariably find teach us far more than our successes, and, having overcome them, I think that I may venture to point out to less experienced "knights of the pencil" how they may succeed in varnishing a retouched negative without losing so much as a single stroke of their carefully placed wok.

Pardon the digression, but I venture to think that, if the *whole* of the work of some of the "retouchers" of the present day came off with the varnish, the negatives would yield much more satisfactory prints, both as regards likeness and artistic effect.

To begin at the beginning, let us take the *medium*. I have tried many makes, and have been successful with them all. Of course I have my favourites, but only so far as regards the *tooth*, not because I find one comes off with the varnish more than another. I do not recommend retouchers to make their own medium, as it is not worth bothering with. A shilling or eighteenpenny bottle will do some hundreds of negatives if it is not wished for it to come off again with the varnish.

For those who may like to make their own, as I know there are many who will not buy anything they can possibly make, I have found nothing better than common resin dissolved in common turpentine. I have used such a mixture for years, and found it work splendidly. I should simply get a lump of resin, about the size of a walnut, put it in an ordinary one-pound jam pot, about half-filled with turpentine, and stand it on the hob, not too near the fire. When dissolved it should look something like strong ale, and when carefully *decanted* into a bottle it is ready for use. Personally, for some time past I have used the Autotype Company's medium. Do not leave the cork out of your medium bottle for long, as, if you do, you will soon have only a nasty sticky mess left. I do not like cotton wool for placing it on the negative, as it so often leaves it messy, with little pieces of the wool sticking to it. You are also apt to leave on too much, which, if you do, you may reckon upon a good part coming off again, and the retouching with it when varnishing. I find the best plan is to keep an old pocket handkerchief for the purpose, stretch it tightly over the end of your forefinger, then tip up your bottle of medium so that it moistens the cork, and with the cork moisten the handkerchief on the end of your finger, then rub it *well* on the part of the negative to be retouched. If it is a large head, you may require to give two dabs on the finger with the cork, but one is generally sufficient; but be sure you do not leave on too much. Then you may commence retouching almost at once, or you may leave it for a few hours, as convenient.

Now, as to the varnish and varnishing. I may also say that I have worked with many different varnishes, as a retoucher must necessarily do in going from berth to berth, and some employers are very obstinate and think the varnish (or anything else) that was used by an old assistant must do for the new, especially if it happens to be a little cheaper than what the new man recommends.

The varnish I generally use when I have my own way is the ordinary "white hard," to be obtained at any oil and colour shop, thinned down with methylated spirit and filtered. In a future article I may describe a very useful varnishing pot that I have in use.

Do not use the varnish thick, as it takes longer to set hard, and is likely to become "tackey" in hot weather, when the prints would leave marks upon its surface, and dust be more likely to adhere to it.

Although I prefer the "whitehard" varnish, most of the photographic varnishes in the market are good, and I have not yet come across one that would shift the pencilling if properly treated. Some few years ago I had just commenced work in a new berth, and had varnished about half a dozen negatives before leaving in the evening; my surprise may be imagined, on looking through them the next morning before sending them down to the printers, to find that the retouching was scattered all over the plates instead of on the face, &c., where I had placed it. I showed them to a lady retoucher sitting at a desk next to mine, and asked her if she could account for it in any way; of course, she laughed at the "new man," and told me that the emulsion had been thoroughly "cooked" long before it came into our hands, and, if I would be satisfied with only *slightly* warming it up, I should find matters all right.

I think that girl had got to the bottom of moved retouching. I tried her plan, viz., only *slightly* warm the plate, then varnish, being careful *not* to pour the varnish on the retouched parts, stand the plate in a rack to set for a few minutes while some more are being varnished, then commence with the first and dry them off by thoroughly warming them. I was never troubled any more; that was the worst case I ever met with, and I think that the varnish had a good deal to do with it; it was a home-made varnish entirely. The principal thought it perfection, made it himself, and kept the ingredients a secret, which I think was a blessing to photographers generally.

I have met at various times with slight cases of moving, but have always traced it to the medium being too thick on the plate, or else the plate being made too hot before varnishing, generally the latter.

In some firms all the retouching is done upon the varnish, and in quick trades of the middle class it is perhaps best to do so, as I have found that more work can be got through in that way, the medium upon the varnish giving a better tooth for the pencil, and the negatives can be varnished as soon as they are dry by a lad, and so be ready for the printer almost as soon as retouched. Now I have found that it is the *medium* upon the varnish which rubs off (and, of course, the retouching with it) with the constant dusting, &c., so that if the negative is retouched *before* varnishing, and one wishes to do only a *little* more after, it is best to dispense with the medium altogether, the varnish itself generally giving enough tooth; but, if the whole, or a great part of the work, is done upon the varnish, medium is necessary; to protect which in the quickest way is to *thoroughly* warm the plate, when it will be found that the medium and retouching have sunk into the varnish and is quite safe.

A word as to collodion. If you value your negatives, never allow even a single silver print to be taken from them in this damp climate of ours without giving them first a coat of something damp-proof. If you don't like varnish, give them a coat of enamel collodion: or, what is better, both, as, if you coat first with collodion, and, when that is dry, give a coat of varnish, you will have the best waterproof coating known.

If you don't like coating the plate with anything, then have a sheet of talc between the plate and print. But collodion has another

use. There is sometimes a dark piece of drapery you would like removed, a lady's waist may be too thick and require some off on the shadow side, or some other dark object you would like taken away, and yet you cannot get on enough pencil to do so, even by working under and over the varnish. Now, if you will use both collodion and varnish, and work on each with a little medium, you may go on indefinitely, using each alternately until the desired effect is produced, and, if both are used thin, the thickness of half a dozen coats is inappreciable. Should the collodion at any time take a slightly opalescent appearance, it will entirely disappear with the succeeding coat of varnish.

HAYNES WELCH.

DETERMINATION OF PLATE SPEEDS.

MR. WILLIAMS has not seen fit to avail himself of Messrs. Marion & Co.'s invitation to acquaint himself practically with our method of speed determination, nor to accept our offer to submit his negatives to us for measurement; and, as we have neither time nor inclination to enter into a prolonged discussion with him, we must leave him to discover for himself the fallacy of deciding percentage differences in speed by the ocular comparison of negatives. We should, however, like to say a few words more before, as far as we are concerned, the matter drops.

The system of speed determination which we have freely given to the world is, we believe, destined eventually to be generally adopted; in the meantime we can well afford to look on with unconcern while people, who either cannot or will not study the principles and theoretical considerations upon which the system is based, set themselves ruthlessly to destroy what we have taken years to build up.

We should be the last to claim that the working details of the system are incapable of improvement; but, while we warmly acknowledge the efforts of Mr. Cowan and Mr. Cadett to work the system with accuracy and efficiency, we cannot take any responsibility upon ourselves should errors occasionally arise. The adoption of the check plate, on the initiative of Mr. Cowan, is a proof of the anxiety of those gentlemen to take every possible precaution to prevent error.

Mr. Williams' repeated assertion, that he can detect by ocular inspection a difference of ten per cent. in two exposures, convinces us that he can never have devoted any attention to the law which is the foundation of our system, and which is graphically expressed by what we term the "characteristic curve." If he were to plot the characteristic curve of a plate, and then consider the effect upon it of a difference of ten per cent. in the exposure, he would easily convince himself of the utter futility of expecting to find any ocular evidence of such differences in two negatives.

Apart from this, Mr. Williams has probably never realised that, in the case of two plates of identical speed but having different characteristic curves, it is absolutely impossible to produce two identical negatives; and this fact, unrecognised by Mr. Williams, has led him to conclusions which any one acquainted with the characteristic curve would at once have seen to be fallacious. Nor has it probably, on the other hand, occurred to Mr. Williams that two negatives, on two similar plates, may have identical printing values, and yet be enormously different when examined either by the eye or by measurement. This is only another way of saying that, in a thickly coated plate, having an extended period of correct representation, there is considerable latitude of exposure. These are facts which may appear to be paradoxical to Mr. Williams, but for the explanation of which we can only refer him to our papers.

We have recently felt that we, perhaps, made a mistake in adopting, for our speed scale the numbers which we did, and that speeds now expressed as 10, 20, 30, for example, would have been better expressed as 1, 2, 3. The public seem to estimate these numbers far more by their differences than by their ratios, and have so acquired an exaggerated idea of their influence upon the exposure. Whether the speed of a plate is, in practice, ninety or one hundred, matters absolutely nothing.

It is somewhat amusing to find how photographers, who have existed for so many years without any system of speed determination whatever, all at once demand such hairbreadth distinctions. We suppose it will be some time before they learn to appreciate the degree of exactitude which it is either possible or necessary to reach. We are glad to say, however, that it is possible, by our method, to estimate the speed of a plate with considerably greater precision than is actually required in practice; but this fact will not be brought home to Mr. Williams and photographers generally till they turn their attention to the law which governs the action of light upon the sensitive plate.

If, when Mr. Williams has studied our theory of the action of light, he succeeds in disproving it, we shall feel compelled to pay more serious attention to him than we do at present; but, till then, we prefer to accept as true a theory which is in such complete accord with photographic phenomena generally, and in opposition to which he has not advanced one particle of evidence. We hope we may have said enough to lead Mr. Williams to consider whether, after all, our method of speed determination may not stand upon firmer ground than he at present wots of.

F. HURTER,
V. C. DRIFFIELD.

IMITATION PHOTO-ENGRAVINGS.

I WAS glad to notice in the last issue of the JOURNAL that you make mention of some "grating photographs" produced by Mr. John Robertson, of Dundee, as this is a style of picture that I have myself done a good deal with during the last two years or more since I first got the idea from your pages. The results, when properly executed, are exceedingly attractive—far more so, I think, than actual screen pictures, as the gradation is far softer and more natural than that produced from an inked plate, and I am sure more photographers would adopt the novelty if it were not for the difficulties involved.

It was a long time before I could produce anything that was at all presentable, although I followed as closely as possible the instructions given for preparing the grained screen, as well as its combination with the photograph. To any one taking up the thing for the first time, the production of the grained surface would appear, from the directions, to be the simplest operation in the world, the chief difficulty being, apparently, to select the kind of grain that will look best. But, when he comes to try it, it will be found anything but the easy job imagined. It is not only that the task of obtaining an even grain, of whatever kind it may be, is far more difficult than it seems, but, having obtained the necessary degree of uniformity, the size and density of the grain are most difficult for a novice to hit, and, moreover, have to be varied with the dimensions of the picture, and very often with the character of the negative.

Although I have never practically worked any of the photo-engraving methods, I can well conceive that the question of grain is an even more difficult one than is the sort of hybrid process I am now referring to, because, in addition to other troubles, there is that of getting a grain that will not too readily fill up in inking; in fact, the grain must not be finer than the absolute exigencies of gradation require. In our present method, however, as we have no inked plate to deal with, the grain may be as fine as we please; indeed, the finer it is the softer and better will be the gradation. Here was the first trouble I encountered. I could not persuade myself to make the grain fine enough in the first place, and I then rendered its coarseness more obtrusive by making the negative too dense.

It is impossible to convey in a mere written description either the size of grain necessary or the density of the grain negative, because these, as I have said, vary so much with circumstances; in fact, I am convinced that nothing but actual experience with a variety of different "gratings," as well as portrait negatives of different kinds and densities, will enable the operator to secure exactly what he wants; but, if he will bear in mind one or two simple points, I think he may save himself much trouble. Let only rather thin negatives, but full of detail, be selected for the purpose, let the grain be as fine as may be without being too fine to deprive the picture of the character it is sought to give it, and let it not be made too obtrusive by giving too great density to the grating negative. It has to be borne in mind that, like retouching, the effect produced on the print is far greater than appears in the negative.

As regards the production of the grained plates, that naturally constitutes the chief difficulty; I believe they are to be obtained commercially, though I have as yet been unable to secure anything satisfactory at a reasonable price, so have had to make my own; and perhaps my experience may be of some assistance to others, as I think I have tried every method I have seen suggested or that I could suggest myself. Ruled screens are, of course, completely out of the question unless you have a ruling machine, and even then I question whether the mechanical difficulties involved are not greater than the result justifies.

I have tried photographing various kinds of gauze, metallic and otherwise, perforated zinc, perforated card, *et hoc genus omne*, but am always met with the same difficulty, namely, a perfectly even division of the original. In any of the woven fabrics it will always be found that there are here and there single threads or strands of different thickness to the rest, or that are badly spaced, and in such materials as perforated zinc there seem to be at regular distances wider spaces between the lines of perforation, as if these were made by means of

rollers which at each revolution imparted their own irregularities to the sheet of metal. Every one of these departures from strict uniformity produces its effect upon the resulting grain; indeed, when this is so fine as to be scarcely distinguishable to the eye except with the aid of a magnifier, the irregularities seem to be even more prominent than on the larger scale.

A method of ruling, described about two years ago, in which a perforated strip of paper or tinfoil is drawn across the surface of a sensitive plate, so as to form a series of fine lines when exposed to light, seemed to promise a way out of the ruling difficulty, and on a small scale I found it answer very well. But I was not fortunate in being able to procure the necessary tools for making the perforations fine enough to work directly, and, when the dimensions were increased to a sufficient extent to admit of reduction, the mechanical difficulties seemed to be increased out of all proportion, and I had to relinquish that method.

Eventually I gave up attempting to get a mechanical grain of any kind, and turned to what may be called, in contradistinction, a natural grain—one obtained by spreading a granular substance evenly over a suitable surface. This at first offered no great promise of giving a better result, though after some perseverance I at last managed to arrive at something that seemed to be nearer the mark. The process I eventually adopted consisted in spreading the grain evenly over a flat surface, and then photographing this under proper conditions of lighting, when a beautiful grain of the greatest uniformity can be obtained, and that is more than I can say in favour of any of the methods of pressing the grained surface into tinfoil or soft metal, so as to form a matrix from which to take impressions in gelatinous or other ink.

I tried first of all spreading the granular material on glass, with the intervention of an adhesive, and, when dry, using this as a negative by transmitted light, from which to reproduce others in film form. But the result was unsatisfactory, as I could not find any grit that was translucent enough and yet gave a good grain. Such screens were, in fact, too opaque, whereas the beauty of the reproductions by *reflected* light from a granular surface is, that you get what may fairly be called a selective grain, that prints more forcibly in the shadows than in the high lights.

The plan I have used with most success consists in, first of all, stretching a sheet of paper smoothly and lightly over a plate-glass surface, and coating this in turn with a thin solution of gelatine, spread very evenly by pouring it on and off again, rather than with a brush. When this is perfectly smooth, I sift over it, by means of a perforated zinc tray, powdered emery, mixed in three different grades of coarseness—40, 50, and 60, as the numbers go—and, when the gelatine has set, I shake off the superfluous powder by gently tapping one corner of the plate on the table. Then another sheet of smooth paper, and a second piece of plate glass are laid on the dusted surface, and as much pressure applied as I dare without danger of breaking the glass, in order to render the surface as smooth as possible, when it is allowed to dry.

The dark tint of the emery prevents any harshness, or rather hardness, in the subsequent photographing, and if a good diffused light, coming principally from the front, be used, a grain may be produced by reduction that will rival in softness, evenness, and minuteness, anything in the way of photogravure, and give printing results upon albumen or gelatino-chloride paper that are far preferable, I think, to the mechanical "Meisenbach" grain. In effect, the prints, if toned dead black, look just like photogravures, and are no more difficult to make, when the suitable grain negative has been selected, than plain ones.

The film negatives are made on collodion emulsion, the glass being first rubbed with talc to make the collodion "strip," and, of course, the grain may be reduced to any degree of fineness. I have been unable to get the clearest and best "gratings" by using the process of reversal by means of nitric acid or ferric sulphate, but by the direct method no difficulty will be experienced if too strong a light be not used, and no attempt made to get density. The grain negative should be as delicate as possible.

The trouble of spreading the emery may be saved by using ordinary emery cloth, if it can be got free from cracks and creases, and is strained evenly on a flat surface; but I prefer to spread the powder myself.

W. LINDSAY.

PROPOSED NEW CENTRAL PHOTOGRAPHIC CLUB AND INSTITUTE.

WE have received the following official communication on the subject:—

A PROPOSAL has recently been discussed and adopted by a provisional committee, having for object the establishment of a photographic club and institute, occupying a central position in London, easily accessible from the principal railway termini and by the chief omnibus routes, &c., and therefore convenient both for town and country members. The provisional committee discussed the following leading points of the scheme:—

1. That the club be called the Central Photographic Club.
2. That the club premises be open during recognised club hours, refreshments being obtainable, and the premises to comprise meeting room, smoking room, library, dark room, and other photographic and ordinary club conveniences.
3. That membership be at the disposal of ALL INTERESTED IN PHOTOGRAPHY, both in town and country.
4. That the subscription for town members be 1*l.* 1*s.*, and for country members 10*s.* 6*d.* per annum.
5. That it is desirable to make the social element a strong feature of the proposed club, while at the same time technical photographic meetings, lantern entertainments, exhibitions of pictures, apparatus, &c., should also be held.

The idea of the proposed club as outlined above is strongly supported by a great many gentlemen who have expressed their intention of joining. For this and other reasons a very large membership may be anticipated. A meeting (to which all interested in the proposed club are hereby invited) will be held on Monday, March 6, at eight o'clock, at the Memorial Hall, Farringdon-street, E.C., to appoint a permanent working committee for organizing the club, to discuss details and suggestions, &c., and generally to arrange preliminaries.

Provisional committee:

BIRT ACRES, A. COWAN, T. E. FRESHWATER, F.R.M.S., F. W. HINDLEY, J. HOWSON.

REDMOND BARRETT, R. BECKETT, F. W. EDWARDS, T. FALL, E. HOWARD, FARMER.

R. P. DRAGE, WM. FENTON JONES, A. HADDON, A. HORSLEY HINTON, JOHN A. HODGES, CHARLES H. OAKDEN.

J. TRAILL TAYLOR, T. BOLAS, T. C. HEPWORTH, H. STURMEY, E. J. WALL, THOMAS BEDDING.

WOOLWICH PHOTOGRAPHIC SOCIETY'S EXHIBITION.

THIS young Society is fortunate in having for President such a prolific producer of photographs as Mr. A. R. Dresser, inasmuch as at its first annual Exhibition, which was held last week, it was able to make up for a comparatively small display of competitive work, by showing a large selection of that gentleman's well-known pictures, and thus the Exhibition as a whole, which also included non-competitive exhibits from Mr. Pringle, Mr. Davison, and Mr. Seyton Scott, was not shorn of any of the elements of attractiveness to the outside public. The Exhibition, which was held in the large room of the Woolwich Polytechnic, was decidedly creditable, as a first attempt, to all concerned in it.

In the class for Members' work we liked Mr. A. Godfrey's portrait studies, and the Rev. E. J. Doherty's large yacht pictures, as indicating promise of better things in the future. Mr. G. C. King showed, in *Sunset after Storm*, a capital study, in which the heavy shadows of the subject were well rendered; Mr. W. Davies, a charming view of Shanklin, with the peculiar uranium tone which Mr. Dresser affects, and in which he finds many imitators in this and other exhibitions. In the class open to all amateurs, Mr. C. F. Archer's large bromide study of a female head, *Interested;* Mr. J. A. Young's portraits; Mr. C. Court Colea' Oxford interiors and Iffley views; and several of Mr. T. M. Brownrigg's Pall Mall exhibits were noticeable. Mrs. S. Frances Clarke showed some soft, delicate, and well-lighted outdoor studies, the lady's figure in them being charmingly posed, which to our thinking, were unfortunate in not securing an award. In the class open to amateurs who had never received an award in open exhibitions, we had seen and criticised most of the pictures before. Viscount Maitland, Mr. Edward Hawkins, Mr. C. H. Oakden, Mr. W. Howell, Mr. J. O. Grant, Mr. H. E. Farmer, and others showed good and familiar work therein. The class for hand-camera work was a small one, but Mr. W. Thomas, Mr. A. Brooker and Mr. Charles Job made up for the paucity of the exhibits by the good quality of their work.

The Judges were Messrs. A. R. Dresser and Andrew Pringle, and the following were their awards:—Class 1. Prints (Members only).—Bronze medal, C. G. King; bronze medal, Geo. J. Gill; diploma, W. Dawes. Class 2. Lantern Slides (Members only).—Silver medal, W. Dawes; bronze medal, C. G. King. Class 3. Prints, open to any amateur photographer.—Silver medal, C. Court Cole; bronze medal, T. M. Brownrigg. Class 4. Prints, open to any amateur photographer who has never received an award in an open competition.—Silver medal, Chas. Moss; bronze medal, Viscount

Maitland; bronze medal, Ed. Hawkins; diploma, Ernest R. Ashton Class 5. Lantern Slides (best set of six), open to any amateur photographer.—Silver medal, W. Taverner; bronze medal, H. E. Farmer; diploma, E. Hawkins. Class 6. Set of four prints taken with camera held in the hand, open to any amateur photographer.—Silver medal, E. Hawkins; bronze medal, Chas. Job; diploma, A. Brooker. Gold medal for best picture in Exhibition, Chas. Moss.

THE PHOTOGRAPHIC SOCIETY'S LECTURES ON "PHOTOGRAVURE."

No. I.—Preparation of the "Resist."

In connexion with the affiliation of photographic societies to the Photographic Society of Great Britain, Mr. Herbert Denison, of Leeds, gave on Friday last, February 17, the first of two lectures on *Photogravure*, when Mr. J. Traill Taylor presided. The attendance at Bloomsbury Hall was an extremely large and influential one, including, besides many members of the Photographic Society of Great Britain, several well-known engravers and process workers, and members of the following Societies:—Photographic Club, London and Provincial Photographic Association, South London Photographic Society, Photographic Section of the Croydon Microscopical Society, North Middlesex Photographic Society, North London Photographic Society, Greenwich Photographic Society, Brixton and Clapham Camera Club, Leeds Photographic Society, and many others. Several ladies were also present.

The lecturer, having said that he had accepted the invitation to give the lectures because he was glad to see the Society taking its proper place in the education of photographers, alluded to the difficulties of obtaining assistance or advice in the practical working of photogravure, and expressed his indebtedness to Mr. A. W. Turner, of the Survey of India Office, Mr. Bolas, and Mr. W. T. Wilkinson, for much useful information He commenced his subject proper by indicating the kind of plate one aims to produce in photogravure. The plate, he said, is of copper, with the image in intaglio, that is, the portions of the plate bearing the darks of the picture are sunk, having been eaten out by an etching fluid, and the whites are represented by the original bright surface of the plate which has been protected from the action of the solution. The plate is printed from by having a specially prepared stiff ink, composed of lamp-black or other pigment, ground in linseed oil, rubbed into the depressions by means of an ink dabber, *i.e.*, a roll of woollen material, the fibres at the end of which have been frayed out. A small quantity of the ink is taken up on the frayed end, and with a rocking motion and some pressure the whole surface of the plate is inked. The plate is then wiped entirely clear, the ink remaining in the etched portions. To print, a sheet of damp paper, with a few thicknesses of "blanket" behind it, is placed on the plate, and the whole passed through the rollers of a copper-plate press, the shadows, half-tones, and high lights of the resulting print being proportioned to the depth to which the image on the plate had been etched.

Having pointed out that if the etched spaces were not broken up into a number of minute depressions instead of a few large ones, the ink would be wiped out from the hollows as well as from the surface, the lecturer indicated how the copper surface could receive the necessary protection by the application of a solution of bitumen in benzole, the effect being upon the evaporation of the solvent, to cover the plate with little dots which resist the action of the etching fluid, and to impart a grain to the picture. A carbon negative, called the "resist," is next placed on the copper plate, the thinnest parts of the gelatine offering the least resistance to the action of etching solution, and so on through the half-tones to the high lights. Upon the resist being cleaned off, small bright points, which have been protected by the bitumen dust, stand up to the original surface level, and form the grain.

From the principles of the process, which is known as the Talbot-Klic, and is extensively employed commercially, Mr. Denison passed to its practical side, enumerating the following list of materials which are required; A printing frame, Autotype special transparency tissue for the transparency, a tin box with a weighted lid to keep the tissue in, an actinometer, a porcelain dish, and a solution of bichromate of potash (six drachms to the pint) for exciting the tissue, ferrotype plates to dry the latter on, two developing trays of tin, a squeegeeing board covered with zinc, a small gas stove, five per cent. solution of alum, methylated spirit, glass plates coated with bichromated gelatine. The foregoing are necessary for the transparency. For the plate the following are required: Copper plates (obtainable from Messrs. Hughes & Kimber, West Harding-street, E.C., or Mr. A. Nicolls, Cyrus-street, E.C.); some pure cotton wool (to be obtained from chemists) and washed whiting for cleaning and polishing the plates; a dusting box about a foot square at base, and eighteen inches high, arranged to revolve upon pivots placed in the middle of each side, with a door at the front through which a plate may be passed after shaking up the dust by causing the box to revolve; about a pint of powdered bitumen or asphaltum to place in the box; a sheet of iron about a quarter of an inch thick, and larger than the copper plate; this is to place over the gas stove, and is used for fixing the bitumen dust to the copper by heat; a flat ruler; a draughtsman's pen; a camel's-hair brush for varnish; five solutions of perchloride of iron of different strengths, and five dishes for them.

The negative required should be of the class to give a good print in platinotype or plain silver and free from defects. Having described the sensitising of the Autotype Company's Special Transparency Tissue by its immersion in a bichromate bath of the above given strength, pigment side downwards, until it curls outwards, this being, he said, a better guide than stating a definite time, although the latter is usually from two to four minutes, he said it is squeegeed, tissue side down, to a clean ferrotype plate, and dried at a temperature of 65° in the dark and stripped, when it will have a fine bright surface. The printing of the transparency from the negative was next dealt with, and its development upon glass coated with bichromated gelatine exposed to light, so as to form an insoluble substratum for the transparency. One of these plates being placed in a dish of cold water, the exposed tissue is also placed in it, face upwards. As soon as it has uncurled, the exposed tissue is squeegeed in contact with the substratum on the glass plate, and developed in water at 95°. When the pigment commences to ooze out at the edges, the paper backing can be removed with the finger, and the warm water is dashed over the plate until the soluble gelatine has been washed away.

Mr. Denison said that, as the transparency was to be printed from, it should be judged from the same standpoint as one would a negative, being vigorous and full of detail in the high lights, showing very little clear glass when placed on white paper. Both in regard to the transparency and the carbon negative to be made from it, the lecturer fully entered into details, and at the conclusion of the paper demonstrated sensitising the tissue, development, &c., in accordance with the details laid down.

To-night (Friday), the second lecture takes place at the same hall at eight o'clock, the following being the syllabus:—*Résumé* of first lecture; preparation of the copper plate; laying the ground; fixing the ground; transfer of the resist to the copper; development of the resist; drying off; protecting the margin; the etching; finishing and retouching the plate; pulling a proof. A practical demonstration will be given of each step in the process after the verbal description.

THE PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The Annual General Meeting was held on Monday, February 20, in the rooms of the Photographic Society of Great Britain, Mr. J. Traill Taylor (President) in the chair.

The President said that he regretted that he had been unable to attend the Committee meetings, but that his attendance had really been unnecessary owing to the fact that the late Mr. William Bedford, as Chairman of Committee, had been such an efficient head. He had intended to refuse re-election as President in favour of the late Mr. Bedford, and had already intimated his intention before Mr. Bedford's death. That gentleman's loss to the Association was such a blow as could hardly be expressed, but he (Mr. Taylor) was still obliged to retire from the presidency owing to the fact that his medical adviser had ordered him to withdraw as far as possible from all evening engagements.

The report of the Committee was taken as read.

Mr. J. Spiller (the Treasurer), in presenting his report, said that the Association was to be congratulated on an unusually good balance-sheet for two reasons—firstly, because the disbursements had been unusually small; and secondly, because a windfall of fifty guineas had come to the Association through Dr. Lindsay Johnson. The list of subscribers of 1*l.* and upwards was better than for many years past, and the only unsatisfactory thing about the balance-sheet was that the small subscriptions of under 1*l.* still reached but a very small total. In moving that the balance-sheet be adopted, he wished to include special thanks to the Photographic Society of Great Britain and to Mr. Frederick Hollyer for their substantial contributions to the funds.

Mr. F. W. Hindley inquired whether the total of small items had been diminished owing to the fact that the subscribers had increased their subscriptions and come into the list of 1*l.* and upwards.

The Secretary replied that this had only occurred in one instance.

The balance-sheet was unanimously adopted.

Mr. T. E. Freshwater expressed deep regret at the retirement of Mr. J. Traill Taylor, who had been for many years a most valuable President. The Association was greatly indebted to him, not only for his presiding at the annual meetings, but also for very considerable help

that he had given in other ways. He begged to nominate Mr. George Mason, of Glasgow, for the position of President. Mr. Mason was unanimously elected.

The following were elected members of the Committee:—Messrs. R. Child Bayley, F. H. Berry, Robert Beckett, R. P. Drage, T. E. Freshwater, F. W. Hindley, H. R. Hume, P. G. Hunt, T. C. Hepworth, Alexander Mackie, E. W. Parfitt, and W. J. Tabrum. As no new nominations had been received for Treasurer or Trustees, these remain as before, namely, Trustees, Captain W. de W. Abney, C.B., R.E., and Mr. W. S. Bird; Treasurer, Mr. John Spiller, F.I.C. Messrs. Thomas Bedding, H. G. Rapson, J. Guardia, and Burnett were elected Auditors.

Votes of thanks to the Treasurer, Secretary, Auditors, and the photographic press and the retiring President concluded the meeting.

The following is the balance-sheet for the year ending December 31, 1892:—

RECEIPTS.

	£	s.	d.	£	s.	d.
Bank Balance from 1891	97	14	3			
Balance in P.O. Savings' Bank, 1891	3	7	0			
Pension Fund 2¾ per cent. Consols	250	0	0			
				351	1	3
Bequest from the estate of the late Mrs. Emma Mary Evans, per Dr. Lindsay Johnson	52	10	0			
The Britannia Works Company	5	5	0			
Messrs. Elliott & Son	5	5	0			
The Paget Prize Plate Company	5	0	0			
The Cheltenham Amateur Photographic Society	3	3	1			
The Autotype Company	2	2	0			
Mr. Francis Bedford	2	2	0			
THE BRITISH JOURNAL OF PHOTOGRAPHY	2	2	0			
Messrs. Henry Dixon & Son	2	2	0			
The Eastman Company, Limited	2	2	0			
The Photographic News	2	2	0			
Messrs. Ross & Co.	2	2	0			
Mr. William Bedford (the late)	2	0	0			
The Blackfriars Company	1	1	0			
Mr. F. W. Hindley (Fallowfield)	1	1	0			
Messrs. Hazell, Watson, & Viney	1	1	0			
Mr. Francis Ince	1	1	0			
Messrs. Marion & Co.	1	1	0			
,, Mawson & Swan	1	1	0			
,, Geo. Nelson, Dale, & Co.	1	1	0			
,, Perken, Son, & Rayment	1	1	0			
The Practical Photographer	1	1	0			
Mr. John Spiller	1	1	0			
,, John Stuart	1	1	0			
Messrs. Watson & Son	1	1	0			
,, Wratten & Wainwright	1	1	0			
Mr. H. Walter Barnett	1	0	0			
,, Geo. Mansfield	1	0	0			
,, Geo. Mason	1	0	0			
,, Arthur Reston	1	0	0			
Donations and Subscriptions under 1*l.*	12	12	2			
				118	2	2
Repayment on Loans	2	0	0			
Pall Mall Exhibition, 1892	8	10	3			
Interest on Investments	6	19	8			
Mr. Fred. Hollyer's Exhibition	12	5	0			
Collections at Meetings	1	9	2			
				31	4	1
Balance due to Secretary				3	8	0
				503	15	6

EXPENDITURE.

	£	s.	d.	£	s.	d.
Grants and Loans	28	16	6			
Printing and Stationery	3	4	4			
Postage	3	6	6			
Sundries	1	5	6			
				36	12	10
Pension Fund in 2¾ per cent. Consols	250	0	0			
Interest on Pension Fund in P.O. Savings' Bank	10	7	11			
Balance at Bank	206	14	9			
				467	2	8
				503	15	6

Audited, compared with Vouchers, and found correct { THOMAS BEDDING. J. GUARDIA.

January 30, 1893.

DURHAM CITY CAMERA CLUB EXHIBITION.

AN Exhibition of members' work was held in the Shakespeare Hall, North-road, Durham, on February 14. There were five classes restricted to members, and a sixth class for lantern slides, open to amateurs and professionals alike. In both departments there was a large number of exhibits. In Class 1, for the best set of six prints of general out-door work, Mr. J. Morson, jun., secured the premier honours. The set for which he obtained the bronze medal included photographs of prize sheep and poultry. They secured general admiration. In the same class Mr. F. Cluff was awarded a certificate. Mr. Cluff's work included three landscapes—a view of *Elvet Bridge*, another of *The Count's House*, and a study in hoar frost—and three snap-shots of golf-players. Mr. R. H. Blythe, in the first class, was awarded "honourable mention." Class 2 attracted a large entry. It was devoted to general out-door work, and exhibitors presented three direct prints—half-plate and above. Miss C. Fawcett was awarded a bronze medal. The prize-winning set included views of *Lake Lowerie*, *The Matterhorn*, and *The Castle of Heidelburg*. Mr. Edgar Meynell also secured a bronze medal in this class. His set was made up of lake-district views—*Rydal Water* and *On Windermere*—and a tree study, entitled *Birches*. Councillor Ernest White entered five sets, and was awarded a certificate for a set containing a print of *High Force*, *The North Door of the Cathedral*, and *The Cathedral from the Banks*. Mr. J. N. Hunter, whose work was adjudged to be equal to that presented by Mr. White, was also given a certificate. His set included views of *The Cathedral*, *Prebend's Bridge*, and *Count's House*. Class 3 was devoted to portraiture; Mr. T. Harker carried off premier honours. A certificate was awarded to Mr. J. Hunter, and Miss C. Fawcett obtained "honourable mention." In Class 4, for enlargements, Mr. E. White secured a bronze medal, and Mr. J. Morson a certificate. The class restricted to members' lantern slides attracted a large entry, and altogether the collection of slides was a remarkably fine one. Premier honours were carried off by the Rev. R. J. Pearce. He sent views of *Millyill Force*, *Askrigg*; *The College*, *Durham*; and *Patinscale*, *Keswick*. Mr. J. Morson was also successful in this class, he securing a certificate. His work included Continental views and a picture of a fortune-teller taken on *The Racecourse at the Last Miners' Demonstration*. In this class the Rev. H. E. Fox, Mr. G. W. Bater (of Old Elvet), and Mr. J. E. Green (of Gilesgate), also sent some very creditable work. As might be expected, the open class had a large entry. There were thirty sets of six in competition. The Mayor of Durham (Councillor W. Sanderson) gave a silver and bronze medal for distribution in this class. Mr. J. H. Gear secured the silver medal with *Fishing in Preserved Waters*, *Study of Cattle*, *Helping Mother*, *Handel's Organ*, "*Come here, you rascal!*" and *Going to Sea*. The bronze medal was taken by Mr. George E. Thompson (Liverpool), and the certificate went to Mr. E. Cowan (Newcastle). A special bronze medal for flower studies was won by Mr. William Travener (of London). The Judges were Mr. Lyd Sawyer and Mr. M. Laws, photographers, of Newcastle, and Mr. Edgar G. Lees (of Cullercoates, Secretary of the Photographic Society, Newcastle). An idea of the quality of the work sent in to the Exhibition may be gathered from the following report of the Judges:—"The exhibits sent in to this Exhibition show a high order of merit, and in Class 2 the Judges gave an extra bronze medal and certificate owing to the excellence of the work shown."

RECENT PATENTS.

PATENTS COMPLETED.

MAGNESIUM LIGHT CARTRIDGE FOR PHOTOGRAPHIC PURPOSES AND PROCESS OF PRODUCING SAME.

No. 20,119. EUGEN HACKH, Stuttgart, Wurttemberg, 31, Königstrasse. *December* 10, 1892.

THIS invention relates to the mixing and producing process of magnesium light, which, on account of its exceptional steadiness, and as it burns an absolute white light, is very suitable and specially advantageous for photographic purposes.

The method of manufacture is so far essential for the invention, that an oxidation of the magnesium powder during the mixture of the constituents of the light, as also during storage, is thereby impossible. For the practical requirements of the photographic art, the invention has a farther and a very far-reaching import, in that the magnesium light is made in cartridge form, which enables the steady concentration of the light in any direction or on any object desired, whereas by the use of magnesium powder as a so-called flashlight, which has hitherto been the case, this fixed concentration is impossible.

For manufacturing the magnesium light I use a mixture of metallic magnesium powder and so-called mealing powder, as used for fireworks, &c., but which, in combination with magnesium powder for rapid magnesium light production, has not hitherto been applied to photographic purposes.

The proportion of ingredients of the mixture varies according to the constituents of the mealing powder from fifty to sixty, and magnesium powder fifty to forty. These substances are thoroughly agitated and equally mixed in a revolving drum, and the disadvantages of oxidation of the magnesium powder during the mixing are prevented by the introduction of a current of carbonic acid, nitrogen, or any other inert gas in the otherwise hermetically closed drum, and which current not only purges the oxygen out of the drum itself, but also out of the pores of each particle of powder, so that the mixture of the powder takes place in an atmosphere which excludes any possible oxidation of the magnesium powder.

The extracting from the drum of the mixture of powder thus produced takes place without its coming in contact with outside air by small quantities of the powder mixture being put in cartridge form.

Such cartridges consist of a flat disc made of cardboard or any other suitable material adapted for holding the light powder, and which, by being folded, prevents the oxidation of the contents by contact with the oxygen of the outside air; or this cartridge disc is covered with paper or other suitable easily and completely combustible.

The use of sheet metal is not recommended for these cartridge plates, not only on account of the heavy costs of same, but also because they absorb a

great amount of heat, and thus the burning of the light powder is less perfect. Cardboard or other non-conducting paper material is, on the other hand, specially suitable.

The plate can be of asbestos board, which offers still more advantages for the purpose in question. The plate has a kind of wooden supporting peg in the middle, which serves for receiving the igniting contrivance, for which electric sparks are used, since, by this, an instantaneous ignition is obtained at any moment desired without any difficulty.

In order to make these light cartridges burn more rapidly, fibres of asbestos can be mixed with the constituents of the powder, being there distributed in a very fine and equal degree during the process of mixing the powders. This addition of asbestos fibres varies, according to the effect required, between five and ten.

Fibres of asbestos are specially suitable for this purpose on account of them being unburnable, and they therefore do not absorb the oxygen of the mealing powder, which is thus of more profitable effect in the perfect combustion of the magnesium powder. Again, owing to the asbestos being a non-conductor of heat, no heat is drawn from the light powder during its combustion, and hence the latter gives a whiter and stronger light.

As mentioned in the introduction, the closed disc-like cartridge form of magnesium light offers the exceedingly practical advantage of enabling the object to be illuminated with the most diverse effects, since this light cartridge can be moved to all directions and the light concentrated on a certain part of the object, which cannot be done with magnesium light in the form of a loose powder burnt off on a plane surface as hitherto practised.

Having now particularly described and ascertained the nature of this invention, and the manner in which the same is to be performed, I declare that what I claim is:—1. A magnesium light cartridge substantially consisting of a mixture is held by a disc-like casing consisting of paper, cardboard, or other suitable material, and is closed by folding such casing or covering same with a sheet of paper easily and completely combustible, substantially as described. 2. The process of producing magnesium light consisting therein that the ingredients of such light are mixed in an hermetically closed drum, from which air is exhausted or substituted by carbonic acid gas, nitrogen, or another inert gas, so that no oxidation of magnesium can take place, substantially as described. 3. The combination with the mixture producing the magnesium light cartridge, the employment of asbestos fibres finely distributed in such powder substantially as described.

A Machine for Pasting, Mounting, and Performing the Various Processes in Finishing Photographs.

No. 525. Joseph Wilkinson, Blue Hall, Ingleton, York.—*January* 7, 1893.

The various processes in pasting, mounting, dabbing, or squeegeeing a picture to the card, drying, lubricating or soaping, and rolling or burnishing are now performed separately by hand labour.

I propose to substitute an automatic machine that will perform all the processes above named much more advantageously than what is now done.

To commence with, the pictures, after being printed and washed, I propose to put in a box, case, or other receptacle, made according to various sizes as required. At the bottom of this box I fix a spiral spring which works against a false bottom, upon which the pictures are placed, and at the top are pegs or wires, against which the pictures are pressed. The same end may be attained by elastic bands or similar means which will press the pictures upwards against the pegs. This box containing the pictures is placed in position on a stand. A number of boxes can be arranged to be fixed and worked by the same machine. I fix a brush, roller brushes, or rollers, as may be preferred for the pasting process, to a table attached to a pivot, resting upon a substantial pedestal. With the pivot is connected a rack, which is worked by a handle on the endless-screw principle, and the action of this is to regulate the position of the brush so as to adjust it to the picture. A crank connected with the other part of the machine works the table horizontally, the brush making the segment of a circle in its action; but I can so arrange it as to work vertically or obliquely. The brush is supplied with paste by passing over corrugated wood or metals horizontally or on an inclined plane. I arrange at this part an apparatus similar to the ordinary printing press, which contains the cards, and in its action brings one down upon the picture in the box, according to register. The other part of my machine consists of a number of rollers and burnishers combined, fixed in two lateral portions or sides constituting the framework, to work as will appear in the manner following:—To perform the process of dabbing and pressing the picture firmly to the card, I supply a roller or rollers covered with some kind of absorbent material, such as cotton, felt, &c., which will lay the picture flat. These rollers may be made of any weight and dimensions, according to requirements. A revolving sheet, which may be in one or more lengths, runs under the rollers. This sheet is continued past the last roller for a certain length to act the part of drying apparatus. This is done by means of heat from gas, steam, or other heating processes applied to this portion. From the drying apparatus the sheet passes on to the part of the machine which is to lubricate or soap the picture. This consists of one or more rollers, which are made of steel or other metal, and with guides to carry the picture over, and are supplied with soap from a box, which works by a spring or springs, pressing the soap in block against the roller or rollers. The soaping rollers are made to revolve at a much quicker rate than any of the other rollers, and in a contrary direction to which the picture has to travel. This is effected by means of a reverse-acting wheel or strap, and in order that every part of the picture may be thoroughly lubricated, this being a preparation for the burnishing process. Following the soap-rollers are fixed a number of burnishers. These are made in a similar manner to those now worked by hand, consisting of a steel bar and roller over the same, and are heated in the usual way by gas or spirit jets. The first burnisher after the soaping roller is a cold one, this being done to prepare the picture for the heated ones which afterwards follow. These burnishers can be multiplied to any extent to give the photograph the required polished or enamelled surface, and can be placed any distance from each other according to the size of the card, or by placing carrier rollers between, any size of picture can be thereby worked through the same machine. I arrange for these burnishing rollers to work either by strap, chain, or endless-screw movement. The burnishers are locked by a bar, which runs along the side of the frame and fits in a groove of each, and this is fastened by a screw. By loosing the screw the bar can be slided along, and all the burnishers are then free.

The machine is made in its various portions of wood, metal, and other materials which appear most suitable, and is fitted with the necessary wheels and cogs to work it by power—gas, steam, or any other motive power—or it can be divided into parts and worked by hand, either treadle, crank, or handle.

When the machine is set in motion the box is placed in position for the brush to come properly over it for pasting the picture to attach it to the card, the latter being brought down upon it by an apparatus arranged similar to the ordinary printing press, as previously stated. The picture being fixed on the card, the pegs are released by a catch, spring, or other similar automatic device, and passes on to the revolving sheet, which is between the two sides of the framework, and in passing under the first set of rollers before described the processes known as dabbing and squeegeeing the picture to the card are performed, it passes along to the drying part, and then over the lubricating or soaping rollers, and finally between the rollers and burnishers, and is then delivered into a box, finished in every respect,

If it is desired to have a picture not lubricated, I arrange to divert it after leaving the drying apparatus part to a set of rollers, worked on the same principle as the rollers of the burnishers, and it is then finished as a rolled picture only, and delivered into a box the same as the above.

It will thus be seen, from the above description, that a picture is never handled after being put into the box from the washing process until finished, which is a great advantage, causing it to come out cleaner and better finished.

My machine will enable the various processes of photographic work here described to be performed by power, and in consequence there will be a great saving of labour, fewer assistants being required, and the process will be more perfect in its action than the present methods of hand labour.

Improvements in Shutters for Photographic Cameras.

No. 4122. Edward Howard Percy Humphreys, 8, Hyde-park-gate, London.—*January* 7, 1893.

My invention has reference to shutters for photographic cameras, and it consists in forming such shutters of a tube having two openings or apertures diametrically opposite each other, or of a solid rod or bar having an opening or aperture formed through the same at right angles to the axis. The tube or rod is free to be turned on its axis, and is provided with a spring which, when set, tends to give it a partial rotation. A catch retains it in the set position. The tube or rod is so placed with respect to the lenses, that when the opening or openings above described are in line with or face the lenses, the beams or pencils of light pass through them.

The focus of the object to be photographed is taken when the opening or openings are in line with the lenses. The tube is then turned partly round until it engages with the catch, and in this turning movement the spring is set, and the openings in the tube are moved out of line with the lenses, a dark or full portion being presented to them. When it is required to make an exposure, the catch is released; the spring then causes the tube to partially rotate, and in this movement the openings come temporarily in line with the lenses, so that the photograph is taken.

Instead of a single tube or rod, I can, and preferably do, employ an inner tube or rod, and an outer tube having openings corresponding with those in the inner tube or rod, and in this case either the outer or the inner tube, or both the outer and the inner tubes, can be arranged to rotate. Or, instead of, or in addition to, a rotary motion, either of the tubes may be free to be moved longitudinally.

In some cases I fit one or both of the lenses in the opening or openings of one or other of the tubes.

My shutters can be employed as either instantaneous or time shutters. When they are used as time shutters I provide for retarding the movement of the shutter under the action of the spring, so as to produce more or less retardation, as may be required. This may be effected by more or less winding up the spring, an indicator or scale being used to show the various degrees of retardation, or the desired object can be obtained by means of a brake or similar device; or I employ two catches, one of which holds the shutter in the dark position and the other in the light position. Then, when a time exposure is required, the shutter would be moved to the catch that holds it in the light position, and would be released by the operator when the necessary time had elapsed.

Improvements in Photographic Cameras.

No. 4138. Henry Grant Madan Conybeare, The Hut, Ingatestone, Essex. *January* 7, 1893.

It is frequently desirable, more especially when photographing architectural objects, that the sensitive film should occupy a vertical position whilst the body of the camera is inclined in an upward direction. The parallelism of those lines of the picture which represent vertical portions of the object is thereby better maintained.

Also, when the film is carried upon a flexible material, which whilst in the camera is wound from roller to roller, it is necessary that the material should be tightly strained between the rollers in order that the film during exposure may present a plane surface to receive the image.

The purpose of my invention is to attain these objects more efficiently and conveniently than heretofore.

I suspend the box or slide which carries the sensitive film upon pivots so that it may be free to automatically assume and maintain by the action of gravity a vertical position whilst the body of the camera is inclined.

Also to admit of a like adjustment of the position of the film when it becomes necessary so to place the camera that the automatic regulation by the aid of gravity is unattainable, I arrange one of the pivots above mentioned, so that it can be moved a suitable distance along the body of the camera to compensate for the inclination to be given to the camera at the moment of exposure.

To ensure a suitable tension upon the material carrying the film I mount the roller from which it is drawn upon a rocking frame provided with a spring which yields whilst the material is being drawn off from the roller, and afterwards by its reaction strains the material tight. To prevent the unwinding taking place too freely I provide a bar which presses against the film roller; the bar is carried by two springs which are attached to the rocking frame.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 27.....	Camera Club.....	Charing Cross-road, W.C.
,, 27.....	Dundee Amateur.....	Asso. Studio, Nethergate, Dundee.
,, 27.....	Lantern Society	20, Hanover-square.
,, 27.....	North Middlesex	Jubilee House, Hornsey-road, N.
,, 27.....	Putney	Boys' Gymnasium, Charlwood-road.
,, 27.....	Richmond	Greyhound Hotel.
,, 28.....	Birmingham Photo. Society ...	Club Room, Colonnade Hotel.
,, 28.....	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 28.....	Hackney.....	206, Mare-street, Hackney.
,, 28.....	Halifax Camera Club.....	
,, 28.....	Lancaster	Springfield Barracks, Lancaster.
,, 28.....	Leith	165, Constitution-street, Leith.
,, 28.....	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 28.....	Paisley	9, Ganze-street, Paisley.
,, 28	Rochester	Mathematical School, Rochester.
,, 23.....	Warrington	Museum, Bold-street, Warrington.
March 1.....	Edinburgh Photo. Society	38, Castle-street, Edinburgh.
,, 1.....	Leytonstone	The Assembly Rooms, High-road.
,, 1.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 1.....	Southport	The Studio, 15, Cambridge-arcade.
,, 1.....	Southsea..	3, King's-road, Southsea.
,, 1.....	Wallasey.....	Egremont Institute, Egremont.
,, 2.....	Birmingham Photo. Society ...	Club Room, Colonnade Hotel.
,, 2.....	Camera Club.....	Charing Cross-road, W.C.
,, 2.....	Dundee and East of Scotland ...	Lamb's Hotel, Dundee.
,, 2	Glasgow Photo. Association.....	Philoso. Soc. Rooms, 207, Bath-st.
,, 2.....	Glossop Dale	
,, 2.....	Hull.....	71, Prospect-street, Hull.
,, 2.....	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 2..	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 2.....	Oldham	The Lyceum, Union-st., Oldham.
,, 2	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
,, 3.....	Brighton and Sussex	
,, 3.....	Cardiff.....	
,, 3.....	Croydon Microscopical	Public Hall, George-street, Croydon
,, 3.....	Holborn	
,, 3.....	Leamington	Trinity Church Room, Morton-st.
,, 3.....	Maidstone	"The Palace," Maidstone.
,, 4.....	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 16,—Mr. E. Clifton in the chair.

Messrs. Woodbury and Jamieson were elected members.

Examples of collotype by Messrs. Morgan & Kidd were passed round for inspection.

THE AIR BRUSH.

Mr. W. H. HARRISON, of the Polytechnic, prefaced a practical demonstration of the Air Brush in working up bromide enlargements by saying that it was remarkable for its mechanical properties and artistic results. The apparatus is worked by air being pumped by means of a treadle into a container; the air is then led up a pipe to the hand piece containing two tubes. By depressing a thumb piece a valve is opened and the air rushes through the two tubes which divides the current of air into two portions; one blows a small wheel round, and this sends the needle point backwards and forwards and passes through the liquid. The other current of air passes downwards to the needle point carrying a minute portion of liquid which is then carried to whatever direction it is pointed at. The closer the machine is held to the paper the finer the line that is drawn, while the further away it is the cone spreads and a larger result is obtained. But, inasmuch as the quantity of colour that is needed to make a fine line would take an enormous time to cover a large surface, some means is needed to increase the flow of colour, which is obtained by pulling the thumb piece back, which sends more of the needle into the current of air, thus taking more liquid and increasing the flow of the ink. Lamp-black dissolved in water is used for the colour. As a means of putting in backgrounds and working up drapery, a knowledge of how to use the air brush is soon obtained. For putting in high lights Chinese white looks too blue, and would not do for the purpose on that account. A short needle would not throw off such a large cloud of colour as a fine one.

Mr. L. S. TEAPE suggested that a tint might be removed by means of clean water in the handpiece and the application of blotting-paper to the surface.

The CHAIRMAN, in reply to Mr. Harrison's question why the brush was not more used, indicated the price, 9*l.* 9*s.*, as being high, and said that if a body of men were trained up to its use photographers, seeing the advantage in the saving of time, might be disposed to employ them.

Mr. P. EVERITT thought the brush would be useful for making vignettes in negatives.

Mr. HARRISON said that in his class at the Polytechnic a photographer after only three lessons had found the results he obtained with the air brush much appreciated by his customers.

Mr. JAMIESON suggested that the electrification of the needle point might answer, as the quantity of colour would not be increased in volume but only the facility with which it was thrown from the point and in a finer line. That principle was employed by Thompson in his galvanometers. An electric turning device would also relieve the foot.

During the evening Mr. Harrison practically demonstrated the air brush by working up a bromide enlargement with it, the finished result placed alongside of an unworked picture eliciting great praise from the meeting. He also showed colour work and a large head worked up in four hours from a faint pencil outline.

At the conclusion of the demonstration Mr. Harrison received a vote of thanks, in acknowledging which he took occasion to say, humorously, that he hoped to see many of the members present among his class at the Polytechnic.

North London Photographic Society.—February 7, the Rev. E. Healy in the chair.—Mr. J. F. Nisbett was elected a member. Messrs. W. T. Coventon and J. Oakley were elected delegates to represent the Society on the affiliation committee for the current year. Mr. Parfitt wished not to be re-elected, as he considered the delegates should be chosen from those who were not members of the Photographic Society of Great Britain. Mr. A. E. Smith showed a collection of photographs of views taken in Kew Gardens, and Mr. Parfitt some very pleasing portraits taken, in order to obtain softness of outline, with the front combination only of a cabinet portrait lens. They were taken out of doors, and Mr. Parfitt said he used no background to screen objects behind the sitters, as, owing to the depth of definition of the lens being so slight, such objects were not rendered on the plate. In the course of a discussion about amidol, a letter from Messrs. Fuerst was read, in which they stated that, so far as they knew, amidol is not poisonous, and the reason they said in the instructions issued that the amidol substance is not to be touched with the fingers is that, if this is done, it will stain them very badly. They further stated that amidol in solution will not stain the fingers. Several members thought this last statement required modification. Mr. Healy had used the developer for lantern slides, and had obtained a nice warm tone, but at present had failed to get sufficient density. It was resolved that in future the meetings of the Society should commence at eight o'clock sharp. The next meeting, on the 21st inst., is a Lantern Night, when the convention slides of the Devon and Cornwall Society will be shown.

Hackney Photographic Society.—February 7, Mr. R. Beckett in the chair.—Mr. L. E. Morgan gave a demonstration on amidol. The Hon. Secretary asked whether the cartridges were any special preparation, but was informed they only contained sulphite of soda and amidol; any alkali could be used, and, in answer to a question, the lecturer said carbonate of ammonium could successfully be used with it for lantern slides. Mr. Sodeau liked citrate of soda for over-exposed plates. Amidol could be used dry like pyro, owing to its easy solubility. A number of plates could be developed in the one solution. The HON. SECRETARY said he had recently developed twelve bromide papers and one lantern plate, and the solution seemed to be good enough for more. He preferred the formula given by Mr. Dresser. Mr. RODER asked whether amidol would develop Morgan & Kidd's papers. Mr. MORGAN said he had not tried himself, but felt satisfied they would. Two plates of street scenes having received one-twentieth of a second at *f*-8, and taken this month, were then developed and bromide papers exposed. The HON. SECRETARY, in proposing a vote of thanks, said he used amidol some long time since, but had a difficulty of getting density; he had, however, again tried, and was very favourably inclined to it. Mr. MORGAN said he used pyro before, but now gave it up in favour of amidol. The attendance was very large, and being a ladies' night, the fair sex were well represented.

FEBRUARY 14, Mr. R. Beckett presiding.—Some discussion ensued on a print developer with amidol, two and a half minutes, by the Chairman. Mr. Barker asked, Was there any tendency to destroy the transparency in the shadows? The CHAIRMAN said, Not so much as iron, which was too energetic when fresh. Mr. NUNN asked, Was there any advantage in stopping down when making lantern slides? Mr. S. J. BECKETT said no advantage would be gained, if lens was good, in stopping down beyond what would cover the lantern plate. Mr. SODEAU knew of a lens which was defective in centre. From the question box: "Can an ordinary magic lantern lens be used for enlarging purposes?" The answer given was that it could for three and a quarter inches square or parts of a quarter-plate. The front tube would have to be drawn right out or an addition made. The projecting lens should be good or slightly stopped down. Mr. W. H. SODEAU then read a paper on *Photographic Chemicals*. The principal subject he dealt with was their keeping qualities. He attributed the power of keeping according to the atmosphere. A list of deliquescent chemicals was given. He advocated the use use of glass stoppers which if stuck at any time could be tapped or put in warm water. The Hon. Secretary had seen vaseline recommended. Mr. GOSLING said he generally found warming in the hand sufficient. Mr. Sodeau proceeded to say, caustic corrodes the glass and sometimes joins the stopper to the neck. Indiarubber corks were useful, but should not be used for benzine or like compounds. Developing agents were best kept in an acid condition or filled up to the stopper of the bottle, or ordinary wash bottles can be used if paraffin is kept on the surface of the liquid. He recommended the use of vaseline inside the neck of the bottle for substances which creep up the side. Magnesium should be kept in well-corked bottles, metabisulphite potassium would keep fairly well in paper, if in large lumps, though not advisable. The strength of anhydrous soda was about twice the strength of the ordinary carbonate of soda. Sulphurous acid would only turn to sulphuric by oxygen.

West London Photographic Society.—February 14.—Mr. A. Horsley Hinton read a paper entitled, *Specialisation in Art Work* (see next week's No.). In the discussion which followed, Mr. Tripplin, whilst paying full deference to the views of Mr. Hinton, pointed out that photography was elevating in itself

and that too high a standard of refinement in photographic work should not be universally insisted upon. The majority of members were business men with limited time, and could derive great pleasure from their photographic work if they secured a picture of a view that pleased them, even though it might not possess all the qualities of a work of art. He admitted, however, that by working to a high standard degeneration was prevented. Mr. WHITING insisted on the importance of education in picture-making, and suggested that great good would result from the forming of a class of instruction in art—the rules of art and composition should be well instilled. Mr. HINTON, replying to the previous speakers, pointed out the difficulty of ascertaining what it is in a picture which pleases, and of securing it. He stated that the photographer's aim should be to catch the sentiment of the subject as far as possible. He would not be bound by rules of composition, which were scientific, and thus opposed to the artistic. He suggested that good would be derived from competitions in the illustration by photography of a given subject. Mr. SELBY disagreed with Mr. Hinton on the importance of rules of art, stating that it was necessary, particularly at first, to have a grammar to work upon. Mr. Winter agreed with the objections of Mr. Hinton to rules of art, and deprecated the copying of the methods of the painter. He would take what was pleasing to the eye, and he strongly urged the advisability of cultivating the technical side of photography as an aid to the pictorial side. Mr. Winter concluded with a candid criticism on some of the photographs exhibited by Mr. Hinton, and the discussion closed with a vote of thanks to the lecturer.

Greenwich Photographic Society.—February 1, Mr. H. H. Turner, M.A., F.R.A.S., in the chair.—Mr. W. E. Debenham gave an exhaustive demonstration of transparency-making by the carbon process. At the conclusion of the practical portion a few lantern slides produced by this process were projected, and it is worthy of note that there was an entire absence of any evidence of relief in the slides thus submitted. Mr. Debenham was thanked for his interesting lecture. The following were elected members of the Society:—Professor Lambert, M.A., Messrs. Parrett, Duckham, Parsons, and Holliss. The Committee announced that in view of the Society's youth they had decided to postpone date of closing entries for Lantern Slide Competition, (originally January 31), till April 30, and to admit slides made from negatives taken at any time provided no awards had been previously gained. On the proposition of Mr. Haddon it was unanimously resolved that the Greenwich Photographic Society affiliate to the Photographic Society of Great Britain.

Woolwich Photographic Society.—February 9, Mr. W. H. Dawson in the chair.—Correspondence between the Hon. Secretary and Mr. R. Child Bayley respecting affiliation with the Photographic Society of Great Britain was read to the members. The proposal was warmly received, and it was unanimously resolved that the Hon. Secretary take steps to apply for affiliation. Mr. L. E. Morgan then proceeded with a demonstration on "Amidol," the leading features of which have been reported in this JOURNAL. It should be said that the meeting was highly pleased with the results obtained.

Croydon Camera Club.—February 13, Annual Meeting.—The report and balance-sheet being presented and adopted, the officers and Council for the current year were chosen as follows:—*President:* Mr. Hector Maclean, F.G.S.—*Vice-President:* The Mayor of Croydon (Mr. F. Fass, J.P.), the Hon. Sydney Herbert, M.P., Messrs. F. T. Eldridge, J.P., and B. Gay Wilkinson.—*Council:* Messrs. Frost, Hirst, Holland, Isaac, Neeves, Oakley, Packham, and Wratten.—*Treasurer:* Mr. A. G. Sargeant.—*Hon. Secretary:* Mr. G. R. White, 55, Albert-road.—*Hon. Assistant Secretary:* Mr. S. E. Burrows. The meeting was well attended by the members, and a large collection of prints, lent by Mr. E. J. Wall, was displayed upon the walls. On the proposition of the President, and supported by several influential members, it was, *nem. con.*, decided that the Club be forthwith affiliated to the Photographic Society of Great Britain. It was also resolved that, after the present month, the ordinary meetings be held upon Wednesday in each week instead of as now, Monday. The annual dinner of members and friends is fixed for March 8, at the Greyhound Hotel. Tickets, price 4*s.* each, to be obtained of the Secretary. The particulars and regulations of the local Exhibition, which will be open for four days and evenings, on April 5, were read and approved, and ordered to be printed and circulated. The Exhibition will be held in the Braithwaite Hall, and will be inaugurated by the Mayor.

Aston Natural History Society (Photographic Section).—February 9.—Mr. Walter Tyler gave a paper entitled *How to Develop on Tour.* The lecturer practically demonstrated how exposures could be tested by a few plates being developed while on the trip. With such simple means as a few pieces of Willesden paper folded for dishes, an ordinary window-blind lath on a knife edge for an extempore balance, and some ruby fabric round a candlestick on a penny for his lamp, he showed how practical, if not orthodox, development could be performed while away from home. A piece of card, $4\frac{1}{4} \times 3\frac{1}{4}$, cut in the middle, and hinged by stamp paper, on which was laid the sensitive paper and then the negative) served as his printing frame, the whole being secured by two elastic bands. Table, dessert, and teaspoons acted respectively as his one ounce, half-ounce, and drachm measure, while threepenny pieces were used to weigh his one ounce of hypo, and a sixpenny piece five grains of pyro.

Birmingham Photographic Soc ety.—A large and appreciative audience assembled in the large lecture-room of the Y.M.C.A., Needless-alley, on the evening of Tuesday, the 7th inst., when a paper was read by Mr. C. J. Fowler on *The River Severn, from its Source to the Sea.* The lecture was illustrated by a series of 300 excellent slides, the outcome of a survey of the river undertaken in 1891 by Messrs. Middleton & Fowler, when upwards of 400 pictures were secured. The course of the river from the point where it rises in a swampy hollow on Plinlimmon to its reception by the Bristol Channel is replete with interest, and some of the more famous places, such as the cathedrals of Worcester and Gloucester, Berkeley Castle, Buildwas Abbey, Much Wenlock Priory, Tewkesbury, Bridgenorth, &c., of which very fine pictures were shown, elicited hearty applause. In addition to this, the completeness of the subject added very much to its interest.

Bristol and West of England Photographic Association.—February 10.—It was decided the hold the meetings fortnightly instead of monthly, and that a question box should be started.

Burnley Photographic Society.—The Annual Meeting of this Society was held on the 1st inst., when the balance-sheet, which was fairly satisfactory, was adopted. Mr. Jno. Butterworth, J.P., was re-elected President, and Mr. J. Altham Secretary, and Mr. A. H. Kellet Treasurer, in place of Messrs. Sutcliffe and Lee resigned. The following were elected to the Council:—The Rev. T. Layland, and Messrs. T. Ormerod, V. Dunkerley, J. Holgate, J. L. Lee, J. J. H. Bell, A. Howarth, and W. H. Hoghton.

Derby Photographic Society.—February 14, Mr. Keene presided.—The Hon. Secretary brought forward a circular which had been received from the Photographic Society of Great Britain, in connexion with the affiliation scheme, and after a short discussion it was decided to join with the Photographic Society of Great Britain. Mr. Porritt (President of the Leicester Society) gave a paper on *Isochromatic Photography.* Mr. Porritt had to illustrate his paper a set of negatives of stained-glass windows, also a hand-painted set of designs for same, to show what an amount of gradation could be obtained by means of isochromatic plates with the use of a yellow screen. He also had a large number of lantern slides, one set being from negatives taken on ordinary plates, and the others of same subjects taken on isochromatic plates. Mr. Porritt passed round a few yellow screens of different tints, and explained which, in his opinion, was the better way to make them.

Leicester Photographic Society.—February 10, Mr. J. Porritt in the chair.—It was decided to hold the meetings on Thursdays instead of Wednesdays after the summer recess. The President then read a paper by Mr. A. B. Webber, of Bromley, on *Isochromatic Photography*, who sent a large number of paintings, transparencies, and fifty lantern slides to illustrate his subject, and proved a most useful stimulant to the members who work in that direction. The results of isochromatised plates were still more definitely shown by the useful method of showing two prints or lantern slides of the same subject with iso and plain plates, and which were exceedingly useful in showing the value of the prepared plates. The church windows shown by Mr. Webber were admirable examples of the process, as also several differently coloured chrysanthemums in variously coloured vases, also several other tests of colouring, as wools, cloth, &c., which amply illustrated the utility of the process in colour photography, and in maintaining the value of the visual colour scale.

Liverpool Amateur Photographic Association.—February 9.—Dr. Charles A. Kohn, of the University College, delivered to the members a lecture on *Chemistry of Photography.* He illustrated his remarks with interesting experiments in a very clear and lucid manner, demonstrating the mystery of the action of light and formation of the latent image on the photographic plate. Other similar practical lectures follow every Thursday until the end of April.

Sheffield Photographic Society.—February 7, Mr. B. J. Taylor in the chair.—Mr. J. W. Charlesworth opened the discussion, "Was amidol a good developer for lantern transparencies?" which was taken part in by most of the members present, and eventually decided that, given a good negative, warm tones could be produced.

South Manchester Photographic Society.—Mr. R. B. Barningham in the chair.—Mr. C. Lord described a ramble through Switzerland with a camera. The tour was taken in the summer of 1891, the party consisting of two parsons, a merchant, a doctor, and a lawyer. This was the fifth time, said Mr. Lord, that he had visited Switzerland, but the first time with a camera. The party went to Antwerp by way of Harwich, and train was taken for Schaffhausen and the falls of the Rhine. The first impression of the falls was disappointing. The height of them is only about sixty feet, but the breadth is nearly 400, and they have the appearance of supendous rapids rather than a cataract. It is only by drawing close to the falls that their vast magnitude can be realised, and the immense volume and force of the water estimated. One of the great attractions of Switzerland is Cloudland. Clouds are always brighter and more varied in mountainous than in flat regions. It is beautiful to watch clouds from below sailing quietly along or scudding before the wind, and mark the transfiguration wrought by the glow of the setting sun. But to his mind it was more wonderful to look down upon the clouds from some peak high above the cloud line.

Amateur Photographic Society of Madras.—January 12, Annual Meeting.—After the transaction of other business, a grant of 2*l.* 2*s.* was made to the Photographers' Benevolent Association of London. The Honorary Secretary again drew the attention of members to the proposed collection of lantern slides illustrating the Madras Presidency for the Society of Great Britain, and said he had received not a single offer from any member to co-operate with him in the collection! The following were elected as the committee for the ensuing year:—*President:* Mr. C. Michie Smith, B. Sc.—*Vice-Presidents:* Messrs. C. Slater and E. W. Stoney, M.I.C.E.—*Committee:* Messrs. Surgeon Lieut.-Col. S. L. Dobie, Mr. W. M. Gerrard, Mr. A. E. Lawson, Mr. V. G. Lynn, Mr. A. L. H. Palmer, Surgeon Major J. L. VanGeyzel.—*Hon. Secretary and Treasurer:* Mr. F. Dunsterville. The President, having delivered an address, asked the members to pass a very hearty vote of thanks to Mr. Dunsterville, the Honorary Secretary, to whose labours they were chiefly indebted for the revived interest in the Society. The proposition was put to the meeting and carried unanimously.

Singapore Amateur Photographic Society.—The election of officers at the annual general meeting resulted as follows:—*President:* Mr. H. M. Simons.—*Committee:* Messrs. H. M. Simons, E. J. Robertson, T. F. S. Quin, Hon. A. L. Donaldson and W. Gutcher.—*Hon. Treasurer:* Mr. T. F. S. Quin.—*Hon. Secretary:* Mr. E. J. Robertson.

FORTHCOMING EXHIBITIONS.

March 1, 2 ..... *Fillebrook Athenæum Photographic Society. Hon. Secretary, Joseph W. Spurgeon, 1 Drayton Villas Leytonstone, Essex.

March 3, 4	.....	*Blackheath Camera Club. Hon. Secretary, C. W. Piper, 46, Shooter's Hill-road, Blackheath, S.E.
,, 22, 23	.....	Leicester and Leicestershire Photographic Society, Co-operative Hall, High-street, Leicester. Hon. Secretary, H. M. Porritt, 66, London-road, Leicester.
April 5–8	.....	*Croydon Camera Club, Braithwaite Hall, Wellesley-road, Croydon. Hon. Secretary, G. R. White, 55, Albert-road, Croydon.
,, 17–29	.....	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.
May 4–6	.....	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE CONVENTION SLIDES, 1893.

To the EDITOR.

SIR,—The Devon and Cornwall Camera Club have prepared a set of 118 slides, illustrative of the neighbourhood of Plymouth. This set, which has been entitled *Places to be Visited by the* 1893 *Convention*, is now in circulation, and I should be pleased to have applications from the secretaries of any societies who desire to show them at their meetings.

Immediate application would be desirable, to enable me to arrange the route to be followed by the slides.

I may say that March 7 is the first date on which the slides are now available; any London society making application might probably have them on that date.

I venture to ask your insertion of this note, as I feel sure that you are interested in anything that may help forward the next meeting of the Convention.—I am, yours, &c., R. HANSFORD WORTH,

Hon. Secretary Devon and Cornwall Camera Club,
Hon. Local Secretary Photographic Convention of the United Kingdom.

12, *George-street, Plymouth, February* 18, 1893.

HOW TO USE A BUNSEN.

To the EDITOR.

SIR,—You will see by the enclosed that I invented and patented a self-adjusting Bunsen burner, and which appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY over fifteen years ago. You will perceive that the one end of lever reduces the inflow of the gas, while the other end reduces the quantity of air by lowering the sliding tube over the air holes. Can you, or any one of your readers, say who was the first person who used regulators (or governors) in connexion with the oxygen and hydrogen gases?—I am, yours, &c., WILLIAM BIRRELL.

109, *Graham-street, Airdrie, February* 13, 1893.

RAPID SOLUTION MAKING.

To the EDITOR.

SIR,—We consider those photographers to whom instruction in the elementary operations of their business is necessary and useful should feel sincerely indebted to Messrs. Baird, Ayres, & Webster (*père et fils*) for directing attention to the simple but efficient means by which they prepare their solutions.

We trust we may, however, be pardoned for feeling somewhat amused at the claim to novelty implied, if not distinctly made, in the announcements, when we state that we have had the Doulton perforated dipping basket in use for many years in our laboratories, and find it to be all that those gentlemen describe it to be *in our own hands*.

They, however, omit reference to the "dreadful facility" with which the semicircular handle is broken off by careless and thoughtless assistants, thus making the method, in the long run, an expensive one, and obliging us to adopt a simpler and even more efficient course. The method for the daily preparation of our hypo-bath solution will illustrate all the others.

A jar of suitable capacity, specially reserved for the purpose, is loosely covered with strong unglazed calico, which is firmly tied round the turned-over rim. The hypo soda, being weighed or measured, is poured into the calico bag thus formed, and droops down to a convenient depth inside the jar. Water is then added until it attains such a height as to be in contact with the crystals. The whole is then set aside until the afternoon. When the hour for fixing the first batch of prints arrives, the calico (now void of crystals) is removed, and the jar is found to contain a *filtered* solution of hypo ready for use.

We have not failed to notice that Mr. Baird's "Lothian" jar dispenses with the easily broken handle, but we dispense with the jar also, and with the additional advantage of producing a *filtered* solution, and if this description prove useful to your readers, we shall be glad.—We are, yours, &c., J. MARTIN & Co.

General Photographic Works, New Southgate, N., February 20, 1893.

VALUE OF GOODWILL IN PHOTOGRAPHIC BUSINESS.

To the EDITOR.

SIR,—Your article in No. 1710 was really good, and should be appreciated by those recruits in photography who feel themselves capable of taking to mastership. The tendency of your article is more in favour of the second valuation than the first. Being one of those operators who would like to do something in one way or another, but having counted the sands on the seashore for several months and having nothing else to do, with the exception of applying for a situation or looking into other people's businesses, with a view to taking one over, I will spare a few minutes to give you a peep behind the scenes.

About situations; there are plenty open. If you like to pay out of your own pocket, you may even gain a few shillings, just enough to keep a bachelor from starving; but, as for a responsible post that would suit an educated married man, I almost fancy they are out of fashion.

The other line—I hope you won't get cross—is even more illustrative, and I fancy is not coming up to your 1710 form. For how many ideals and instructive suggestions did you and your predecessors go in, in all those numbers, from 1 to 1710, and how many of them have gone to the wind? As I have looked at nearly fifty businesses for sale, I will give you a small jotting on the point. What do you say to this—that I did not come across one business where proper books were kept, and that is the bare fact. Further, about half a dozen had only something like a studio as it should be. Dark rooms, well, I saw six, not more; the rest pleased themselves with cupboards, boxes, and drapery. The places for the printing are dwelling-places for sun, moon, and rain, but in general the higher the rent the smaller the printing place. I cannot help mentioning one business—about five years ago you could not buy it for several thousand pounds, last year you could have it for one year's rent (nearly 400*l.*) including everything belonging to the business. That London place had no accommodation for printing whatever, not even a printing frame, but it had—and mark that—proper heating accommodation, the only business where I saw it.—Another half a dozen had chimneys; the rest nothing whatever.

About the accessories I won't say much, only that in general photographers seem to have the knowledge of one or two. I always found a chair and something like a balustrade all through. Toilet room, as well as a decent w.c., is generally not found necessary. The only thing that I could not grumble about is the shop or reception room; that seems to be the place which is cleaned once every week. The studios are generally nothing more nor less than greenhouses, the known type, a lot of wood, filled out between with glass, light from all sides. One construction I must mention; I found it five or six times and believe you never advised it. The end of the studio is covered all round for about one yard, next also all round about one yard of glass, and the adjoining part is again covered in dark.

Some of the pictures taken in those studios have full faces, dark fronts of the noses, and both ears in the light. Artistic productions!

Some of these lords wanted just to sell these things, just as they stand; they had no time to attend to them, having another business, and, naturally you believe it, it was the workman's fault that business did not go as well as formerly.

One thing I wish, and that is to be able to use my pen like "Cosmos." I could then occupy my time in writing a book on valuation of photographic premises, or Robinson Crusoe in London and fifty miles round. You will say that is black paint, you who are used to writing on photographic ideals. A year ago I could not understand how some photographers could produce a dozen 15 × 12 cabinets for 12*s.*, and why this trade is in disrepute with the public. No wonder!

This is only lifting the veil a bit, and I hope that you and your friends will investigate the subject before sending a flashlight on the audacious

February 13, 1893. OPERATOR.

To the EDITOR.

SIR,—Upon reading "Operator's" letter *re* the above, I was a bit surprised; but your leader of the 11th is a startler! Yet Jupiter nodded, and I suppose we (that is, those that still think photographic goodwills a marketable commodity) may differ from you. I am one that thinks so, especially now that the building laws are so strict: you cannot alter houses and run up studios just as you please, as in the old times, therefore a studio, in a good position, with a fair return, is worth its price, and any business is worth the last year's returns (*not profits bulk*), large or small.

The things for consideration by one wishing to enter into the business are, as to whether the premises are in a good neighbourhood, of good

approach and repute—and its not only a matter of what has been done, but if, by better work, management, push, &c., he could increase the returns—then to consider if it would pay better to have all the trouble of alteration and incidental expenses, and waiting for business by opening new premises. If I have 300*l.* capital, and buy Mr. Camera's business for, say, 250*l.*, I begin to get returns same day; and should I spend the other 50*l.* in redecorating, new specimens, and advertising, I should increase the returns immediately; whereas a new studio may be altogether a failure. Therefore I am still of opinion that photographic goodwills are worth a price, and, like the devil, the business is not so black as painted.—I am, yours, &c., STARTLED.

February 18, 1893.

To the EDITOR.

SIR,—As one who has had some experience as a professional photographer at the seaside, I certainly think—and am sure I am not alone in thinking—that three years' purchase is too much to give for the goodwill of a photographic business, especially when, as you said in your leading article for February 10, so much depends upon the energy of the person who is working the business.

Your correspondent, "Operator," in your issue for February 3, in giving what you consider a not over-liberal estimate of wages, is, I assure you, not very far wide of the mark—at least, so far as my experience goes. There are plenty of operators, and capable men, too, who will work gladly, and work hard, during the summer months at a seaside town for 30*s.* a week, and will take considerably less than this during the winter.

There are plenty of girls, too, who will willingly officiate in the reception-room, burnish, help in the printing and mounting, and a hundred and one other little odds-and-ends, all for fifteen shillings a week. With regard to the employment of boys for printing operations, I consider that five shillings a week is quite sufficient, as they are, as a rule, too young to be self-supporting, and by this means manage to learn the mysteries of the business, and very often finally blossom into photographers on their own account.

There are not many photographic businesses in this country which make a clear profit of £220 in the course of a year. I have the strongest possible reasons for believing that if a census were taken of the returns of all the professional photographers in England, the average profits would be very much less than this.—I am, yours, &c., PRIMUS.

February 14, 1893.

To the EDITOR.

SIR,—Write me down an ass! Although it hath not been set down write it now. Here have I been working and worritting at this photography for thirty odd years, pluming myself upon belonging to an honourable and lucrative profession. About twenty years since I started to make a business and home for myself, deluded myself that with the bit I saved and the bit I might get for my goodwill when I wished to retire would enable me to take mine ease. And now I am told, on your authority, that it is not worth a rap, and that I had better have been a grocer. Well, certainly the grocer at the street corner cuts a bigger dash than I.

As there is no goodwill in photographic businesses, and negatives are not worth storage, I am going to give mine to the public. In future I shall give all my sitters their negatives. As soon as the lease is up, I shall retire and take a public-house or grocery.

Photography spells Poverty.—I am, yours, &c., OLD UN.

EFFECTS OF HEAT ON AMIDOL-DEVELOPED NEGATIVES.

To the EDITOR.

SIR,—A few days ago I had what was to me a new experience, and, as I do not recollect of seeing it mentioned before, I wonder if it is well known. I had developed two plates with amidol, and, as they appeared to be over-exposed, I stopped the development perhaps too soon; but that, I presume, has nothing to do with what I wish to mention. After the plates were fixed and washed, they were set up on end to dry, and had become quite dry for some breadth all round the edges when I wished to put them away in a safe place, and finished the drying by heating them gently at a fire; but, when the drying was finished, I was surprised to find that in both plates the portions dried at the fire were very sensibly darker than the edges which had dried spontaneously.

I enclose prints, which show the heat-dried parts distinctly by the lighter colour of the ground. Can it be that this is peculiar to amidol? I have before used a little heat to finish the drying of a plate, but never observed any darkening from that cause.—I am, yours, &c.,

February 11, 1893. GEORGE H. SLIGHT.

WASHING CUT FILMS.

To the EDITOR.

SIR,—May I suggest, in reply to your correspondent A. Levy's query *re* washing cut films, that, if he lays them whilst wet on spoilt negative glasses, they will adhere firmly by suction, and can then be stood up in the washing rack and treated just as though they were ordinary glass negatives.

Although there is probably nothing at all original about this method of washing films, I cannot remember to have ever seen it in print.—I am, yours, &c., J. E. HODD.

4, *Goldsmith's-gardens, Acton, February* 11, 1893.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

To the EDITOR.

SIR,—As I presume you will have some mention of the meeting of above at Manchester, on Thursday last, I cannot refrain from a word or two, urging the attention of my brother professionals and this Society, and I venture to hope that you will kindly add your own opinion as to the importance of the Society to our trade, *as a trade* generally.

My excuse, if one be needed, for this letter, is that I am probably one of the latest members, and I feel sure that photographers, as a body, are neglecting their own interests by holding aloof. For many sound and solid reasons it is high time we united, for argue and talk as we may, it is a solid fact that the bulk of photographers are not making fortunes; the big men are, of course, all right, but the owner of the small provincial business, no matter how good and clever a man he may be, is not by a long way so well to do as those in a similar position of twenty or twenty-five years ago, and one of the reasons is to be found in *the amateur*. I don't say this with the slightest ill feeling, but the truth remains, all the same, that many of the dealers and stock houses cater distinctly for amateur customers to the decided detriment of the working photographer. I send you herewith circular just received, and better proof I could not give. Now, one of the dealers here is a top shop and fancy goods dépôt, two others are chemists, and it is obviously an attempt to get these people to cater for amateurs. It is time all this were put a stop to, and it can only be done by the combination of all *business photographers*. It is impossible in space of a letter to go into all the reasons for a genuine trade society, all I would urge is, that every photographer in the kingdom should look into this for himself; almost every trade or profession of any merit or standing has its society, and the want of such an one in our trade has been the cause of endless abuse and loss to the *workers*.—I am, yours, &c., "UNITAS."

February 14, 1893.

INTENSIFICATION.

To the EDITOR.

SIR,—Not understanding chemistry, I generally pass over articles containing chemical symbols, but as most operators are interested in mercurial intensification, I thought I would make this an exception and try to get some meaning out of Mr. Chapman Jones's paper in last week's BRITISH JOURNAL OF PHOTOGRAPHY, entitled, "A Chemical Study of Mercurial Intensification." Not being a chemist, I cannot be said to be an experimentalist, but have worked on the principle of sticking to one plate, one developer, one intensifier, and one reducer, and carefully watch the results and thoroughly understand their power by observation.

Now there is one remark I note in Mr. Jones's paper, under the head of "Practical Conclusions," where he says, "It is impossible, *without falsifying the gradation*, to develop too dense, and afterwards reduce to the desired condition."

I will now give my method of intensifying and how I use it for reducing an over-developed negative *without*, I think, *falsifying* the *gradations*.

INTENSIFIER.

Sat. sol. bichloride of mercury	2 ounces,
Iodide of potassium, about	2 drachms,

added to the mercury until the scarlet colour is almost vanished, then add 8 or 16 ounces of water.

To intensify, I flow the plate with the above until the correct density is obtained; afterwards fix *without washing* in hypo, not too strong, and wash well, of course, afterwards. Now to reduce a negative, no matter how dense it may be, I flow with intensifier until the iodide of mercury has uniformly changed the plate or, rather, film. I then, *without washing*, take the plate from intensifier and dip in an upright bath of recrystallised cyanide of potassium—you will then note a negative that would perhaps take a week, in good light, to print—rapidly and uniformly reduce with the most delicate gradation of light and shade. I only intensify on rare occasions, and the same thing applies to reduction, because I like to regulate my developing in such a way that the correct rendering of the lighting is obtained; but I think a sure intensifier and certain reducer is a most pleasing power in the operator's hands. I also find the above reducer very useful in removing silver stains from gelatine negatives.—I am, yours, &c., ALFRED E. DIGHTON.

22, *Mount Ash-road, Sydenham Hill, London, February* 5, 1893.

BLISTERS.

To the EDITOR.

SIR,—Your correspondent, Mr. A. Levy, seems troubled with the use of the new methylated spirit as a prophylactic in the case of blisters.

Before I gave up the use of albumenised paper I was now and again troubled with them, until the cure—so far as the brand of paper I was then using was concerned—came to me by chance. Whilst toning I found I had no hypo prepared. I hastily got some ready by suspending a muslin bagful in some very hot water, and by the time I required to put my prints in it was still quite warm. No blisters rose. I tried repeatedly afterwards, warming my hypo, and never had another blister. I should be glad if this method may bring Mr. Levy and others relief.—I am, yours, &c., J. CARTER BROWNE, D.D.

Thurning Rectory, Oundle, Feb. 6, 1893.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

PHOTOGRAPH REGISTERED:

S. V. White, Reading.—*Photograph of William Isaac Palmer, taken on March* 14, 1885, *but not published until January* 28, 1893.

PUZZLED.—Such an article will appear shortly.

LANTERNIST.—There is practically no loss of light when using the long instead of the short-focus lens.

W. H.—Either A or B will answer your purpose. Not having seen C or D, we cannot speak of them from personal knowledge.

IGNORAMUS.—Try the effect of warming the solution. Are you sure you are employing the solution at a uniform temperature?

WILLIAM WEBB.—We believe the article is the subject of a patent, but we must decline to express an opinion as to its validity.

W. D.—Apply to Messrs. Eyre & Spottiswoode, New Street-square, who are the proprietors of the Woodbury Company's business.

M. POWELL.—We cannot supply the details of the processes you allude to, not having cognisance of them. Had you not better employ a patent agent?

J. HIGHFIELD.—1. *The Studio and What to Do in It*, by H. P. Robinson (Piper & Carter), will probably give you the desired information. 2. Yes.

W. FREEMAN.—As both lenses are negative, no matter how they are placed in relation to each other, their sum will be negative, and they will not form an image.

ENGRAVER.—In the JOURNAL for April 8, 1892, you will find two articles describing how subjects may be photographed on wood for engraving purposes.

T. J.—There are several firms of photographic dealers at Cape Town. The prices of photographic goods are somewhat higher we believe, freight, &c., having to be taken into account.

R. A. SYMES.—The stains are caused by the negatives not being sufficiently washed between the different operations. Unless this is perfectly carried out, staining is very prone to arise with mercurial intensification.

RODNEL.—You have so good an idea of the apparatus that we should think you would be able to construct it for yourself. The arrangement works perfectly, any lantern-maker would be able to construct it from your description.

A. MUIRHEAD.—You would be infringing the patentee's rights by making the camera for your own use or to dispose of; and even though you were not, we cannot reconcile it with proper conduct to copy other people's manufactures.

B. C. CURTICE.—You can cure the distortion in the photograph when copying it by either tilting the photograph or swinging the back of the camera. See that the vertical lines of the temple are parallel with the frame of the ground glass or focussing screen.

NERO.—To engage in photography on the sands at the seaside we believe it is necessary to procure a permit from the town authorities, most of whom now (happily for the visitors) regulate the number of photographers by licence. Apply to the Town Clerk.

COLONEL GUBBINS, M. D., and other correspondents.—Mr. Frank Haes informs us that the flexible steel tubing to which he referred in his recent letter may be obtained from the United Flexible Metallic Tubing Company, 96, High Holborn, W.C. We do not know its price.

W. LLOYD.—The picture is not distorted, but the perspective is very violent. This is caused by the interior being taken with a very short-focus or what is known as a wide-angle lens. When such wide angles are included the pictures always have an unpleasant appearance.

J. BROWN.—Spots, such as those on the print sent, may proceed from several causes, such as want of care in the manipulations, impurities in the cement with which it is mounted, deleterious matters in the mount, &c. By merely looking at a print, it is obviously impossible to say from what source such spots proceed.

EXPERIMENTALIST.—We could give you a formula for photo-transfer ink, but it would be very troublesome to make in small quantity, and probably in inexperienced hands would not turn out satisfactory. Better buy it; you will then get a reliable article. It may be had from any dealer in lithographic materials.

J. HAWKES SMITH (Bowbridge, near Stroud, Gloucestershire.)—Messrs. Kilner Bros., King's Cross, supply such bottles.

E. WILTON.—No tax, we believe, is payable for a horse and trap, provided they are used solely for trade purposes, and photography would be classed as a trade. But if the horse or vehicle be used at any time for other than business purposes, it would at once become liable for the tax. The name and address must be legibly written on the right-hand side of the trap.

LENS.—If a lens of the rectilinear type of eighteen inches focus will not cover sharply, a 12×10 plate with a stop equal to *f*-32, it must be a very faulty instrument. As the lens was supplied subject to approval, it should be returned without delay. A lens is not necessarily bad because it bears no maker's name, though a name is generally some guarantee of quality.

G. W. C.—1. The Euryscope named will serve your purpose quite well. We speak from personal experience. 2. The query as regards plates you must ascertain for yourself. It involves our making comparative trials of the twenty-three brands you tabulate, which you, as a reasonable man, could not expect us to make. 3. From Piper & Carter, publishers, Furnival-street, London, E.C.

R. O. S. complains of "an opalescent coating on his lantern slides when he developes with the ferrous oxalate. He says that with pyro or amidol he does not get it."—The coating complained of is oxalate of lime from lime in the washing water. It can, however, be easily removed by immersing the slides in a very dilute solution of hydrochloric acid. A few drops of the acid to each ounce of water.

T. WALLACE.—The best information that has been published on retouching is that given in the two series of articles by Mr. Redmond Barrett that appeared in our pages. Study them well. A few practical lessons from a good artist will then be all you require. The services of retouchers are not so well paid for now as they were some years ago, except in cases of exceptional ability, by first-class houses.

LANCASHIRE LAD.—There are two sides to most questions; but, according to your own statement, you were entirely in the wrong. What you were asked to do was the legitimate work of an assistant, and your positive refusal to do it, coupled with the strong language you say you used, though you may now be sorry for it, we should say would, in the County Court, be considered a justification for summary dismissal.

INDIA says: "I should be glad if you or any of your readers can give me any information *re* starting a business in India. In what part is one most likely to succeed? Is there much opposition? and any other particulars which might be of interest to one going to India to start a business, or whether you know of any firm there requiring a partner?"—Perhaps some of our correspondents can supply the desired information.

WISEACRE.—We have had no experience of the lens referred to, but if it is of the spectacle-glass form: 1. No doubt. 2. No. 3. The same law applies as in the case of other uncorrected lenses. 4, 5, 6. We do not know. 7. We have had no experience of the shutter. 8. If you have arrived at the size you wish the object on the plate to be, the table will give you the remainder of the information. 9. Roughly, the equivalent focus of the lens.

S. W. says: "I am much troubled with my prints sticking to the negative while printing, particularly in the summer, and also just lately, when the printing room was unusually warm. I use a varnish sold specially for gelatine plates. Can you suggest any remedy?"—The only thing that we can suggest is that another kind of varnish be tried. The varnish may, however, not be at fault, for we found, some years ago, that if the film contained hyposulphite of soda, although a reliable varnish was used, after a time, especially if subjected to heat, the varnish became more or less tacky.

HORTON (Cardiff).—Flare cannot be avoided in a Petzval portrait lens when used with a stop for taking an outdoor subject, such as a view, no matter where the stop is placed. In the studio no flare spot is usually produced. The best marginal definition by such a lens is obtained when the stop is nearer to the front than the back combination. It is in the case either of a cemented doublet of the "rapid" type, or of a single achromatic landscape lens, that flare, when present, vanishes by a slight alteration of the distance between the back element and the stop. When enlarging direct with a portrait combination, the back lens must be directed towards the negative, the front to the sensitive sheet or plate. If the foregoing does not quite meet the difficulty write, again.

G. & W. MORGAN write:—"In enamelling we are a good deal bothered with air-bells. Our plan of procedure is about the usual way, cleaning the plate, dusting with French chalk, coating with collodion, and warming the plate before putting on the print. We use Coignet's gelatine, and make up about one gallon of solution; if acid, add ammonia, put the prints in the solution, then take them one by one and lay them on the warm plate till we get eight on; lay a thin piece of paper on top and squeegee well down. After about one hour lay on backing paper, keep them in a warm room from twelve to sixteen hours before stripping. We shall be obliged if you can assist us to get over the difficulty."—If the gelatine solution is free from air-bubbles, and care be taken that none are formed in placing the prints, no trouble will be met with. In placing the prints on the glass, lower one corner first, and then, gently, the whole of the picture.

RECEIVED.—Communications from James Cadett and several others. Thanks; in our next.

PHOTOGRAPHIC CLUB.—March 1, *Combined Toning and Fixing Baths*, by Mr. J. B. Wellington. 8, Optical lantern lecture on *Winchelsea and Rye*, by Mr. Brooker, of Hastings.

THE Bolton Photographic Society have decided to hold an Exhibition (four days) during the second week in April. Six silver and six bronze medals will be offered for competition.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—March 2, Technical Lecture, *Cameras, Dark Slides, and Tripods*, by Mr. Edgar Clifton. 9, *The Lens*, by Mr. J. Traill Taylor (second evening). 16, Monthly Lantern Night.

SEVERAL correspondents who this week write for information, but without enclosing their names and addresses, are informed that their questions remain unanswered in consequence of their contravention of our rules as printed in the JOURNAL every week.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical Meeting, February 28, at 50, Great Russell-street. *Panoramic Photography.* Colonel Stewart will open the discussion and show his "Panoram." Other panoramic apparatus will be on view. To be followed by the adjourned General Meeting.

BLACKHEATH CAMERA CLUB EXHIBITION.—Mr. George Davison, being unable to attend as one of the judges at this Exhibition, to be held on March 3 and 4, the Rev. F. C. Lambert has kindly consented to take his place, working in conjunction with Messrs. Cembrano and Pringle. Entries will close on 28th inst.

THE proprietors of Cresco-Fylma are offering two prizes for the best enlargements by their process, viz., three guineas for the best negative, two guineas for the best transparency floated on to opal. Mr. E. J. Wall has consented to act as Judge. Entry forms and conditions, together with full particulars, may be obtained of the Cresco-Fylma Company, Brighton-road, Surbiton.

MR. PHILIP THOMAS, Hon. Secretary of the Cheltenham Photographic Society, writes from the College Pharmacy, Cheltenham: "The Cheltenham Amateur Photographic Society has made up a set of 100 lantern slides for loaning to other societies, and I shall be obliged if you will make it known that the set is at the service of any secretary on application, the only condition being that carriage shall be paid one way."

THE Leicester and Leicestershire Photographic Society's exhibition of photographs will be held in the Co-operative Hall, High-street, on Wednesday and Thursday, March 22 and 23, 1893, under the patronage of Sir James Whitehead, Bart., M.P., ex-Lord Mayor of London, J. A. Picton, Esq., M.P., J. W. Logan, Esq., M.P., and others. All communications respecting the Exhibition should be sent to the Hon. Exhibition Secretary, H. M. Porritt, 66, London-road, Leicester.

THE Fourth Annual Exhibition of the Holborn Camera Club was held on Saturday last at Anderton's Hotel. The Exhibition, although a small one, proved in every way successful. The exhibits were divided into four classes: 1, Over half-plate; 2, Half-plate and under; 3, The best interpretation of "twilight;" and 4, The best set of lantern slides. Mr. A. J. Golding was successful in every class, coming out at the top each time. Two lantern show swere given during the evening. The annual Cinderella dance was held on Monday last in the same rooms.

WE are informed that the biggest photographic enlargement ever made on one piece of paper has just been produced by Messrs. Morgan & Kidd. It is 8 ft. 4 ins. long, by 4 ft. 5¼ ins. wide. The work has been done for a well-known London photographer, who, it is stated, intends showing it at the Chicago Exhibition. For some time Messrs. Morgan & Kidd have been erecting extensive plant and machinery, and enlarging their various departments to enable them to carry on their business more expeditiously, and amongst other things, the plant necessary for producing these large pictures has received their attention.

THE North Middlesex Photographic Society have arranged a series of elementary lessons for beginners as follows:—1. A talk on the management of cameras, lens, stops, &c., in the field. 2. Outing to put theories into practice. 3. Development of plates exposed at outing. 4. Toning gelatino-chloride prints. 5. Improvement of negative by reduction, intensification, &c. There will be no charge whatever for attending this meeting, which will be held at Jubilee House, Hornsey-road, N. The Society has room for a limited number of gentlemen, not members of the Society, who would like to attend, and full information as to dates, &c., can be obtained by applying to Mr. George Gosling, Hon. Secretary, 13, Lausanne-road, Hornsey, N.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—A Meeting of Committee was held in the rooms of the Photographic Society of Great Britain, February 20, before and after the Annual General Meeting, Mr. Alexander Mackie in the chair. A letter from Mrs. William Bedford acknowledging the Committee's expression of regret at the death of the late Mr. William Bedford was read. Messrs. Robert Beckett, C. J. Emeny, and P. H. Hunt were accepted as subscribers to the Association. Messrs. J. Traill Taylor, J. S. Rolph, and G. T. Harris were added to the Committee. Mr. A. Mackie was elected Chairman of the Committee in place of the late Mr. William Bedford, deceased. Seven applications for assistance were considered in full detail. It was decided that in three cases the applications could not be granted, but in the other four cases assistance in the forms of grants and loans, to the extent of 24*l.* 16*s.* 6*d.*, was given.

POLYTECHNIC CO-OPERATIVE EXCURSIONS TO THE WORLD'S FAIR, CHICAGO, starting each week during May, June, and July.—The Committee of the Polytechnic have been fortunate in obtaining, at greatly reduced rates, a number of berths upon the express steamers, which leave Southampton, of the Inman and International and H.A. Steamship Companies. Parties will leave every week during May, June, and July, and the tour will include a visit to New York, Philadelphia, Washington, Chicago and the Exhibition, and the Niagara Falls, and will cover a distance of over 8000 miles, returning to Southampton after an absence of one month. The special fare for the round trip from London is twenty-seven guineas, and includes rail fare to Southampton, second saloon accommodation on steamer, railroad journey from New York to Chicago and return (visiting above-named places of interest *en route*), accommodation in New York, Philadelphia, Washington, and Chicago, and return journey to London. The number of each party is limited. Further particulars may be obtained on application to the Secretary, Polytechnic, 309, Regent Street, London, W.

SOCIAL EVENING.—On Saturday, February 11, the *employés* and friends of Messrs. Percy Lund & Co. held their third annual "Social" in the Teetotal Hall, Bower-street, Bradford. Over a hundred persons sat down to tea, and a number of others joined them later in the evening for the entertainment which followed. The London branch of the business was represented by Messrs. H. Snowden Ward and W. C. Hay, and the firm's provincial travellers, Mr. F. Parkin from the north ground, and Mr. Spencer Warren from the south, were also present. Mr. Percy Lund presided over the entertainment, which was entirely sustained by the *employés*. The programme included songs and recitations; a mock trial arranged by those taking part in it, several tableaux, and a vocal waltz, which was received with enthusiasm and vigorously encored. Between the stated items of the programme a few games were interpolated for the younger folk, and the proceedings finished with a couple of verses of "Auld Lang Syne."

AUSTRALIAN PHOTOGRAPHS FOR CHICAGO.—Among the New South Wales exhibits at the Chicago Exhibition will be an extensive collection of photographic enlargements, executed by Messrs. Kerry & Co., of Sydney, for the Commissioners appointed by the Government of New South Wales, and representative of country life and scenery in that colony. Before being sent to Chicago they were publicly exhibited for a few days in the National Art Gallery of New South Wales, in the same room with Poynter's *Queen of Sheba*, where they attracted the largest attendance on record at that place. The pictures include representations of ox teams hauling cedar on the Richmond River, the various operations of handling wool from the time it is ready at the shearing sheds to its being placed upon the railway tracks, the magnificent scenery of the Snowy River with Mount Kosciusko in the distance, ocean views from the romantic heights of the Illawarra Range, scenes in the Jenolan and Garrangobilly Caves, Katoomba Falls, Govett's Leap, &c. The shearing and lamb-marking scenes are excellent, but the view which will probably excite most interest will be that of Randwick Racecourse, near Sydney. It measures fourteen feet six inches by three feet six inches, and furnishes an excellent idea of a race meeting in one of the Australian capitals. It is probable that on the termination of the Chicago show the collection will be sent on to London.

CROYDON CAMERA CLUB.—1893 Exhibition, April 5 to 8. The following are the particulars of prizes and classes:—A. Hand-camera Work: Four prints on one mount. Open to all members. Prize, bronze medal. B. Lantern Slides: Sets of four. Open to all members. Prize, bronze medal. C. Outdoor Views (not portraiture, groups, or *genre*): Size, half-plate and over. Open to all amateur members. Prize, silver medal. D. *Genre* or Figure Subjects, direct or enlarged: Open to all members. Prize, large framed etching of painting (by Mr. H. Maurice Page). E. Any Subject: Open to lady amateurs throughout England who have never won a prize in open competition. No size limits; but if hand-camera work, then not less than four prints on one mount. Prize, bronze medal. Entrance fee, 2*s.* each. F. Any Subject: Open to all Surrey photographers who have never won a prize in open competition. No restriction, except that hand-camera work must be entered not less than four prints oneach mount. The winning print or set in Class F. will be reproduced in Woodburygravure, and the prize consist of forty copies thereof presented to the winner, besides which a copy will be sent to each competitor and to each member of the Club. Entrance fee, 1*s.* 6*d.*; members free. G. Exhibits by Members: Not for competition. H. Works of Distinguished Photographers: By invitation only. Not for competition. Further particulars may be obtained of Mr. G. R. White, 56, Albert-road, Croydon.

FORFARSHIRE INTERNATIONAL PHOTOGRAPHIC EXHIBITION.—The first Exhibition will be held in the Reid Hall, Forfar, on Thursday, May 4, 1893, and following two days. The following are the officials:—*Hon. President:* Alexander Robertson, of Burnside, Sheriff-Substitute of Forfarshire.—*Hon. Vice-President:* Robert Whyte, Procurator-Fiscal of Forfarshire.—*Chairman of Committee:* Gilbert W. Don, Clocksbriggs House.—*Vice-Chairman:* J. Watson Craik, Forfar.—*General Secretary:* W. J. Anckorn, Arbroath, N.B.—*Treasurer:* R. Bruce, Banker, Forfar.—*Local Secretaries:* A. H. Simpson, Chemist, Forfar; James D. Ross, 6, High-street, Brechin; and A. Davidson, Chemist, Montrose. The Classes for Competition are as follows:—Class 1, Amateurs confined to Forfarshire, any subject, any printing process, irrespective of size. Class 2, Amateurs, Open Class, Landscape and Marine, irrespective of size or process. Class 3, Amateur, *Genre* and Portrait. Class 4, Professional, Portraits, irrespective of size. Class 5, Professional, *Genre*. Class 6, Open Class, Enlargements, untouched. Class 7, Professional, Landscape, with or without Figures. Class 8, for Ladies only, any subject. Class 9, Open Class, Lantern Slides, set of six. Class 10, Medalled Class (Champion), no restriction in number of pictures. One gold medal will be awarded to the best picture in the Exhibition; also a silver and a bronze medal will be at the disposal of the Judges for any special photographic work, any subject or process.

*** In type, but unavoidably held over, articles by Hector Maclean, T. Nr Armstrong, J. Pike, W. H. Davies, a paper by Mr. Horsley Hinton, and othe. interesting communications. These we will endeavour to overtake next week.

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PANORAMS, WIDE ANGLES, AND PERSPECTIVE.

While it may be difficult to indicate a sharp line of division between a narrow and a wide angle of included subject in a photograph, a like difficulty does not prevail as to the nature of the perspective in which such a picture is presented. The Panoram, as given in the title to these notes, differs from the ordinary camera in this, that whether a wide or a narrow angle of view be included in the picture, the perspective is not plane, but cylindrical or panoramic.

The Panoram—as described by its inventor, Colonel Stewart, R.E., at the meeting of the Photographic Society of Great Britain on Tuesday evening—is a camera containing several ingenious devices. A fair idea of its nature may be had if we describe it as a Johnson & Harrison pantascopic camera fitted with an Eastman roll-holder instead of the dark slide for glass plates which characterised the elder invention. The principle of the camera mentioned permits of its taking in a view that includes the whole circle of 360 degrees, but as it was introduced anterior to the days of films and when glass plates formed the sensitive support, it was evidently impossible to utilise plates so abnormal in length compared with height as to give practical effect to its possibilities, hence 120 degrees was selected as an angle sufficiently large.

By the application of the Eastman roll-holder the original great bulk of the instrument is minimised to such an extent as to reduce it to that of an ordinary portable camera. As the image falls upon the sensitive surface through a narrow vertical slot immediately in front of the film the roll-holder does not necessarily exceed a very few inches in width.

The camera rotates upon its stand, the axis of rotation being the focal centre of the lens; and the slot through which the light passes to the film is of unequal width so as to allow of a greater practical exposure being given the foreground than the sky. The motive or driving force is clockwork, as in the pantascopic camera, and this likewise causes the revolution of the roll-holder by which the film is carried across the plane of delineation at the focus of the lens. A complete rotation of the camera (the one exhibited had a lens of ten inches focus) ensures the covering of a band of film a little exceeding six times the focus, which in this case would form a continuous picture over five feet in length.

But while the camera possesses this giant's power it is not necessary that advantage be taken of it. On the contrary, the clockwork after being started may be stopped at any stage by the mere manipulating of the pneumatic ball, and the exposure may be such as only to include an angle of the smallest conceivable dimensions, if the subject be one that does not warrant more being included. The termination of the rotation ensures the marking off of the portion of film exposed by the action of a pricker, after which the clockwork is wound up and everything is in readiness for the next exposure, which may include either a wide or a narrow angle of view as before.

An ingenious method of developing these long pellicular negatives has been devised by Colonel Stewart. He fastens the exposed band to the periphery of a wheel of suitable width, and then rotates it slowly in a vessel of developer, which need not be any larger or deeper than just to submerge the film. Several negatives of this class which were exhibited attested the success which attends this novel and ingenious system. A similar method may be adopted with the printing from films of great length.

A camera of the nature here indicated, while useful for such pictorial purposes as involve the depicting of any subject in which there is continuity, such as a range of hills, a chain of lakes, or a coast scene, must prove of special value in military reconnaissance, and it will form a useful addition to our appliances.

But it may be said, as the perspective of such pictures will be cylindrical they will necessarily be distorted. To meet this, we may say, speaking hypercritically, that photographs of every kind are distorted if they are not looked at from the correct point of view. When this is attended to there is no distortion in pictures in either plane or cylindrical perspective; otherwise there is.

Let a number of spheres be placed squarely in a row in front of a camera containing a wide-angle lens and then be photographed. A careful examination will reveal the fact that, while the central one is of the same height as that nearest the margin, yet the latter is not circular but elliptical, the width exceeding the height in dimensions.

The central one is quite circular; but, in proportion as the others recede from the centre, so does the horizontal width increase. This arises from a circular beam of light being made to impinge obliquely on a flat surface. No picture whatever can be seen with absolute accuracy unless the eye or point of observation be opposite the centre of the picture, and at no greater distance from it than the focus of the lens by which it was taken. Only in this way will the elongated marginal spheres adduced as an example be seen *as* spheres. A similar principle applies to the examination of a panoramic view. To see this with accuracy, the picture must be bent in a curve, the radius of which equals the focus of the lens, and the eye must be in the centre of the curve, so as to be directed squarely to each part. No distortion will now be apparent.

WASHING PHOTOGRAPHS.

We make our title as wide in its scope as possible, as we propose to include in our purview not only negatives, but prints of various kinds. We are led to consideration of the subject owing to inquiries, familiar enough to any one known to have experience, as to the cause of this, that, or the other kind of spot which, in even a brief practice of photography, exercise the mind of the tyro, and not only him, but, not infrequently, the expert. It is not our purpose to write a disquisition on spots in general; we have in view a particular aspect of the subject—those spots attributable to the water employed. First, let us say that we consider efficient washing of prints may be done with an extreme maximum of twelve hours, if properly carried out; with negatives, a maximum of four hours may be considered sufficient. We refer to this point as, from personal knowledge, we can say that some workers considerably exceed these limits. One amateur who came to us with a tale of unavoidable "frilling," was astonished when we informed him that the twenty-four hours' washing he gave his plates was the cause of his frilling, and was almost incredulous when he learnt that he might consider from two to four hours ample time to leave his negatives in a running stream of water. Then, again, the universal consensus of opinion from printers with extensive experience is, that prolonged soaking injures the quality of the print.

The condition of the washing water is a prime factor in the production of spots and stains of an extensive and varied character. It will only be necessary to briefly allude to hard waters, in which a large quantity of carbonate of lime is held in solution by carbonic acid. Such waters are fruitful in producing negatives with a closely adherent scum. Again, waters of a ferruginous character deposit iron under some conditions, and so stain the prints. This cause, when the iron is not very largely present, might possibly escape attention.

But the foremost cause of all, whether running streams or water from a public main is made use of, is the presence of suspended matter. Good samples of water, fit for use as a beverage, may, in average conditions of purity, contain so much suspended matter as to cause a deposit of more or less fineness over every print or negative placed under its influence, even though the impressed surface may be placed face down in the trough or other receptacle. The suspended matter may be fine particles of inorganic matter, or, what is more probable, low forms of vegetable life that have either escaped through the interstices of the filter bed or have germinated in the water in its progress through the mains. If any one supplied with what he deems the purest of water will merely attach round one of his water taps a piece of clean flannel, and allow the water to run gently through, he will, in the large majority of cases, be surprised at the amount of "dirt" he will in an hour or two find arrested by even so open a woven fabric. Such matter will largely attach itself to photographs in washing, and produce a faint, though decided, scum or discolouration, which occasionally forms in clots, and gives rise to distinct centres.

But it must be remembered that, as the water mains themselves become coated internally with a deposit from the water passing through them, this is liable to be disturbed when alterations are being made. A neighbour, for example, is having his water supply altered. What is the result? For some hours, perhaps, the water is decidedly muddy, and if negatives or prints be washing it is quite possible that all this muddy water is being used, and its presence never observed. Especially is this so with prints which are being washed through the night, as is so generally the case. If a cistern is used and the water not taken direct from the main—an excellent plan in one direction, as it ensures constant pressure—a portion of this mud is intercepted, but not all, and the further evil remains of a portion of this accumulation of mud some day or other surely being disturbed and despatched to its innocent victim, a batch of photographs under washing operations. Again, many stone cisterns are not kept air-tight, some not even covered: atmospheric dust is bound to accumulate and be deposited upon the pictures being washed.

Instances could be multiplied, if need be, to give point to the obvious moral. All water for washing purposes should, before entering the washing trough, be passed through a filter of some kind. We look upon this matter as one of prime importance, but one which is neglected in by far the largest proportion of cases. How the water is to be filtered we need not indicate. A home-made filter of two thicknesses of flannel is used in some studios we are acquainted with, and very frequently, we are informed, have they to be cleaned or renewed. There are numberless filters upon the market to suit the most fastidious taste. We have one suggestion to offer. Whether the filter be one to discharge filtered water into the store reservoir, to filter it after storage, or to attach direct with the main and supply filtered water as the tap is turned on, in any of these cases let the filter chosen be one that is readily cleansed and its contents removed, or, better still, one that is self-cleansing. Many excellent filters of the latter pattern can be obtained; the matter is rather one of embarrassment of choice. In conclusion, let us say to all photographers, Filter every drop of water you use, and use a self-cleansing filter for the purpose, and so avoid a fertile source of spots and stains.

WARM TONES WITH IRON DEVELOPMENT.

Although the class of tones usually associated with iron development—by which, of course, we mean ferrous oxalate—ranges only between grey and black, yet it is by no means impossible, under certain circumstances, to obtain warm tones, as all workers of Alpha and similar papers are aware. But the conditions requisite are such as to practically bar the application of this method in a great many instances where protracted exposures are objectionable, as the effect is gained by using a very weak developer after an exposure of abnormal length. For contact printing, or for enlarging in a good light, and from suitable negatives, no objection need, perhaps, be raised, but in the dull light of the winter months this system of working is almost impossible.

A correspondent, however, in another column this week, calls attention to another means by which the same end may possibly be equally well attained without the same necessity for increasing the exposure; indeed, speaking from recollection of the behaviour of the developer referred to by him, we believe the general tendency is to give the warm tones with a normal exposure, though, as in other forms of development, the effect increases proportionately with its extension. The means referred to consist in substituting ferrous sulphite for ferrous oxalate, either partially or wholly, but preferably by making a mixed solution of the two salts.

Mr. M. Carey Lea was the first, soon after his introduction of the ferrous-oxalate developer, to call attention to the developing power of several of the other ferrous salts, and amongst those of which he spoke most favourably is the one in question, the sulphite, which, however, has not, up to the present time, been recognised as an established developing agent. It has

been put forward, as our correspondent points out, as a means of restoring the energy of a spent ferrous, oxalate solution, and it was in employing it in that connexion that we some years ago noticed its remarkable tendency in the direction of warm tones.

This is more particularly the case with collodion emulsion plates, with which we have obtained images that could not be distinguished from the red chalk or "Bartolozzi" effects that have become popular for some classes of portraiture. With gelatine films the colour is not, as a rule, so decidedly red, unless a considerably augmented exposure be given, but it is sufficiently removed from the ordinary ferrous-oxalate tone to deserve the title of "warm." The colour so produced is, moreover, particularly well suited to toning either with gold or platinum, passing from the original red stage through the same range of purple shades as in the case of an albumen print. In fact, in this respect the toning is far more certain, and the final result far more like an ordinary silver print, than when a chloride film is in question, and satisfactory tones can be obtained either by transmitted or reflected light, that is, either for transparencies or paper prints.

Ferrous sulphite is not itself soluble in water, though it is freely soluble in excess of sulphurous acid. It is also soluble—though probably by conversion first into oxalate—in oxalate of potash. It may be made by dissolving iron wire or filings in aqueous sulphurous acid, the result being a mixture of ferrous sulphite and hyposulphite, the former of which slowly crystallises from the solution or may be precipitated by adding alcohol. A better plan, however, is to prepare it from freshly precipitated carbonate of iron, in which case it is obtained free from the hypo sulphite.

The process is conducted as follows:—A concentrated solution of ferrous sulphate is mixed with an equivalent proportion of carbonate of soda, also in solution, and the bulky, gelatinous precipitate—white at first, changing rapidly to dark green and eventually foxy red—is thrown on to a calico filter and left to drain with as little exposure to the atmosphere as possible The carbonate is extremely unstable, passing quickly, if exposed to the air, into the state of ferric hydrate, when it assumes the characteristic brownish-red colour; it is impossible to altogether avoid this change, but every effort should be made to prevent it as far as possible by protecting the mass from the atmosphere It is hopeless to attempt to hasten the separation of the excess of water, or to get the mass into a more condensed form; all that can be done is to let as much water drain from it as will in a reasonable time.

The next operation is to convert the carbonate into sulphite. For this purpose, if a very dilute solution is all that is required, let a given quantity of the aqueous sulphurous acid of commerce be shaken up with a quantity of the dirty green carbonate—rejecting, as far as possible, that which has changed to the red colour—until it will take up no more; then let it settle, and decant the clear portion, or filter it. This, however, constitutes at best a solution of very low and indefinite strength, and the preferable, though more troublesome, plan is the best.

Arrange an apparatus for the generation of sulphurous acid gas by fitting a cork to a wide-mouthed bottle or jar. Bore two holes in the cork, and into one fit a bent tube to lead off the gas, and into the other a funnel with a long stem to reach nearly to the bottom of the jar. What is known as a "thistle-head" funnel will answer, but it is better to use one with a stop-cock, obtainable in all sizes at the philosophical apparatus dealers.

Let the jar be three parts filled with saturated solution of sulphite, or, better, bisulphite of soda, insert the cork, and see that all the joints are tight. Place the precipitated carbonate in a wide-mouthed bottle, into which the bent tube from the generating jar is inserted, so as to reach nearly to the bottom. When this is all arranged, pour gradually into the generator, by means of the funnel, strong hydrochloric acid to decompose the sulphite. The acid must be added only a few drops at a time, as each addition will cause violent ebullition; and here is where the utility of the stop-cock is found, as the funnel may be filled with acid, and a few drops allowed to trickle into the jar as the effervescence subsides, and without allowing the gas to escape except by way of the bent tube.

The sulphurous acid, as it escapes, is taken up by the iron, and carbonic acid in turn is given off. Gradually the green colour of the carbonate changes to a dull brown, and eventually the liquid becomes clear, and then consists of a solution of ferrous sulphite in excess of sulphurous acid. Obviously it is of uncertain strength so far as regards the excess of acid, even though, with a definite quantity of iron to start with, the volume be made up to a certain quantity. But, if the passage of gas be arrested just before the solution becomes clear, a tolerable approximation can be made to uniformity in successive batches.

The solution thus formed itself possesses developing power, but it is better used in conjunction with ferrous oxalate. By the addition of potassic oxalate alone, a developer of ferrous oxalate is formed, but the solution is not rich enough in iron to be advantageously employed in this manner. Far better is it to mix it in definite proportions with ferrous oxalate developer, made in the ordinary way, by which means a better idea can be formed of the actual constituents.

Lantern Slides as Window Decorations.—The lantern season will soon be drawing to a close, but there is no reason why the slides should not still be objects of enjoyment by utilising them for decorative purposes. We were recently shown a frame of about a score of lantern transparencies, backed with ground glass. The frame was of lead, such as that used for church windows of stained glass, and the slides were surrounded by a narrow margin of various coloured glass. Strips of tinted glass, of quiet tones, were also interspersed between the photographs, which gave an exceedingly pleasing effect. With each transparency two nicks were cut in the lead, sometimes at the top, sometimes at the bottom, and at others at the sides so as not to weaken the frame generally. This enabled the lead, which is soft and ductile, to be turned back, so that any slide could be readily taken out and replaced by another as required.

Exclusive Rights.—Another exhibition in connexion with photography is projected at the Crystal Palace. The prospectus contains the following:—"Notice is hereby given, that the right of taking photographs in the Palace and grounds has been let by the Company under an agreement for a term of years, and all exhibitors are expressly prohibited from taking photographs of any kind whatever. Any one invading these rights renders himself liable to a claim for damages." It is tolerably well known that Messrs. Negretti & Zambra have held this sole right for very many years—if we mistake not, from the first opening of the Palace. The Company have, like the authorities at the Chicago Exhibition, often been censured for letting exclusive rights; but it has no doubt been with them a consideration, as at Chicago, whether permitting the unlimited use of the camera would increase the returns to the same extent as letting the sole rights to a commercial firm.

Improved Blood Albumen.—When an unusually malodorous sample of albumenised paper is met with, it is frequently

assumed that it is necessarily prepared with blood albumen. This is a fallacy, because blood albumen need have no more odour than that from eggs, while the latter may be, and often is, used in a most offensive condition. The application for a patent for the manufacture of a light-coloured albumen from blood has been made by a Dr. Carl Cosinera, of Berlin, the specification of which has just been issued. The inventor says, when defibrinised blood is mixed with slightly acidified ethyl, or methyl, alcohol, or acetone, the albumen and the globuline contained in the blood are precipitated, while the colouring matter of the blood, hæmatine, remains in solution. The method is briefly this: One part of defibrinised blood is introduced in a thin jet into four or five parts of ethyl alcohol of ninety-five per cent., previously acidified with one per cent. of sulphuric acid, the mixture being well stirred during the addition of the blood. Albumen separates in the form of almost colourless flakes, and the red-brown coloured mother liquors are separated by filtration. The albumen is then to be washed with alcohol, and afterwards with water. It can afterwards, if desired, be bleached with any oxidising agents, such as hydrogen dioxide, &c. Considering the small proportion of albumen contained in blood and the price of alcohol, even methylated, we fear that photographers will not reap much advantage in their albumenised paper from the new process of obtaining albumen, however excellent it may be.

Photogravure.—We have often in the past directed attention to the little interest taken by professional photographers in the various mechanical methods, photogravure in particular, also that work which could very profitably be done here was being sent abroad in large quantities for execution. Whatever the profession may have been doing, it is certain that of late many amateurs have been taking a great interest in photogravure, as evidenced by the large number who attended the two lectures by Mr. Denison. The process described by Mr. Denison is an exceedingly simple one, and will yield excellent results, requiring no expensive plant for its working. A copper-plate press, such as that used at the demonstration, costs but about 12*l.*, while a second-hand one may be had for much less. A couple of pounds will cover the cost of the dusting-box, heater, "jigger," &c. The same heater that is used in the printing will also serve in laying the ground on the copper plate. It will be better for the experimentalist, at first, to send his plates to a regular copper-plate printer to print, as skill is required in copper-plate printing as in all other work. Copper plates are not expensive; the half-plate size cost from about two shillings to three shillings each, according to quality and finish, other sizes in proportion. Beginners in the work who are *au fait* with carbon printing will have far less to learn than those who are not, because the whole thing is dependent upon that process—the production of a carbon transparency, and from that a suitable carbon negative on the copper plate. The other portion of the work is very simple; therefore experimentalists will, as a matter of economy, do well to master the details of carbon printing, and they are very easy, before essaying etching on the copper. If that be done, no difficulty will be experienced in getting the most suitable carbon image for the purpose on the plate.

THE WEAKNESS OF "STRONG POINTS."

Although to some it may at first sight seem that discussion respecting those so-called laws which have been formulated for the guidance of all who yearn to become art-perfect is outside the scope of a photographic periodical, nevertheless, as I shall presently show, the particular one I wish to direct attention to is of unusual importance to all photographers, and I think my criticism of it will be welcome to a considerable number of the fraternity.

The object of this paper is to remove from its high pedestal a certain graven image which a large proportion of us have hitherto with confiding superstition worshipped, not merely to the exclusion of quite a host of other equally potent little idols, but also to the grievous neglect of the great mother goddess—Art. And the name of the graven image aforesaid is "Strong Points.'

Who first set up this minor deity, so that it has come to be received as a major one, I wot not. Anyhow, Mr. Howard draws particular attention to it in his *Sketcher's Manual*, where, as far as photographers are concerned, it might have lain dormant until this very moment and longer, had not Mr. H. P. Robinson given it prominence and his own *cachet* by devoting a whole chapter of *Picture-making by Photography* to its consideration. Ever since then the camera crowd has adopted and cherished this wonderful one rule as a *sine-quâ-non* in all pictorial designs. This has been much helped forward by the various handbooks of photography which, big and little, have taken up the above now omnipotent law and enlarged upon it with unflagging satisfaction.

It is so easy to demonstrate, so simple to master, so substantial to handle.

Take a T-square, divide your paper into nine equal rectangles, then where the vertical and horizontal lines intersect you have your "strong points;" upon one of these place your chief object. The recipe is more readily practicable than are the directions for boiling a potato. It is but a rhetorical exaggeration to say that from Abney's text-book, published ever so many years ago, down to Bothamley's shilling manual, which every one was last year reading, the advice upon line composition is mainly "strong points," leavened by a holy horror of that damnable heresy "symmetry."

All this widely disseminated literature, which is, as regards art matters, necessarily founded upon opinions borrowed one from another, and all from one, has, in due course, borne fruit, which has nourished a race of judges and critics, who apply, as a kind of touch-stone, this magic principle of "strong points" to every luckless print, picture, or view coming under their ken.

Is the main subject—say, the village church, or the toiling reaper—in or near the magic spot, then is the *pons asinorum* safely got over; but, should the leading motive be palpably distant from one of the "strong points," then *anathema!* In vain may the landscape be brimful of sweetness, fancy, and delight, if it has sinned against this awful little law, it is only worthy of perdition—that is, perdition of medals. And so it must needs happen that "full many a time and oft," not the best, but the second best, of two works is placed first.

Far be it for me to deny that some one of the aforesaid points is the strongest region in the rectangle of a picture, nor dispute that it is a good place to group the salient objects, because it is impossible to demonstrate the negative of a contention which only rests upon a fanciful impression—and, besides, I do not doubt but that in many instances some such a position is best for the purpose, for the sake of convenience, if for no other reason; but what I most earnestly protest against is the growing habit of making this comparatively insignificant rule a chief test of artistic merit.

To illustrate the immateriality of observing the law of "strong points," let me briefly refer readers to one or two paintings which they may with ease inspect for themselves from the hands of artists whom even photographers will not care to declare untrustworthy.

First, an example of David Cox, whom we all know. In the South Kensington Museum is one of his master works, called a *Water Mill in Wales*. A most cursory glance at this (which is also reproduced in Redgrave's short memoir of the painter, and can be seen at most free libraries) will enable the student to note that it is composed in absolute defiance of the "strong points" dogma. The most vivid juxtaposition of light and dark, the chief incident, the dominant forms, are arranged upon a vertical line, which, with almost mathematical precision, divides the picture into two equal parts!

Next witness P. De Wint, whose *Lincoln Minster* (which can be seen in the same gallery and the same book) is placed exactly central upon the paper, so that the bisection of diagonal straight lines occurs at the very acme of pictorial interest, which is therefore both vertically and horizontally equidistant from the sides.

Turning to figure paintings, it is less necessary to advert to the examples in which the model is placed on or by an upright central line, because the fault—if fault it be—is too common to need emphasising, but the localising of the centre of interest halfway between the top and bottom is less often done for the very sufficient reason that, inasmuch as the head forms the key, it is, as a rule, almost a physical impossibility to get the aforesaid centre of interest very far from the upper boundary of the canvas. Of course it can, by the exercise of some ingenuity, be done, especially where the figures are small in comparison with the dimensions of the composition. Now, in spite of all inherent difficulty and improbability, it cannot be gainsaid that quite a number of figure subjects might be cited having their leading and dominating emphasis, alike human and artistic, in the very middle of the picture. Indeed, in several instances the artist seems to purposely and contemptuously flout that upstart idol "Strong Points."

I have made no diligent search for examples of the above, but find plenty of them ready to hand; of these I append one or two.

Firstly, there is *The King's Daughter*, by Herbert Schmalz, shown at the New Gallery in 1889, and reproduced in *Pictures of the Year*, published at the *Pall Mall Gazette* office. In this, although there does not seem any reason why such should be the case, the chief figure

is not only midway between each side of the canvas, but her face, which is the essence of the painting, is over a point equidistant from each corner.

Again, who is there that, having seen, can forget Henrietta Ray's entrancing *Zephyrus Wooing Flora*, which was in the Royal Academy of 1888? Well, here we find that the two heads are arranged upon a central perpendicular line, and, moreover, a circle of relatively small radius described about the centre of the picture will include the faces of Flora and her swain.

No useful purpose is served, or I would continue the list of works by eminent artists showing a complete disregard of the tenet of "strong points;" but enough has been done to prove that the rule, "Put your chief object in the corner," as if it were a naughty boy, is not by any means an essential one, but is one of those unimportant regulations which, good in its way—as is, say, sea-bathing or smoking—may be practised or not, at the pleasure of the artist, without detriment to his production.

In conclusion, I hope my remarks will induce those who take upon themselves, or have thrust upon them, the duty of passing judgment upon photographs to be in the future less prone to condemn a study simply because it does not conform to the greatly overrated doctrine of "strong points."

HECTOR MACLEAN, F.G.S.

SPECIALISATION IN FINE-ART WORK.

[West London Photographic Society.]

THE photographic world is a comparatively small one, and it needs only that a man should make a few pictures and contribute an article to the photographic press to ensure his being known to the average photographer; hence I may not be taking too much for granted if I presume that I and my misdeeds are not altogether unknown to at least some few of those who have courteously come here to receive me this evening. And, this being so, I am wondering what you expect of me. Your syllabus makes me responsible for a paper on "Art and Photography." How delightfully vague; how good of your Secretary to give me such elbow-room! I have been presumptuous enough to suppose that my works or my doings are not wholly unknown to you, and from this, and from the title which is put down for me, I imagine that you may perhaps share the general though somewhat erroneous notion that I am pledged to uphold the possibilities of photography in the field of fine art, and may possibly be expecting me to speak of such matters to-night—expecting me to once again enter the lists, to fling down the glove to you, and demand the homage of every artist to this fair sun-goddess, and compel your acknowledgment of her purely art claims, admitting her in all respects equal to those queens of the tournament, the pictorial arts, whose claims are already established and whose sovereignty is acknowledged.

"FIDDLING ON THE SAME STRING."

Now, ladies and gentlemen, I propose to do no such thing. I am by no means in fighting condition, and have grown wary of late how I enter into any such conflicts as the championing of photography as an art might lead to.

It is a considerable time ago that I accepted, with great pleasure, your President's invitation to come here to-night, and my memory may be at fault; but I believe I gave as the title for a brief discourse "Specialisation in Art Work," and I did so with a deliberate intention.

I was at that time smarting under a newspaper critique which described some of my own picture attempts as "fiddling upon the same string," which I considered as uncalled for as it was foolish (I hope the reviewer is here to-night). In the heat of the hour I felt eloquent, and partly for the sake of self-defence, and also because I felt that I might thereby drop some remark, some slight suggestion, which should be of use and of interest to others, I elected to read a paper on "Specialisation," which is, perhaps, a prettier expression for "fiddling on the same string."

WHAT A PICTURE SHOULD BE.

But, whilst I foreswear any intention of urging upon you the high artistic position which I may or may not believe photography should hold, my remarks must apply essentially to that side of photography which, in order to avoid the debatable term artistic, we will call the pictorial aspect of photography, meaning by that photography employed for the production of a complete and æsthetically pleasing result—a picture, not a diagram, or a mere reflection of objects or circumstances—a picture, not a mere memorandum to be employed by the painter, artist, or draughtsman, in his subsequent work—a thing of beauty, not a pictorial anecdote, nor an exhibition of execution, or a cleverness which may come of much careful training, but a picture which corresponds to the impression which any arrangement in nature left upon the artist's mind, and may be depended upon to awaken a response and a similar impression in the spectator to whom it may appeal. I trust I am making my meaning understood. I want so particularly to clearly express my own notion of what a picture should be, it would clear the way very much for those who claim that photography may be art. I don't say it is, at least not here! Truth, to tell, I am trying to find out, it may be I shall be following an *ignis fatuus* all my days, but it is a fascinating pursuit and a pleasant one, and, any way, it will keep me from meddling with my brother photographer who makes topographical views and curiosities of manipulated skill his special care.

NATURE RARELY RIGHT ARTISTICALLY.

In the endeavour to produce by means of the camera *pictures* properly so called, we must disregard every other consideration; it is by no means sufficient that a photographic picture should be an exact copy of nature, it must aim at something more than that; remember that, artistically, nature is very rarely right. You may remember who it is that has said, "To say to the painter that nature is to be taken as she is is to say to the player that he may sit on the key-board;" and, again, "Nature contains the elements, in colour and form, of all pictures, as the key-board contains the notes of all music," and it is for the artist to select, to emphasise, to suppress the notes according to his fancy, and to group, to combine, and weave the whole into an harmonious chord.

How is this to be done by photography? Well, well, I am not here to say it can be done, I will not now say it ever will be fully done, but I may privately think sometimes that we are perhaps nearer the goal than we were.

Please observe the "sometimes" and "perhaps." Am I not very cautious?—too guarded, too doubting, I know, for many who, having secured with their camera a little impressive bit of landscape, very pleasant to look at, often full of suggestion, in feeling, in taste, in treatment so far above the typical photograph that, in a proud moment, they fancy the doors of the Temple of Art standing wide open to receive them.

EXAMINING AND STUDYING NATURE.

So, now, if we are devoting our photography to the production of pictures, in the best sense of the word, it will be necessary for us to examine that nature which, like a keyboard, contains all those notes which we shall need to make our harmonious composition, and study them all the more closely because we find that the composition ready to hand is usually far from perfect; and, having acquired an intimate knowledge of things around, we become more fastidious and less easy to please. I know of no more hopeful a sign in the photographer than the over-exacting and dissatisfied mood of the man who has been there before, and will visit that spot again and again, patient until this and that feature are in proper unison, waiting and watching so that the objectionable shall be removed and the wished-for come to pass—perhaps, after all, to go empty away, because he found nature not wholly right. Dutifully and reverentially he hoped nature would come right—come as he wanted her—because he, lacking the painter's skill, could only photograph a little less than nature chose to show him. Herein is the barrier. Who will break it down?

NOT ENOUGH SERIOUS STUDY.

This waiting, and watching, and patient study implies a seriousness of purpose which is all too rare amongst our photographers. With those who find in photography a pleasant pastime, an occupation for leisure hours, much that I have said must appear very unnecessary and making much ado about little. With such a one I have nothing to do for the present, and I can only presume to interest those who, like myself, care for photography, not for its own sake but merely as possible means to picture-making, and hence I make complaint that much photographic energy is misapplied. There is too much of the *hobby* and not enough of the serious study: too often a holiday-making air about the excursion with the camera, a triviality of purpose and insignificance of aim. This cannot fail to make itself felt in the resulting works, and it is not fair to judge of what can possibly be done with photography by such examples. Let me tell you that the man who goes out with his photographic appliances with the serious purpose of getting a picture which shall express some of the poetry and sentiment of nature, but returns home without having used a single plate, has done a better day's work than many who may have exposed the entire half-dozen here and there at each prompting of fancy and inclination.

Still, there is hope—nature is not always so coy; and, on the other hand, sometimes the photographer may do well to be a little less exacting, or at least be content with a compromise.

If the photographer cannot gather and choose the elements of his composition as he wishes, still, if he accept, after diligent search, what is given him, the greater truthfulness with which he can portray this little may be some compensation for his limitations in another direction.

Waiting for Nature in the Mood we Desire.

But let me attempt to come more precisely to the matter in hand. I have pointed to the necessity of finding nature in her best mood. I don't mean necessarily in her most sunshiny and smiling mood, because, for my own part, I find nature weeping, or wild and stormy, more charming than in radiant sunshine. You know what Mr. Whistler says about "the sun blazing, the wind blowing from the east, the sky bereft of cloud, and without all is of iron. The windows of the Crystal Palace are seen from all points of London. The holiday-maker rejoices in the glorious day, but *the painter turns aside to shut his eyes.*" But it is necessary to wait until we find nature in the mood we desire, and this means many visits to the same spot, perhaps many plates exposed. If I could but drive home to each landscape-worker the desirability of often visiting the same spot, I should be well repaid for speaking.

The facility with which a plate may be exposed, and something like a satisfactory picture obtained, is probably photography's greatest stumbling-block. If only we could sufficiently restrain our impetuosity, and never expose the plate until we have become acquainted with every feature, every form in the scene, we should be surer of success, and we should probably be surprised to find that the effect which pleased us at first is far surpassed by the effect which we subsequently discovered. But our habit is to wander over yonder green hills to-day, and, not finding a subject to please us, to-morrow we traverse the woodlands, and next day the meadows, securing something perhaps from each.

Ringing the Changes on a Single Landscape.

But surely it is hardly reasonable to suppose that, if we secured a fairly pleasing effect on the day we visited a certain favourable point, by returning and going again we may be able to improve. We can hardly suppose that nature was forewarned of our first coming, and prepared herself in her best guise for that particular moment. A lucky chance may favour us in that way sometimes, but I say that, if we bring away a charming picture of a given spot on our first or second visit, continued visiting and further observation will more probably result in something even past our highest conceptions.

And, if this is true of a definite spot, so is it still more so of a certain class of scenery. I will say that within the limits of one small valley, on the slopes of a single mountain, by the banks of a river, between one lock and another, there is subject-matter for a life-time. Changing seasons, changing skies, and not until you have studied it all shall you know how much there is in it worth noting, or what effects are possible. I think it is a fair comparison to ask that, suppose a scene to contain twenty matters of detail, twenty notes of form, light, shade, &c., will you tell me how many changes you can ring on twenty notes in music? And why not in our landscape?

And in the course of all this prolonged study we shall have exposed a great number of plates, and every picture will be of much the same character, and we shall hear it said, "How long this fiddling on the same string?" What matters if at last our melody is more perfect—as it is sure to be—than when for the first time we struck it?

Something to be made out of the most Unattractive Subject.

I do not know whether any of you have known what it is to have acquired a taste for a scene or for a certain description of landscape which before you had felt no particular liking for. Have you ever known what it is to pass through a district and be quite unmoved to admiration, but upon a subsequent visit to express surprise that you had not before noticed this or that picturesque possibility? I have, and felt it very keenly, and then, yielding to inclination, have found that what I had previously regarded as a very unpromising district to be crammed full of beauties wholly unsuspected.

I am convinced that most spots, carefully studied, will, after a while, have a very different aspect viewed pictorially; and many of us might do worse than to sternly resolve to make something out of the most unattractive and unlikely material, making, in spite of first impressions, a picture where such seemed impossible. It would probably be a more profitable occupation than running to and fro upon the earth and touring in far-off places. I am speaking artistically and pictorially, and make no reference to the pleasure of the thing.

A Little Bit of Practice.

Following all this theorising with a little bit of practice, I remember that, within a period of seven days last spring, I exposed six plates on the same spot, each time believing that I had found the view in the best possible light and circumstances.

At the side of a broad space of water was a little promontory of green grass and moss, perhaps some twenty feet in area, fringed around with tall reeds, at that time newly springing into greenest life, but which in summer would have shut out my view, marsh-marigold, and butter-burr sprinkled the ground with their glorious yellow flowers and jewelled the rugged grass—grass so soft and yielding that the feet sunk in the spongelike turf and made one wary of walking. On this little region of turf I spent whole days, and watched the particular scene in front of me from fifty different positions, and, as I have said, exposed some six or seven plates, and, though none are bad, certainly the latter ones are better.

Study a Particular Class of Subject thoroughly.

I cannot too strongly advocate confining attention, for a considerable time at least, to a particular class of subject, and learning thoroughly. Is it not what the painter does? He will study in one particular district for a long period, not because he wishes to practise mere skill in copying, but because we cannot know the conditions under which various objects appear best until we have seen them under all.

And, but that time will hardly admit, and I have not the present inclination to claim your patient hearing longer, I might advance as a reason why it is only by long watching that we may know what is best, that ultimate impressions are usually more lasting, and therefore in better taste than immediate impressions. Things which improve upon acquaintance are generally more worthy our attachment, and, in these sensuous appeals, are more satisfying. The subtle and obscure, veiled, hidden away, hard to find, be it form or colour, possess a more enduring charm than the gay and glittering thing which quickly attracts but as quickly palls upon the senses.

A. Horsley Hinton.

THEORIES OF DEVELOPMENT.

[Photographic Society of Philadelphia.]

I listened with much pleasure and great interest to the lecture of Dr. Mitchell, delivered at the last meeting of this Society, and was especially gratified to find that some opinions of mine, held for some time, regarding development were supported by such an able and eloquent advocate. I refer principally to the building down or etching of the film of the dry plate in contradistinction to the building up in the wet plate by the application of the alkaline developer, which, to my mind, accounts partly for some of the mishaps that frequently occur to all of us. But I think it hardly fair that the Doctor should so summarily have dismissed the photo-physical part of development, especially so in view of the lately very striking discoveries made in regard to light. I refer to its production of sound. It was found, so the report states, that when a beam of sunlight was thrown through a lens on a glass vessel containing lampblack, coloured silks, worsteds, and other substances, this beam of light being cut up by a revolving disc, so arranged with slits as to make alternate flashes of light and shadow, sound was heard, the ear being placed close to the glass vessel, as long as the flashing beam was falling on the vessel. By continued experiments a more wonderful result was obtained. A prism being interposed between the disc and the lens, it was found that sounds were given with different intensity by different parts of the spectrum, and at times no sound was heard in other parts of the same. The report goes on to say that when the red played on the green, or green upon the red, the sounds were the most intense of all, but when blue was used there was little or no sound given off. The published account of these experiments in the *Art Journal* are not as full or well arranged as one would wish, and we will anxiously await further developments. But from these experiments, if correct, it will be necessary to give to light other powers than have been conceded to it, and will considerably modify, if not change entirely, the theories of the formation of the latent image as now held.

Three Theories of Development.

It is well known that, in regard to the formation of the latent image and its subsequent development, there have been three classes of investigators and defenders, two of these classes holding very widely different views on the subject:—The photo-physical, who claim that the action of light by its dynamic force so arranges or disarranges, as the case may be, and so makes less stable, the molecules of silver held in the gelatine film as to enable the developer to bring forth and render visible the image unseen until action has taken place.

The photo-chemical, who claim that it is a tolerably certain fact that under the action of light the haloid of silver, the bromides, chlorides, and iodides have a tendency more or less powerful to return to the metallic state, which tendency is promoted and made permanent by the action of developers which are always reducing agents; that is, they are substances which are able to reduce the soluble salts of silver to the metal state. But will either of these two theories account satisfactorily for all the changes that take place from the time of exposure to the fully developed plate?

The third class are in favour of a combination of the two classes, or claim a mechanical and chemical combination, and set forth thus: The dynamic action of the wave of light, setting free the invisible particles of silver in the granules which form the emulsion on the plate, and these nuclei of metal acting as centres upon which the chemical action may take effect and proceed to the end. We know that some agents have the power of starting an action, and that others, though not able to start the act, have the power of continuing it and completing it. Another theory is that the development of a negative may be effected in one or two ways. First, the new compound may possess an attractive force. The action of light on sensitive compounds of silver tends to cause the formation of a substance capable of attracting the metal of which it is a salt when slowly deposited from a solution. This first deposit is capable of attracting more of the metal, and in this way an image is gradually built up. This is the theory of the physical development of the wet-collodion plate. If the theory of the dynamic power of light can be proved, it can also be used as a theory for the development of the dry plate. Secondly, the image may be the result of the reduction, more or less complete, to a more elementary state of the altered compound when treated with certain solutions, in which state it may have the same attractive power as before. This is the *rationale* of all alkaline development.

"Actinic Force" and "Dynamical" and "Mechanical" Powers of Light.

But to return to the discoveries previously mentioned, and subsequent ones following rapidly, as they will. If correct they will of necessity displace to a great extent, if not entirely, the vagueness that now surrounds the words "actinic force," "dynamical," and "mechanical" powers of light—words that are too frequently used to conceal our ignorance or to impress upon the minds of others an erroneous estimate of our own wonderful knowledge. If a wave of light is capable of producing sound, it must have ponderance, a power to disturb an equilibrium, to disrupt and to separate, in fact, a dynamic power in many ways. By dynamic power we mean the power inherent in light to strike, to move, arrange, separate, congregate, disrupt, build up, or destroy any of the elementary substances, and in many cases their compounds upon which it acts.

The very disturbances which these waves of light are subject to in passing from and through different media must of necessity cause the generation of an immense amount of energy, and when we call to mind the immense velocity of these waves of light, and their uncountable number, we cannot as yet estimate the force contained in a single ray, or the power it exercises upon any sensitive substance it impinges on. It has been repeatedly denied that light produces any separation of the elements in the formation of the invisible image, such as occurs when a visible image is formed by its action. But where is the proof for this assertion? I have as yet been unable to find it, though I have sought for it diligently, and am forced to believe it to be the *dictum* of one, repeated by others as true. The fact is, that, surrounded by light, we have all the time been wandering in darkness. Cannot the occurrence of halation or solarisation be explained if we give due credit to the dynamic power of light, as defined? By halation we mean not only the havoc it plays on a window in an interior, but also with a landscape, the foliage becoming blurred, losing its true tone value, and thus becoming both inartistic and unscientific. We have been taught that the reflection of light from the outside or back of the glass or transparent support is the cause, and to prevent it we must back the plate with some opaque substance in optical contact. This explanation and teaching is true, as far as it goes, with our rapid plates and films. But why do these returning rays exercise this power, and produce this effect, if they have not hammering force, so to speak, upon the already disturbed molecules of silver in the film?

Wuestner's "Improvements" on the Sandell Plate.

A plate has recently been introduced in England, called the Sandell plate, that is said to be entirely free from a chance of this mishap. It is coated by two or three emulsions of different sensitiveness, and to my mind this tells the story. The first coat is decidedly less sensitive than the others; in other words, the light power is used up by the time it reaches the glass, and there is no reflection.

The objections raised against those plates, in the main, consisted of the extreme length of exposure said to be necessary; but even here "the doctors disagreed." Wuestner, of Jersey City, has very much improved the Sandell plate. His first substratum was a slow orthochromatic, and upon that spread one or two emulsions of high and highest sensitiveness, working upon the premises that halation occurred less with dyed than plain plates. Since then he has also prepared another brand, simply with plain bromide of silver emulsions of different degrees of sensitiveness. It is said that either of these plates works rapidly, and can be safely used for instantaneous exposures, and that halation has been reduced to *nil*. The reversal of the image is evidently caused by the same action of light as in halation, but that action has ceased before halation is produced.

Fog.

The veiling and the ultimate production of fog can be accounted for if we agree that the dynamic action of light causes the molecules of silver to be so arranged and freed from their environment in the gelatine film, so that the latent image is formed, and, by development, made visible. All goes well if there are plenty of molecules of silver for the developer to act on. But let the film be weak in especially the iodide of silver, we find at a certain point the developer stops its work. An additional quantity of the alkali is added, the work begins again, then stops. More alkali is added to force the developer. Suddenly a veil appears, followed quickly by a fog that destroys our work. You may ask me for my explanation of this destruction. The plates most subject to fog are those koown as "rapid." The film is thin and very delicate. Bromide of silver is in excess, the iodide much less than normal. Whilst the light was so arranging the molecules of silver to form the latent image, it doubtless disarranged and partly separated some adjacent molecules, not needed for the image, from their weak support. The development ceased because all the silver of the image was used up, or nearly so. More alkali, the accelerator, caused the using up of the remaining molecules. An additional dose of the alkali started the pyro or reducing agent in search for more material to work upon against the adjacent only partly protected molecules, and then—well—you all know what happens when a lighted match touches a pile of gun cotton.

John H. Janeway, M.D., U.S. Army.

THE PHOTOGRAPHIC SOCIETY'S LECTURES ON "PHOTOGRAVURE."

No. II.—Etching the Plate.

On Friday evening last Mr. Herbert Denison, of Leeds, delivered the second of two lectures on *Photogravure*, in connexion with the affiliation scheme of the Photographic Society of Great Britain. There was again a very large attendance. Mr. J. Traill Taylor presided.

Cleaning the Plate.

After giving a brief *résumé* of the previous lecture, which dealt with the preparation of the carbon negative or resist, Mr. Denison next treated of the copper plate for its reception. The plate, he said, should have a perfect surface, and be free from scratches. It should have bevelled edges, which avoid the risk of the plate being scratched in after bevelling. To clean it from grease, &c., which might cause irregular etching, lay the plate on a piece of clean paper larger than the plate, and rub the face with cotton wool moistened with a solution of American potash, strength immaterial. When the greasiness has disappeared, rinse the plate under the tap, and rub with another pledget of cotton wool moistened with nitric acid solution—1:3; rinse again, and rub over with washed whiting moistened with a five per cent. solution of ammonia. Whiting for the purpose can be prepared by mixing ordinary whiting with water, decanting the solution after the coarser particles have settled, and allowing the finer particles to settle when the whiting is dried for use. The plate should have a final rinse in hot water, and be dried with a clean cloth.

Laying the Ground.

The bitumen ground is laid in a box, the size of which depends on the size of the plate. Through the bottom of the box wire nails are driven from the outside so that the points stick up inside and serve as a rest for the plate out of the way of the dust, which will lie at the bottom of the box. A piece of wire netting fixed at a convenient height answers the same purpose, or a little stand of two pieces of wood in the form of a cross. The inside of the box should be lined with glazed paper to prevent the adhesion of coarse particles. The plate is admitted through a door in the box, and the latter is suspended on pivots so as to be easily revolved. About half a pint of finely powdered bitumen is placed in the box, which is revolved about twenty times, when the plate is placed in

position, and after from three to five minutes the plate is taken out. It will have a layer of bitumen in small particles.

The more delicate the subject the finer the grain required; a dark subject requires a coarse one. The quality of the grain can be varied by allowing the dust in the box to settle for a longer or shorter time, or by leaving the plate in the box a longer time, or by inserting it again. If the dust is allowed to settle for about two minutes, all the coarser particles will have subsided, and only the finest will remain in suspension; so that, if the deposited dust is found to be insufficient, the operation can be repeated. For ordinary subjects Mr. Denison finds that the most suitable grain is obtained by allowing the dust to settle for from half to one minute, and leaving the plate in the box for ten minutes.

Fixing the Ground.

This is done on a copper-plate heater—that is, a plate of iron about a quarter of an inch thick, and larger than the plate to be heated, placed on a suitable gas-stove. In a makeshift arrangement, a sheet of paper is placed under the copper plate, which is set on the heater and watched till the ground is seen to become transparent and afterwards to darken. The plate is allowed to cool spontaneously. If the plate has not been heated sufficiently, the ground will not be attached to it; if too much, the particles of bitumen will run together. To find whether the ground is properly attached to the plate, a camel's-hair brush should be applied to a corner of it when cooled, and the plate examined with a glass.

The exposed tissue, having been brought into contact with the plate under water and squeegeed down, is allowed to remain so for about ten minutes; then immersed in water at 100°, the paper backing stripped and development carried on as previously described. The resist is dried with methylated spirit and water, the former being added until all the water has been removed from the film. When dry the margin of the copper is protected with black varnish, a line being first of all drawn round it with a draughtsman's ruling pen charged with black varnish; the back of the plate and the edges are also varnished. The plate before etching should be kept in a cool room to avoid stripping or cracking of the film.

Etching the Plate.

The iron perchloride etching solutions to be employed are:—

No. 1.	45°	Beaumé's Scale,	47	per cent.	of iron	in the solution.
,, 2.	40°	,,	41	,,	,,	,,
,, 3.	38°	,,	38	,,	,,	,,
,, 4.	35°	,,	35	,,	,,	,,
,, 5.	27°	,,	27	,,	,,	,,

The stronger the solution the less penetrating power it has; a solution at 45° will only penetrate the thinnest part of the film, one at 27° will penetrate any thickness. No. 1, therefore, will etch the deepest shadows, No. 2 the next thinnest portion of the film, and so on to No. 5, which penetrates the thickest or high lights of the picture. It requires some experience to decide for how long each solution should be allowed to work before the plate is transferred to the next weaker, but a good guide is to allow each solution to operate until the darkening of the copper ceases to spread to a thicker part of the film; when this occurs, the plate should be transferred to the next solution. The action of each solution after the first is cumulative. The etching of the plate as a rule takes from eight to twelve minutes; No. 1 solution taking one minute, No. 2 two, No. 3 about three, No. 4 two or three minutes, and No. 5 until the highest lights are discoloured, and from half to a minute longer. It is advisable to use the solutions at, say, 70° Fahr. The iron solution is made by putting about 7 lbs. of solid perchloride into a large wide-mouth bottle and pouring boiling water on it sufficient to cover it; the liquid is drawn off with a syphon, and will register between about 43 and 45 on Beaumé's scale, a portion of it can be evaporated down to form No. 1 solution, and water added to obtain the other four strengths. If the resist has been printed on standard brown tissue to a depth only just sufficient to give detail in the shadows, no difficulty should be experienced in watching the darkening of the copper beneath.

Cleaning the Plate.

When etched, the plate is washed under the tap, and rubbed with the fingers until the film is removed. After drying, the varnish is removed from the margin and back with a pad of cotton wool moistened in benzole, which also takes away the ground. The plate is next rubbed with another pad of cotton wool, a small quantity of spirits of turpentine having been poured on the plate; after drying, it is further cleaned with cotton wool moistened in methylated spirits and dried, the final polishing being given with the washed whiting and five per cent. solution of ammonia already spoken of. The whiting being removed with dry cotton wool, the plate is ready for printing.

Making Corrections.

A proof is next pulled to see what corrections are necessary. Portions of the high lights which have been edged too deeply may be reduced by burnishing with a steel burnisher, faults caused by spotting and pinholes filled in with an etching needle, and the light portions strengthened with a roulette. If the plate has not been etched sufficiently, it may be re-etched, which is done by rolling up the plate with a gelatine roller using a special ink composed of

Spermaceti	14	ounces.
Stearine	6½	,,
Asphaltum	2¼	,,
White wax	6	,,

The asphaltum is first melted and the other ingredients added gradually. This is mixed with an equal quantity of lithographic ink and made thin enough for use with turpentine after rolling up, the plate is slightly warmed and re-etched with an iron solution at 40°.

During the evening Mr. Denison demonstrated the preparation of the copper plate, the development of the resist, and the etching of the plate, and introduced Mr. Reardon, of Messrs. Brooker & Co., copper-plate printers of 78, Margaret-street, who printed from several plates.

Steel Facing the Plate.

At the conclusion of the lecture Mr. Denison described the method of steel facing a plate. It is as follows:—A wooden box has two brass rods running its whole length, and from them are suspended the copper plate and a plate of iron measuring one quarter of an inch, thick face to face. The solution in the trough is composed of one pound sal-ammoniac and one gallon of water. The electricity is supplied by a battery consisting of a stick of carbon in a porous cell, the latter being surrounded with a plate of zinc and the whole contained in an earthenware jar. In the outer cell is sulphuric acid solution 1:10, in the inner bichromate 3:20. The rod from which the iron plate is suspended is connected with the carbon anode and that supporting the copper with the cathode. The current is allowed to pass through the trough for two days before being ready. The plate should be carefully cleaned before steel facing, first with turpentine and a nail brush, then with benzole and rinsed under the tap, and then put in caustic potash solution 1:10 for half an hour. It is further rubbed and cleaned alternately with nitric acid 1:20 and with whiting and water, the operation being repeated until the plate is chemically clean. A piece of copper wire is soldered on to the back, and by this the plate is attached to one of the brass rods opposite the plate of iron. A sufficiently thick coating will be obtained in about half an hour.

The proceedings terminated with a vote of thanks to Mr. Denison, who, in acknowledgment of it, expressed his pleasure at the interest which had been taken in the lectures.

MULTIPLE-COATED FILMS IN PRACTICE.

The promptitude displayed by American dry-plate makers in placing multiple-coated films, primarily designed to resist halation, on the market so soon after the introduction in England by Messrs. R. W. Thomas & Co. of their double and triple-coated plates, as well as the many interesting discussions to which the points involved have given rise, says much for the acumen of Mr. J. T. Sandell in devising and taking advantage of this system for curing one of the commonest defects to which negatives on single coated films are liable. It must be obvious to the photographer that, by the superposition of a rapid film upon a very slow one, both back reflections and lateral spreadings of the light rays are largely, if not entirely avoided, and as it is conceivable that these phenomena are present in most subjects, not counting difficult interiors, upon which the lens is brought to bear, the gain in vigour and brilliancy of image, in the proper separation of tone and the better and truer rendering of gradation by the use of plates having this semi-catalytic substratum, so to speak, should be highly welcomed by those who are alive to the influence of halation, which Mr. Sandell, with considerable show of reasoning, regards as an almost omnipresent evil, in flattening and degrading the image. Extending the same principle a step further, a triple-coated film designed for interior work, which both dispenses with backing and gives a long range of exposure latitude, thus rendering it virtually impossible for the photographer to over-expose in this kind of work, should also prove a boon of great practical service.

It is with these two objects in view that Messrs. Thomas and Mr. Sandell have been working; but there is a third, which affects even the humblest and most incapable amateur. It is this:—That where the minimum normal exposure of the top film has not been under-estimated, the latitude in exposure (of course, to be followed by suitable develop-

ment), is bounded by such widely separated limits that, for all practical purposes, one may, by taking advantage of the image-forming properties of the lower film, ignore, or rather clear off, the fogged impression on the top film, with the happiest after-results, so far as the negative is concerned; or, where he has sufficient command over his developer, can produce a printable negative straight away. This, indeed, would appear to show that one can consistently over-expose with impunity with multiple-coated plates, without apprehending fatal consequences, and, within the limits spoken of, may be independent of exposure calculations.

As bearing upon the matter, we have lately, by the courtesy of Mr. J. T. Sandell, inspected a large number of 15×12 negatives, on Thomas's double and triple-coated plates, which that gentleman took during a recent visit to Italy and Switzerland. The subjects chosen embraced Alpine views, and exteriors and interiors of Roman, Venetian, and Milan churches, palaces, and monuments. The outdoor views were taken on the double-coated plates, and had a range of exposure of from a minimum of a quarter of a second to a maximum of many hundreds that length of time. In the Alpine views, the distance, which in all probability with an ordinary plate and an incorrect exposure would have been lost, was rendered with great force and strength; the exteriors of St. Mark's, Venice, St. Peter's, at Rome, two or three Venetian palazzi, the Doge's Palace, and other subjects exhibit, not only an almost ideal preservation of crispness in the relative translation of tones throughout the scale, but also where marble was contrasted with darker stones, and where, as in the case of St. Mark's exterior, the elevation is adorned with frescoes, a most faithful rendering of the respective colour values.

Mr. Sandell admittedly chose very difficult tests, and at the same time pitted himself against the best-known Continental photographers, several examples of whose work on the same subjects he also showed us, side by side with his own pictures. We must say that in the limited time at his disposal, Mr. Sandell, by means of his multiple-coated plates, produced pure photographs of his subjects where the Continental photographers had falsified the tone renderings to an alarming extent. But Mr. Sandell's success was undoubtedly the most striking in his interior exposures—particularly in the case of Milan Cathedral, which had five hours on a triple film. Commercial photographs of this subject are not to be had, so difficult is it regarded by photographers. Interiors of St. Peter's at Rome, the Jesuit's Church at Venice, St. Mark's, St. John Lateran, and many others all taken on triple films, and with long exposures, appeared to us to show this class of work to a degree of excellence seldom met with, the absence of halation, the tone renderings, and the wealth of detail being remarkable.

We understand that a public exhibition of prints from these and other negatives will shortly be given.

THE STEREOSCOPE AND STEREOSCOPIC PHOTOGRAPHY.

[Brixton and Clapham Camera Club.]

Many authors in ancient and more recent times have observed and commented upon the fact that the image of any near object seen by one eye differs very considerably from that seen by the other, although no blurring is apparent when the same object is observed with both eyes, and several writers in the last century and in the early years of the present surmised that it was to this that our impressions of the solidity and relative distance of near objects were principally due. Professor (afterwards Sir Charles) Wheatstone proved that this is the case by the invention, in 1838, of the stereoscope, which may be primarily described as an instrument by the means of which two dissimilar views of the same object may be simultaneously presented one to each eye. Professor Wheatstone's stereoscope consisted of a long board, at each end of which one of the two pictures was placed, one representing a solid object as it would be seen by the left eye, and the other the same object as it would be seen by the right eye. The pictures were placed in an upright position parallel to and facing each other, and midway between them were two plane mirrors adjusted so that their backs formed an angle of ninety degrees with each other, and their fronts angles of forty-five degrees with the front edge of the board. The observer had to place his eyes as near as possible to the mirrors, the left eye before the left-hand mirror and the right eye before the right-hand mirror, and then adjust the position of the two pictures by means which were provided until similar points in the two reflected images coincided with the intersection of the optic axes, when the two pictures blended into one, which had all the appearance of solidity. As this instrument has now been entirely superseded by a more convenient one, it is not necessary for me to enter deeply into its merits or demerits, and it will be sufficient to say that its principal defects were its clumsy and unmanageable size, the great loss of light by double reflection, and the difficulty that there was in securing an equal illumination of the two pictures.

The discussion to which the introduction of this instrument gave rise among scientific men led to the invention of several other stereoscopes in the course of a few years, and, among others, of the lenticular stereoscope by Sir David Brewster, who appears also to have been the first to suggest the application of the stereoscope to photography.

After this point in its history had been reached, the stereoscope rapidly emerged from the experimental stage, and became in a few years a most popular scientific toy. Since then it has lost favour a great deal, but now there are many signs that among amateur photographers at least it is about to achieve a greater popularity than ever, and deservedly so. It is not necessary for me to describe the lenticular stereoscope to you, as you are, no doubt, perfectly familiar with its appearance, but I will attempt to give an explanation of its mode of action.

If we look at any object through the centre of a double convex lens, such as an ordinary reading glass, and then, keeping the eyes fixed, move the lens slightly to one side, we shall find that the object will appear to move also, but in a contrary direction. This is because the rays of light proceeding from the object travel in straight lines while they pass through the centre of the lens; but, when the lens is moved so that they pass through its side, they are bent or refracted towards the centre, [the thickest part of the lens, and the object appears to have moved a distance equal to the refraction, because we judge of its position by the direction in which the rays reach us. The lenses of the stereoscope usually act in a similar manner. They are, as a rule, mounted, so that there is a greater distance between their centres than between the centres of the eyes, and one is therefore compelled to look through the sides of them. The consequence of this is, that the rays of light which reach our eyes from the pictures, having to pass through the side of the lens, are refracted in an outward direction, and the pictures appear to overlap each other more or less, according to the extent of the refraction. This will depend upon the extent of the difference that there is (if any) between the distance from centre to centre of the eyes, and the distance from centre to centre of the lenses, and also upon the difference (if any) between the latter distance and the distance of the pictures from centre to centre.

If the lenses are mounted at three-inch centres, and the pictures also at three-inch centres, the refraction will be just sufficient to cause the pictures to appear the same distance apart from centre to centre as are the eyes of the observer, *i.e.*, usually about two and a half inches. If the lenses are mounted at three-inch centres, and the pictures at two and three-quarter inch centres, the refraction will be greater.

There will be, first, the refraction due to the difference between the lesser distance of separation of the eyes and the greater distance of separation of the lenses, and, secondly, the refraction due to the difference between the greater separation of the lenses and the lesser separation of the pictures, and the result will be that the pictures will apparently overlap to the extent of about three-quarters of an inch. It is possible in this way, either by increasing the separation of the lenses or by reducing the separation of the pictures, to cause them to appear completely superimposed, and, when this is the case, no doubt most persons unaccustomed to the use of the stereoscope find it easiest to combine the pictures, but the best effects are not to be obtained in this way.

It is unnecessary for me to tell you that when we look straight at any object we unconsciously converge the optical axes, so that they would intersect upon that point to which vision is directed in order that its image may be received upon the most sensitive portion of each retina. It is because of this convergence that we are able to judge as closely and accurately as we do of the position and size of near objects. Many instructive and amusing experiments have been devised to prove that this is the case, and one of the most conclusive is to get some one to place a small object, such as a thimble, a short distance away from you, then, closing one of your eyes, attempt to pick it up. The result will be, nine times out of ten, that your first effort will be a failure. From this experiment, and others of a like nature, it becomes evident that, if we wish to arrive at a true conception of the size and distance of whatever may be the subject of a stereoscopic photograph, the two pictures must be so mounted, or the lenses of the stereoscope so adjusted, that when we are looking through them the convergence of the eyes shall be neither more nor less than it would be if we were looking at the view itself from the point at which the photograph was taken.

When we look at a distant object, we see it with so little convergence of the optical axes, that for practical purposes they may be considered parallel. This fact furnishes us with an easy guide for the mounting of stereoscopic photographs. They should be mounted so that when the eyes are directed through the lenses of the stereoscope towards similar

distant points in the two pictures, the optical axes are practically parallel, and this will be the case when the distance between such similar distant points in the two pictures is equal to the distance between the centres of the two lenses.

J. A. Butler.

(To be concluded.)

THE "INFANTS" AND THE PHOTOGRAPHER.

Simmonds v. *Edwards.*

Two young women last week brought an action, through their father, against a photographer at Worthing, by which they sought to recover the sum of 7*s.* 6*d.*, which they had entrusted to him under the following circumstances:—The elder of the girls informed the Judge that she and her sister were going to have some photographs taken, and engaged the defendant for that purpose. They paid 7*s.* 6*d.*, but their father, hearing of their intention, would not allow them to put it into effect.

The Judge: "I suppose the defendant is still willing to take your portrait?"

Mr. Edwards: "Yes. I never refused to fulfil the contract."

The Judge: "You decline to return the money?"

Defendant: "Yes."

The Judge: "But you have not had the trouble."

Defendant: "I have lost time; I kept the engagement open. Mr. Simmonds is so obstinate that he stands in the light of my doing business."

Plaintiff: "My daughters are both under seventeen; they are not of age to make a contract."

The Judge: "Very likely. If they had not paid the money, very likely I should have said he cannot recover."

Mr. Simmonds said his daughters were not going to be taken themselves, but made the engagement for his younger children, to which he objected.

The Judge: "Don't you like a little surprise?" (Laughter.)

Plaintiff: "When I have a family group I should like to pay for it myself."

The Judge: "You were not to be in it?"

Plaintiff: "No, sir." (Laughter.)

Defendant said the money was paid by the plaintiff's son.

The elder daughter said that was not so; "Jack" was going to contribute to the expense, and told them that Mr. Edwards would take the photograph, as his ("Jack's") name was good there. But he did not send any money, owing to the objection made by his father.

The Judge said it was a simple question of law, and, although he thought the plaintiff was entitled to recover, his daughters being both infants, he should like to have time to consider the case, an Act of Parliament having recently been passed which affected minors. He would give judgment at the next Court.

Our Editorial Table.

England's Film and Dry-plate Varnish.

This varnish of Mr. J. Désiré England possesses the advantage of not necessitating the heating of the negative to which it is to be applied. It flows smoothly, and dries quickly with a hard, tough film.

Payne's Crystal Cage.

Mr. J. H. Payne, Mexborough, Rotherham, has devised a modification of such crystal cages as we have previously seen. As the name implies, the "cage" is a porcelain vessel, perforated with holes, into which the crystals to be dissolved are placed. There is a flange, which may rest on a beaker, tumbler, or other vessel containing water, and by a series of projections on the cage and notches in the flange, the former may be lowered down to any desired depth. A small calico bag is supplied for inserting in the cage, which permits of solution and filtration proceeding automatically and simultaneously.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 3312.—"An Improved Support for Photographic Apparatus." Communicated by A. Roger-Dubroni. H. H. Lake—*Dated February*, 14, 1893.

No. 3529.—"An Improved Toy Magazine Photographic Camera." J. W. Rhodes.—*Dated February* 17, 1893.

No. 3604.—"Improvements in Nippers for Toning Photographs and Removing Prints from Baths or the like." G. C. W. Barron.—*Dated February* 18, 1893.

PATENTS COMPLETED.

Improvements in and connected with Photographic Apparatus.

No. 591. Edward Sledge, 46, Rural-vale, Northfleet, Kent. *December* 31, 1892.

My invention relates to a device to be used in connexion with an ordinary photographic camera, and has for its object a more rapid and inexpensive way of changing the plates of the dark slide of the said photographic camera. By its means, moreover, the use of more than one dark slide is obviated.

In carrying my said invention into effect, I make a slotted opening the width of the plate in the end of the dark slide. Over this opening, and securely fastened thereto to prevent the admission of light, is fixed an attachment called a receiver.

The said receiver is made of brass, or some similar metal, and possesses a mouthpiece, with lips curving outwards, so that a lightproof bag may be attached thereto for the purpose of introducing plates for exposure and removing the said plates from the dark slide after exposure without the operator being compelled to make use of a dark room where he can open the slide in the usual manner. In order to prevent ingress of light when the bag is removed, a long sliding piece, working within grooves in the receiver, below the mouthpiece, covers the slotted opening in the dark slide when the bag is not attached. When it is desired to introduce or remove plates, the aforesaid sliding piece can be pulled out by means of a lug, pin, or the like, after the aforesaid bag is attached. Although for the purposes of description I have mentioned a bag for carrying the plates, I do not confine myself to the use of a bag; any suitable receptacle for containing plates can be employed, for example, a box having two suitably slotted openings, corresponding to the opening of the mouthpiece of the receiver of the dark slide, the mouthpiece of the receiver of the latter being, of course, slightly modified for this purpose, the lips of the said mouthpiece being arranged to slide in corresponding grooves in a small metal receiver fixed on the box or plate-holder as shown, the said box being also provided with a sliding piece, similar to that on the mouthpiece of the dark-slide receiver to prevent the access of light.

The opening at one end of the box serves for introducing the plates into the dark slide, and the one at the opposite end for receiving the plates after exposure in the dark slide.

In order to prevent the plate being scratched or frayed during the process of transferring, small rollers or lugs are fitted to the corners of the slotted mouthpiece, so that the plate may only bear on its edges.

Improved Magic Lantern Slide carrier.

No. 2381. Barras Ramsay Reed, The Riding, Riding Mill-on-Tyne. *December* 31, 1892.

My invention consists of a shutter working vertically across the opening in lantern slide-carrier, and is capable of being applied to all slide-carriers now in use.

It is intended to give the effect of a curtain rising and falling upon the picture exhibited on the screen. It works independently of the lateral or vertical motion of the slide-carrier, and can be used at the option of the operator.

I take any ordinary slide-carrier, and at the opening provided for the purpose of throwing the light upon the picture, I cut a slot or groove in each of the top and bottom frames of the carrier, and opposite to each other, such slots or grooves being as long as may be found necessary.

Into these slots I insert my shutter, made of wood, brass, or other metal, talc, glass, vulcanite, or any description of material which may be thought suitable.

The form of this shutter consists of one part being so constructed to cut off the light of the lantern from the picture when placed in position in front of the condenser, the other part being a rectangular opening, which permits the light to be unobstructed when desired.

Improvements in and connected with Store Boxes or Change Boxes for Photographic Cameras.

No. 4886. John Rudolph Gotz, 19, Buckingham-street, Strand, London. *January* 14, 1893.

This invention relates to apparatus for storing the sensitive films or plates used in photographic cameras, for exposing the said plates in the camera one after the other, when required, and for storing them again after exposure.

The principal object of the improvements is to construct a simple and light change box suitable for holding a great number of films in a small space, and for exchanging the exposed films for new films without unnecessary manipulation or loss of time.

The store box may either be permanently fixed to the camera slide (dark slide), so that both must be attached to or removed from the camera simultaneously, or the slide may be separate, and constructed in such a manner that it can be attached alternately to the store box and to the camera.

If thin flexible films are used for exposure, each film is mounted on a light, but sufficiently strong and stiff, backing, preferably of aluminium or other suitable sheet metal, so that the film need never be touched with the fingers or removed from the backing during the different manipulations.

If the camera slide and the store box are made in one, the camera slide forms the face of the box, and the external width of the latter is slightly less than the clean opening in the camera.

The face of the box contains a sliding door similar to that used in ordinary camera slides. Behind the sliding door and parallel with the same the box contains a hinged frame, adapted to hold a film together with its backing or carrier mentioned above. The said frame is preferably hinged at its lower edge, so that it may be turned backward into the box, and is provided at its back with springs, which press it into position. The top of the box is provided with a door hinged on one of its edges, so that it can be opened outward into a flexible bag attached to the top of the box. The said top door has on its inside a ledge or other suitable detent, adapted to hold the edge of the film frame when the door is closed, and to release the same when the door is opened

The back of the store box contains a door, through which the box is charged with fresh films, the latter being placed upright between the back door and the hinged frame. The face of the hinged frame for carrying the films has a pair of ledges, one of which is slightly dovetailed, for holding the edges of the film when the latter is put into its place for exposure.

The box may contain a vertical partition or division plate for separating the unexposed films from those which have been exposed.

After the box has been charged with sensitive films and attached to the camera, the front door or slide is opened for exposure as usual. After exposure, the operator introduces his hand through the flexible bag, opens the top door, and thereby allows the film-carrying frame to drop backward into the box. He then removes the exposed film from the frame, places it at the back of the hinged frame, draws a fresh film out from the box into the bag, and places it on the face of the frame. Finally, he closes the frame forward into its normal position, and secures it by shutting the top door, after which the apparatus is ready for another exposure.

In the case of large store boxes the camera slide is made separate, as mentioned above, and consists of three principal parts, namely, the rectangular frame or body of the slide, adapted to be secured to the camera like an ordinary camera slide, a sliding door which closes the front of the camera slide as usual, and a hinged back door or frame which closes the slide at the back and serves to hold the film and carrier. This door may be provided with a spring, bolt, or other suitable locking device for locking it for the purpose of making an exposure.

The store box is a flat rectangular box provided with three doors, one in front, one at the back, and one at the top. The front door, or face of the box, may be an ordinary sliding door, or it may be flexible like a revolving shutter, so that it can be drawn from the back of the box. The top door is hinged on its rear edge, and opens into a flexible bag attached to the top of the box, as in the previous case. The back door is drawn for charging the box with plates. The front of the box has a pair of holders, or ledges, for holding the camera slide when an exposed film is to be changed.

After a film has been exposed in the camera, the slide is removed from the camera and attached to the front of the store box; the operator then withdraws the front door of the store box, introduces his hand through the flexible bag, opens the top door, and unlocks the hinged carrier frame, so that the latter turns back into the box behind; he withdraws the exposed film, takes a fresh film from the box, places it on the face of the hinged frame, after which he closes the latter and shuts down the top door. The camera slide is now removed from the box and again attached to the camera for another exposure.

Instead of placing the bag at the top, it may be on one side, and the position of the various slides or doors may be varied to correspond.

An Improved Dish or Case for Use in Photographic Development or other Process.

No. 22,633. Harry Rayner, 27, Francis-street, New Leeds, Leeds, Yorkshire. *January* 14, 1893.

The object of this invention is to construct a covered dish or case in, or within which, a photographic plate or film may be exposed to the action of a developing or other agent, or any similar process be carried on which requires to be performed in a non-actinic light, so that, by employment of the improved dish or case, which is made so that it is not affected by the chemicals used, any process of this nature may be carried on under inspection without the necessity of having recourse to a so-called "dark" room, or chamber, into which actinic light is not suffered to enter.

The improved dish or case comprises an inner dish, preferably made rectangular, and consisting of a bottom and sides, the whole being made of glass in one piece, and properly annealed. Near, or at one corner, is a projecting lip, open above, its upper edge being preferably about level with, or a little above the level of, the upper edges of the sides of the said inner dish. This lip or spout has free communication with the interior of the dish, and serves for receiving the developer, or other liquid which is poured into the dish, and for emptying the same therefrom. A vertical inner wall or screen, likewise of glass, lies in front of the lip inside the dish, and extends from the floor of the dish up to a level with the side walls thereof, and from the side wall of the dish next to which the lip is made for some distance parallel with the wall on which the lip is made, extending past the lip, and terminating so as to leave a passage way between it and the wall for entrance or exit, of the liquid from or to the lip. This screen is intended to intercept the actinic rays of light which might enter at the lip. The whole inner dish may be made of ruby or other non-actinic glass (that is to say, glass which prevents passage of actinic rays while permitting of the passage of visual rays, or a certain quantity or amount of the visual rays), or only the floor and the screen may be made of such non-actinic glass.

The inner dish aforesaid is enclosed within an impervious frame which will usually be made of tinned iron or other sheet metal varnished or japanned. This frame covers in the sides of the dish, and its upper face is cut out at the centre so as to leave a projecting flange all round, which lies horizontally at a slight distance above the upper edge of the walls of the inner glass dish, so as to leave a space for a sliding cover of non-actinic glass which may be slid into a slot in the frame left therefor, and so cover the whole dish while its edges are guarded by the frame. The central hole in the upper face of the frame is provided with a hinged cover for closing it, and the said frame has also a hinged cover which may be used to close the lip aforesaid. The frame does not extend far under the bottom of the glass dish, but leaves a free space thereunder, so that the plate or film or other object in the dish may be viewed by either reflected or transmitted light when under the process of development or other treatment.

Improvements in or appertaining to Printing Plates or Blocks formed by Photographic Means.

No. 5008. Joseph Hines, 20, Riding-street, Southport, Lancashire. *January* 14, 1893.

This process is designed to supersede known methods of photo-mechanical printing by the substitution of a quicker, simpler, better, and less costly mode of reproducing photographs in the printing press for pictorial illustration in newspapers, books, magazines, and other periodicals, and in job printing generally, than any which has yet been placed before the public.

It is intended to fulfil the function of supplying to the printing profession metallic plates to be screwed upon type-high blocks of wood bearing upon their surfaces photographs in a hard, durable substance capable of resisting the pressure of the printing press, so that they can be used equally by the newspaper and book press, and printed along with the type simultaneously with the descriptive matter accompanying it, in newspapers, periodicals, magazines, books, or any literary or artistic production of that class on any printing machine.

In carrying out my invention, I coat a metallic plate, preferably a stereotype plate, with gelatine, so attached that it will not ultimately strip off; then sensitise it chemically, so as to become sensitive to light, and allow it to dry. When dry it is ready for exposure under a negative. After being sufficiently exposed to light it is developed in a bath of hot sulphate of iron, which has the property of shrinking those portions of the gelatine not acted upon by the light, hence its name of intagliotype, and leaving the rest of the picture a raised surface, without swelling the gelatine or softening it, thereby enabling it to be printed as soon as the plate is dry, which only takes a few minutes. The plate is then screwed on to a wooden base, the whole making a type-high block ready for the printer.

One of the features of the invention is the preparation of the negative so as to break it up in such manner as to produce the effect of an engraving, and to enable it to print properly. This is effected by the use of thin sheets of transparent cellnloid previously printed with the lines, dots, cross-hatch or stipple, as may be required, and which are placed before the negative in order to impart their characteristics to the ultimate plate. The best effects are produced by taking reverse negatives with different screens, the last one, with all the desired effects upon it, being the one used with the final sensitised plate. (For rough-and-ready work, the screens may be dispensed with altogether by the use of a plate previously embossed with fine dots, but the results are not nearly so effective as with the screens, by which any effect of a line engraving can be readily reproduced.) The invention applies to either method employed, the treatment of the plates being the same, though the resultant picture is entirely different. The great value of the invention lies in the fact that it is simple, rapid, and effective, there being no delay arising from the drying of the gelatine, inasmuch as it does not require it, the action of the sulphate of iron not only shrinking it, but tanning it like leather, and enabling it to bear a prodigious pressure and print an incredible number of impressions without sensible deterioration.

In its simplest form, it consists of the photographic representation of any picture in lines or stipple, in imitation of a line drawing or engraving where there are half-tones.

The manipulation, when taking the negative, is the same as that of any ordinary photograph, and the finished negative requires simply to be placed upon the sensitised film of the metallic plate, and exposed for a short time, to effect all that is necessary, the resultant picture not requiring to be touched by etching tool, graver, or acid, but simply screwed down to a wood block ready for the printing press.

When the first negative is obtained, all that is necessary is to have at hand a few dry plates and transparent printed screens, developing solutions, dishes, &c., and a photographic printing frame. In order that the resultant picture may be right-handed, like the original, reverse negatives must be procured, and advantage is taken of this fact to introduce the transparent screens at these intermediate stages, two of these screens being of parallel lines ruled opposite ways, and one being of the dot-and-stipple order. They are so employed as to produce a hatch over the denser portions of the photograph, plain ruling in the half-tones, and a stipple throughout the lighter parts, breaking the whole up into variegated grains of distinct characteristics, corresponding in appearance to an ordinary engraving.

A metal plate, bearing on its surface a sensitised gelatine film, is placed under the negative last obtained, and both together exposed to light, natural or artificial, for the requisite time, which will depend on the strength of the light and the nature of the sensitised salts employed. After sufficient exposure, the plate is immersed in a hot solution of sulphate of iron, which shrinks those parts not acted on by the light, leaving the rest in relief, in addition to so hardening the whole that, when it is dry, which only takes a few minutes, it is quite ready for printing. The whole process is complete from start to finish in about an hour. The resulting block is remarkably durable, being far superior to other gelatine plates, owing to the developer causing shrinkage instead of, as in other processes, causing a swelling of the gelatine. The parts which are to receive the pressure of the printing press, so far from being softened, as would be the case if swelled, are converted into a tough, leathery substance by the double action of the sulphate of iron, which not only shrinks, but tans it at the same time. Its capacity to resist pressure without wearing or abrading is apparently due to the slight elasticity it still retains, but, at the same time, its hardness is so great that it can be taken direct out of the bath and printed at once.

The metallic plate employed as a basis for the gelatine film may be of any suitable metal, but stereotype metal is preferred, as not only cheap, easily cast and worked, but it readily forms a chemical combination with the acetic acid and gelatine. The stereotype plates are cast, varying from one-sixteenth to an eighth of an inch in thickness, according to size, the sizes chosen being those adopted by the photographic profession, and known as quarter-plate, half-plate, cabinet, full-plate, &c., as the idea all through the invention is to keep it within the scope of ordinary photographic manipulation for the sake of simplicity. It is easier to fall into these professional sizes, already in the market, than arbitrarily to fix others which might suit the printing trade better, for they will both have to work hand-in-hand together, and, as both the metal plate and the negative have to go into the same printing frame, they should both be the same size. There is nothing, however, to prevent the printer cutting the plate smaller after it is finished, as the metal is almost as soft as lead. The plates may be cast on either a smooth or grained surface. If the former, they must be scraped, smoothed, and polished, or otherwise brought to a fine, even surface. These plates are reserved for the best work, and very varied and

beautifully artistic effects may be obtained from them, depending entirely on the manipulation of the negative. The grained or embossed plates are for establishments where rough-and-ready cheap production is of more moment than artistic refinement. The newspaper overseer, in a hurry to get to press, will find them invaluable when time is precious, and they are grained or embossed beforehand.

The original negative is all that is required for these plates, nor is it necessary to use screens of any kind, because the pattern on the plate is partially reproduced by the gelatine film in contact with it. The operator, having procured any ordinary negative, places it at once on his sensitised plate, exposes it, dips it into a warm bath of sulphate of iron, and, as soon as the effects appear, withdraws it, screws it down on a wood block, and it is ready without any manipulation beyond mere handling, all the pronounced lines of the photograph come out distinct and clear, the half-tones exhibit the pattern on the plate, and the whites, if not clear enough, can be readily cut away with a penknife. In the case of the polished plate, which is better adapted for book and pictorial illustration of the higher class, the assumption is that the operator desires the best artistic effect he can get, and, therefore, he takes pains to select his screens with discretion and judgment. With his first negative, he uses a screen with fine parallel lines in a perpendicular or diagonal direction, as he may think fit. This results in a reverse negative, having all the characteristics of a positive, except that a thin white line appears throughout all the denser portions of it. He now introduces a dot or stipple, the purpose of which is to prevent the paper, when it comes to be printed, sinking down into the hollows, picking up the ink which may be lodged therein, and thus creating a smudge. These little pin points, as they ultimately become, bear the paper off the hollows. With the last negative he inserts a screen of parallel lines in a horizontal direction, or diagonal lines at right angles to those of his first negative, and the effects he requires are produced on the final plate in a mixed cross-hatch and stipple.

If he has any artistic feeling, and but a slight knowledge of retouching, he can obliterate lines or dots where he does not want them.

As to the method of attaching the gelatine film to the metal plate, a perfectly clean stereotype plate is made warm, and a warm solution of gelatine in glacial acetic acid is brushed over it in a thin layer. The acetic acid, having a strong affinity for the lead in the alloy of the stereotype metal, forms a close union with it, and, inasmuch as the solution of itself is a well-known adhesive cement, the union is perfect between them. Care must be taken not to mix too much acetic acid with the first coating of the gelatine, as the excess over what is taken up by the metal is liable to incorporate itself with the next film flowed over it to render it so soluble that, when it undergoes final development, it has a tendency to crinkle in those portions not exposed to the light. The plate, being floated with a solution of good gelatine, well strained, is put away to dry in a place free from dust, yet where a current of dry air can get access to it. The film need only be thin, but it should be level and even over all the plate.

The mode of preparing its surface to receive a photograph depends on the kind of light to which it is to be exposed. If for use with daylight or the electric light, it is simply sensitised in a bath of bichromate of potass containing a trace of bromide of ammonium. This soaks through the film and chromes the acetate of lead previously formed below it. It is then allowed to dry, and kept from the light till required. The bichromate must not be so strong as to crystallise on the surface. To prevent this, it is a good plan to lay the plates down on a level place and sensitise them by pouring a little of the solution upon the surface, rubbing it with the finger until the bichromate is absorbed by the gelatine, and finish off with a momentary wash in water.

If neither daylight nor the electric light is available, a plate prepared as described, but with the addition of chrome alum, and well washed, is coated (in place of the bichromate) with a sensitive silver salt emulsion, similar in character and composition to those employed in ordinary dry-plate photography. As this is a much more tender and delicate film than the bichromate, great care must be taken with it at the early stages of the process. It is necessary to employ chrome alum in the first coating of the plate to render it insoluble. The acetic acid and gelatine have, therefore, a small quantity of chrome alum added to them with this object. The ingredients are all mixed together, made hot, and brushed over the stereotype plate, which has previously received a wash of glacial acetic acid dried on. It is highly important, in the case of the silver emulsion, that not a trace of acetic acid be left on the plate in a free state, as it would seriously interfere with the future development of the picture. At the same time too much chrome alum must not be used, as it destroys the adhesive nature of the compound, and causes the film to strip off when dry. The proportions can only be ascertained by experience, as they vary with the kind of gelatine employed, strength of acid, &c. Of course with the silver emulsion process the same care must be taken to exclude all but non-actinic light as with a dry plate, the coating, drying, exposing, and developing being on all fours with other rapid photographic processes in vogue, the only difference being that, when the picture is taken and developed, it is not fixed in the usual way, but at once plunged into warm sulphate of iron, and as soon as the gelatine has shrunk sufficiently, it is wiped with a cloth, mounted on a wood block, and sent to the printer.

Just as the electric light serves the purpose of workers in the bichromate process on dull days when daylight is not available, so the silver process can be utilised where the electric light is not available, and thus it becomes possible to carry on the work by any light, gaslight or candle-light; in fact, the light of a match for a few seconds is ample for some requirements, everything in this particular depending on the sensitiveness of the salt employed. The invention is universal in its scope in this respect, and has the advantage that it can be carried on in the night contemporaneously with other journalistic work without the establishment, where it is conducted, requiring an expensive installation of the electric light, as has been necessitated hitherto. In the matter of time, also, it is an immense advance on all other processes for the same purpose, it being possible, by using embossed plates and a silver film, to obtain a picture capable of being printed in the press within a quarter of an hour of its being taken from the negative, there being no occasion to use screens, or manipulate the negative in any way, the process being purely and entirely automatic.

Where the best and most varied effects are desired, screens of transparent sheet celluloid, printed from engraved plates, must be used. They are cut the size of the plates, and may have any design upon them that fancy may dictate, but simple lines, hatches, dots, or stipples are all that is necessary.

The claims are:—1. The process of forming printing blocks, which consists in forming a gelatine photograph on the material of the block itself and exposing it to the action of sulphate of iron solution, whereby the unacted upon parts are shrunk and the acted upon parts hardened, substantially as described. 2. A printing block formed of a metallic surface almost type high, and a hardened gelatine photograph taken on the surface itself, substantially as described. 3. The improvement in making photographic printing blocks, which consists in forming a fine stipple photographically all over by means of a finely stippled plate, substantially as and for the purposes described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 6	Camera Club	Charing Cross-road, W.C.
,, 6	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 6	Peterborough	Museum, Minster Precincts.
,, 6	Richmond	Greyhound Hotel, Richmond.
,, 6	South London	Hanover Hall, Hanover-park, S.E.
,, 6	Stereoscopic Clnb	Brooklands Hotel, Brooklands.
,, 7	Birmingham Photo. Society	Clnb Room, Colonnade Hotel.
,, 7	Bolton Photo. Society	10, Rushton-street, Bolton.
,, 7	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 7	Exeter	City Chambers, Gandy-st., Exeter.
,, 7	Hackney	206, Mare-street, Hackney.
,, 7	Herefordshire	Mansion House, Hereford.
,, 7	Keighley and District	Mechanics' Institute, North-street.
,, 7	Lewes	Fitzroy Library, High-st., Lewes.
,, 7	North London	Canonbury Tower, Islington, N.
,, 7	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 7	Paisley	9, Ganze-street, Paisley.
,, 7	Rotherham	5, Frederick-street, Rotherham.
,, 7	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 7	York	Victoria Hall, Goodramgate, York.
,, 8	Ipswich	Art Gallery, Ipswich.
,, 8	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
,, 8	Leytonstone	The Assembly Rooms, High-road.
,, 8	Munster	School of Art, Nelson-place, Cork.
,, 8	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 8	Southport	The Studio, 15, Cambridge-arcade.
,, 8	Stockport	Mechanics' Institute, Stockport.
,, 9	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
,, 9	Camera Club	Charing Cross-road, W.C.
,, 9	Cheltenham	
,, 9	Glossop Dale	
,, 9	Hull	71, Prospect-street, Hull.
,, 9	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 9	North Kent	Gravesend.
,, 9	Oldham	The Lyceum, Union-street, Oldham.
,, 10	Bristol and West of England	Rooms, 28, Berkeley-sq., Bristol.
,, 10	Cardiff	
,, 10	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 10	Halifax Camera Clnb	
,, 10	Holborn	
,, 10	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 10	Maidstone	"The Palace," Maidstone.
,, 10	West London	Chiswick School of Art, Chiswick.
,, 11	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

FEBRUARY 28.—Technical Meeting,—Mr. Andrew Pringle (Vice-President) in the chair.

It was announced that, at a Council meeting held earlier in the same evening, Mr. H. Chapman Jones had been appointed Hon. Secretary, Mr. E. Clifton Hon. Librarian, and Messrs. H. A. Lawrence and James Cadett members of Council.

The Genie Hand Camera, &c.

Mr. T. P. Watson exhibited and described the "Genie" magazine hand camera of American design and manufacture, a feature of which is its compactness. The magazine is of metal made by machinery to gauges, takes twenty-four films, and the changing is effected by a simple "pull-out" arrangement. Mr. Watson also showed a simple catch arrangement for preventing a second exposure on an Eastman roll-holder, the invention of Mr. Rawley, an amateur.

A Paraffin "Bunsen" Burner.

Mr. Leon Warnerke exhibited a paraffin gas-stove for heating purposes, having the appearance of a Bunsen burner attached to an oil reservoir. It gives off as much heat as gas, and is worked by placing a few drops of spirit on the burner and lighting it. When the paraffin flame is alight, a lever pump increases the flame to any desired intensity. One movement of the pump suffices for two hours. The top part is made of non-fusible metal. The burner has been introduced in Russia, selling at 15*s.*, and Mr. Warnerke thinks it might be useful where a flame for heating purposes is suddenly required and gas is not available.

Acid Amidol.

Mr. H. Chapman Jones said there seemed to be an idea that amidol for development required an alkali. The makers say that the small amount of alkali with the sulphite suffices. There was, however, so little alkali present that he (Mr. Jones) did not believe that it could have any practical effect. By

simply acidifying with sulphurous acid, and giving an exposure of one second with *f*-64, he had produced with the acid amidol practically over-exposure. He could not see the difference between the alkaline sulphite and the developer as made acid, so that it was not the alkali which was practically effective.

The Panoram.

Colonel R. W. Stewart, R.E., read a paper on *Panoramic Photography—the Panoram*, in which, reviewing several of the cameras which had been previously brought out for panoramic purposes, he described his own, which consists of a rectangular box, a little more in length than the focal length of the lens, and a little higher than the width of the film. The camera rests on the head of the tripod stand, which is in the form of a circular disc, and revolves on ball-bearings in a socket. The camera opens so that access can be had to the roll-holder, in which are fixed four vertical rollers. The first has the tissue wound on it, the free end of the tissue is passed across the second and third roller to the fourth, or winder, the last two keeping the film in the focal plane. The winder is controlled by clockwork actuated by a ball and tube. A slit diaphragm is placed between the second and third rollers. In use, the camera is set on its stand and levelled, the clock wound up, the slit aperture adjusted, and a suitable stop put in; the camera is then turned round to point to the left hand of the view, the bulb squeezed, a needle holding the film in position withdrawn, and the camera begins to rotate. Prints of very great length may be developed on the periphery of a drum.

At the conclusion of the paper,

Mr. J. A. Harrison said the same principles were utilised in the Panoram as in the pantascopic camera, but in 1862 rollable films were not available for the purpose. He exhibited an old revolving camera which was actuated by hydraulic power.

The Chairman (Mr. J. Traill Taylor, who was moved to the chair after Mr. Pringle and the President had successively vacated it) said he had in his possession a panoramic picture of Red Lion-square which, with a microscopic object-glass of one inch power, revealed details that were invisible to the naked eye. Many years ago Rawlinson, of Windermere, sent him a panoramic view subtending the whole circle and about ten degrees more.

Mr. W. E. Debenham understood Colonel Stewart to propose that panoramic perspective was in itself truer than plane perspective. This was a mistake. Panoramic perspective would give views which could not be got in another way, therefore, whatever its faults, it came in useful for such views. Panoramic perspective is in itself false when the panorama is on a flat plane. No one could look at Mercator's projection without being struck at the extraordinary disparity in the size which Greenland bears to the tropical countries. As to the perspective being true if represented on a sphere like the eyeball, it was not so. If the photograph was seen on flat surface the only perspective which can give it truly is that of a flat-surface plate. If the photograph is that of a straight row of houses in cylindrical perspective, the effect is that of the outside of a rotunda. The plane of the plate is the same as that of the picture at which we look. As to the distortion of the foreground, as compared with the background, and the middle distance, not occurring in panoramic photography, the difference was between the margins and the centre. As to what Colonel Stewart had called distortion at angles of 80° and less, he (Mr. Debenham) thought he was mistaken. In wide-angle pictures this was the only perspective which would give the true relation of the various parts; he did not think it should be called distortion at all.

The Chairman said a picture subtending an angle of 80° on the base line with a wide-angle lens is very false in perspective. By photographing a row of spherical balls the centre ones would appear round, but as they approached to the margin they would be seen to expand laterally. They should be examined from a point of view equal to the focus of the lens. In a cylindrical picture the eye should be placed in a similar way and the picture looked at close, and then it would all be perfectly truthful. Both perspectives were wrong unless the pictures were looked at properly.

Mr. T. Samuels said the capacity of the panoramic camera was limited because its initial position must be level. At the same time such pleasing pictures could not be got with the ordinary camera. He had seen depth on these pictures which he attributed to the lens being so well shaded from the light. He suggested modifying the diaphragm slit so that differential exposures might be given where dark buildings, &c., came in.

After some remarks by Messrs. Warnerke, Gotz, and T. S. Davis, Colonel Stewart replied to the discussion, and a vote of thanks was passed to him for his paper.

North London Photographic Society.—February 21, Lantern Night, Mr. J. Brewer in the chair.—Slides were contributed by Messrs. Healy, Williams, Clarke, and others. The set of slides entitled *Places to be Visited by the* 1893 *Convention* were shown. They were disappointing, and are far from doing justice either to the Devon and Cornwall Camera Club or the Devon and Cornwall district. Next meeting, March 7, when Mr. A. E. Smith will demonstrate the photo-lithographic process.

Hackney Photographic Society.—February 21, Mr. J. O. Grant in the chair.—Messrs. Sodeau and Nunn showed reductions by flashlight and printing-out lantern plate. Mr. R. Beckett showed a lens made from two ninepenny meniscus spectacle lenses, and a portrait taken with it at full aperture, *f*-8. The Hon. Secretary asked why it was recommended to keep gold solution in the dark. Mr. Sodeau said *light* was likely to reduce the gold to a metallic form. He said, in answer to other questions, keep chemicals in moderately cool place—not too cool, for fear of crystallising. Every time a bottle of ammonia was opened some power was lost, hence it was better to use a small bottle, or keep stock bottle full up to the neck. The strength may be determined by standard solution of oxalic acid. Mr. Barker asked, "Can ferrous sulphate be recovered from iron oxidised by light?" Mr. Sodeau said "Yes, if organic acidifying matter be present; also recover by use of iron filings or nails." Mr. Avent asked how to harden gelatine films. Mr. Sodeau said chrome alum hardens more than ordinary alum; methylated spirit or aluminium chloride would also do. In answer to Mr. Poulson, it was advised to use boiled water for making solutions. Mr. Gosling asked about keeping of sulphite of soda. Mr. Sodeau said it went to powder. Mr. Beckett said sulphate was inert in developer. Mr. T. H. Smith asked which was the best kind of gloss to use, and was advised black for silver compounds.

South London Photographic Society.—February 20, the President, Mr. F. W. Edwards, in the chair.—Mr. W. Rice (Vice-President) read a paper on *Problems in Photographic Arithmetic*. The lecturer dealt first with the covering power of lenses, and proceeded to show how to calculate the circle of illumination required for the different sized plates in common use when the lens is central, and also when the front was raised. Angle of view was next dealt with. It was pointed out that photographic plates being made rectangular, a portion of the plate or part of the angle of view (covering power) must be sacrificed. Where the latter course was adopted, Mr. Rice defined the angle of the photographic image on the plate as the picture angle, which depended on the proportion of the field of view included in the picture. Tables for the simplification of the measurement of angles were given. Stops and the value of their focal ratio and exposure ratios were explained, and the lecture was concluded with a most simple method of calculating the measurements connected with the optical lantern, without committing the usual formulæ to memory. A considerable amount of discussion followed, led by Mr. P. Everitt, who endeavoured to show that the lecturer's method of calculating angle of view was not quite correct; but it appeared that he did not take the same starting-point as Mr. Rice, and it was ultimately decided to fix another evening to further consider the matter. To further elucidate his remarks, the lecturer distributed printed copies of his diagrams, with a number of questions illustrating the practical workings of the problems. By the courtesy of the manufacturers, samples of Cadett's "Lightning" plates and Schwartz's diamidophenol (developer) in powder and cartridges were distributed among the members present. Miller's "Unique" hand camera was exhibited by Mr. Ransom, and was very critically examined.

Aston Natural History Society (Photographic Section).—February 23, "Mutual Criticism." —The collection of prints and interest displayed by members spoke well for the success of similar future meetings. The works brought up included prints by the albumen, Solio, P. O. P., bromide, Alpha, and platinotype processes, the latter class being represented in some fine Jersey subjects by Mr. A. C. Townsend. Mr. Tylar showed some animal studies by Mr. Gambier Bolton, and some marine works by the Rev. F. C. Lambert. The interest evinced in the impartial criticisms made this meeting undoubtedly the most successful one held by this new association of amateur and professional photographers.

Liverpool Amateur Photographic Association.—February 21, Mr. A. J. Cleaver (President) in the chair.—Five new members were elected. Mr. G. A. Carruthers exhibited and explained his ingenious magnesium flash-lamp, and photographed a group of members as an experiment. He afterwards passed several slides through the lantern, the negatives being taken with the lamp. Mr. F. Clibborn then gave his lecture entitled, *A Little Tour through Ireland*, illustrated by a set of high-class slides made by Mr. G. E. Thompson. The lecturer gave a very lucid description of the various views, and frequently was very humorous.

Edinburgh Photographic Society.—Popular Lantern Night.—The second popular lantern-slide exposition of the Society was held on Friday evening, February 24, in Queen-street Hall. The Vice-President (Mr. J. C. Oliphant) in opening, said he desired to call the attention of this large meeting, many of whom must necessarily be still out of the pale of membership, to some of its benefits. The Society had an extensive membership, perhaps the largest of any similar body in the kingdom, and in earlier years it took one of the foremost positions in Britain. By some unaccountable laxity they had recently fallen into a slumbering state, a state from which the present Council wished to remove it. They had now secured good premises in Castle-street, where, for the use of the active members, they had an excellent dark room, with all its appliances; a large hall for ordinary meetings, as well as committee rooms; the nucleus of a photographic library, as well as all the conveniences of a club. They wished still further to increase these benefits, their numbers, and consequent usefulness. For amateurs, now that a great many of the risks and difficulties connected with the lantern and limelight were done away with, there was a wide field of usefulness, and the opportunity for a display of their work, besides that assistance derived from fellow-membership. All this only costs the active member ten shillings a year, leaving still the old subscription to those who did not wish to take full advantage of the benefits he had pointed out. This evening they were to have a selection from a large number of the recent works of the members, which would now be shown upon the screen. The pictures exhibited were all by members, including Messrs. Mitchell (of Dalkeith), J. S. Smith, J. Patrick Reid (of Wishaw), and many others, most of which were of the highest class. The portrait figure subjects were probably the least successful, but the landscapes, English cottage scenes, architectural work, interior and exterior, from Torquay to the north Highlands, were markedly fine. Those which comprised figures with animals, from lions and elephants and all those of the domestic type, were especially good. Several excellent songs, with music, were much appreciated and applauded. The lantern work was perfect, save where an occasional hitch between the speaker's descriptive notes and the pictures shown did not harmonise with each other. Mr. Oliphant called for an expression of thanks to their musical friends, who had so well aided them. This was heartily given, and the meeting dispersed.

Other Photographic Societies Please Copy.—Mr. R. E. Fenner-Kidson, the Hon. Secretary of the Brixton and Clapham Camera Club, writes: "If I might, I should like to call your attention to the fact that the paper recently read before our Club by Mr. J. A. Butler on *Stereoscopic Photography*, that by Mr. B. E. Pinder on the *Optical Lantern*, and that by Mr. W. Thomas on the *Hand Camera* (which have occupied the members for the last three meetings, and of which I think any club might be proud), have *all* been by members of the Club, the Committee having felt that in ordinary clubs of the type of our own there has been a tendency of late to rely upon outside aid for their meetings, instead of encouraging their own members to provide the entertainment."

FORTHCOMING EXHIBITIONS.

March 3, 4	*Blackheath Camera Club. Hon. Secretary, C. W. Piper, 46, Shooter's Hill-road, Blackheath, S.E.
,, 22, 23	Leicester and Leicestershire Photographic Society, Co, operative Hall, High-street, Leicester. Hon. Secretary-H. M. Porritt, 66, London-road, Leicester.
April 5–8	*Croydon Camera Club, Braithwaite Hall, Wellesley-road, Croydon. Hon. Secretary, G. R. White, 55, Albert-road, Croydon.
,, 12–15	*Bolton Photographic Society. Hon. Secretary, J. E. Austwick, 10, Rushton-street, Bolton.
,, 17–29	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.
May 4–6	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

ANGLE OF VIEW.

To the EDITOR.

SIR,—"Free Lance's" pet sin seems to be disregard of the ninth commandment. In reference to my paper on Mr. Haddon's article in this year's ALMANACK, he states that I endeavoured complacently to show the absurdity of the *quoted table*. On the contrary, I distinctly stated in the first paragraph that by correcting the *rules* I hoped to make the table valuable. "Free Lance" also states that my concrete example is a false one, because Mr. Haddon referred to a plate and not a negative or view. But I think Mr. Haddon's remarks, reported on page 91 of your JOURNAL, show that this was not his intention, for he says:—"It is absurd to give a picture a fictitious value on account of a few trees, or twigs, or rocks at a corner, and so dignify it with an angle of 52° instead of, say, 42°."

"Free Lance" recommends photographers to keep to the rules as stated. Let us examine what the result may be. A photographer wishes to use a 12 × 10 plate for a view and decides to include an angle of 62°. By Mr. Haddon's rule he will employ a lens of ten inches focus. If the lens only covers 62°, the corners of the plate, when developed and fixed, will be bare glass. If he uses another lens of the same focus, which will cover the plate, it must be of wider angle, or about 72°. Consequently the angle included on the plate is more than 62°. Instead of half the length, half the diagonal of the plate should have been taken as the basis of calculation, if the lens is used centrally. Had "Free Lance" been less concerned with standing on his head, he would not have forgotten to take the cap off the lens, and would have discovered his mistake.

Cameras are provided with cross fronts and swing backs, and photographers make use of these conveniences. Under either condition the centre of vision is moved. If a photographer wishes to make a picture under a given angle, it is for special reasons, one such being that the perspective shall not be too violent in appearance. A rule to be of value should be correct, therefore I hold that the calculations for the purposes named should be based upon the distance from the centre of vision to the extreme limit of the plate.—I am, yours, &c., PHILIP EVERITT.

88, *Evering-road, London, N., February* 25, 1893.

WASHING CUT FILMS—BLISTERS.

To the EDITOR.

SIR,—Allow me to thank you and your correspondents, Mr. J. E. Hodd and Dr. J. Carter Browne, for their kind answers to my inquiries as published in your most valuable JOURNAL. I will try the suggestion for washing films, but I am afraid that for 12 × 10 plates the suction will not hold, especially when the washing water falls edgeways on the plate. I have used the following way, which I think very good. I drill on the smallest edge two small holes with a drill, and hang up the films to a cross wire over top of washing tank with an S-shaped wire of suitable length, and then let the water run. This may prove useful to other users of the films, and if the manufacturers of films could drill the holes beforehand so much the better.

Next I will answer in regard to blisters. Having used, since I wrote to you, pure alcohol and not the methylated stuff, I find I am always having the same trouble of scum after mounting, *but no blisters*. I am not positive of it as yet, but I think this scum comes simply from the tint with which the albumen paper is covered—pink, mauve, or whatever it is—being dissolved by the alcohol unevenly, and remaining on top through all ultimate washings without hurting it, otherwise than when dry. I will try white paper and then see the results.

As regards blisters and a warm hypo bath I must say that I cannot agree with Dr. J. C. Browne, having tried long ago hypo at any degree of heat, from 40° to perhaps 100° Fahr., and have generally found the higher the temperature the more blisters and the larger ones. Alcohol I have found the only sure remedy. Nevertheless, I am very much obliged to these gentlemen for their kind suggestions.—I am, yours, &c.,

4, *Avenue Pinel, Asnières, Seine, February* 25, 1893. ALBERT LEVY.

A QUESTION BOOK.

To the EDITOR.

SIR,—At a meeting of our Council, it was proposed that a question book be kept. I suggested that any photographic questions that could not be answered forthwith should be handed in to me, and I would enter them in the aforesaid volume, which would be placed on the table, and the query replied to by some of our abler members, such answers to be discussed at a future meeting, and the best entered opposite to the proposition. In due course, a compendium of useful information would result.

My purpose for encroaching upon your space is to see if other societies would take up the matter, so that at a subsequent date a temporary interchange of these records could be made.—I am, yours, &c.,

FRED. W. PILDITCH, *Hon. Secretary, Aston Photographic Society. Burlington Hall, High-street, Aston.*

A CORRECTION—FERROUS SULPHITE.

To the EDITOR.

SIR,—In my communication which you were good enough to publish last week, occurs a slight error, which has the effect of reversing my meaning. In the last paragraph but one I say, "I have been unable to get the clearest and best 'gratings,'" &c., whereas I meant to say, "I have been *able*," or just the opposite.

Some considerable time ago ferrous sulphite was recommended for restoring the ferrous oxalate developer when oxidised, or for keeping it in working order. I tried the method at the time, following the instructions then given, but cannot now refer back to them. I remember that I obtained some remarkably warm tones in development when using the sulphite, and should be glad to try it again for the express purpose of utilising the tone, if you could kindly give me details of how to prepare the ferrous sulphite, which I find is not an ordinary article of commerce.

Apologising for the trouble, and thanking you in anticipation,—I am, yours, &c., W. LINDSAY.

February 27, 1893.

[See an article in another column on the subject.—ED.]

PHOTOGRAPHING HORSES.

To the Editor.

SIR,—Referring to article on "Photographing Horses" in your issue of the 17th, I send by same post a few specimens of equine photography. The cart-horses were "handled" for the taking by Mr. G. M. Sexton, auctioneer to the principal horse societies, and I need scarcely say that it was an education to me to see and work for him. I prefer when taking horses, whether with a mount or not, to stand a little in advance of them, as it is then more easy to show the light between the legs, and I always expose with sky-shade instead of cap, that I may be able to keep my eyes on the animal.—I am, yours, &c., THOS. STOKOE.

Clare, Suffolk, February 27, 1893.

RAPID SOLUTION MAKING.

To the EDITOR.

SIR,—It is awfully amusing to see old and tried friends of the photographic dark room ("Lab." some people designate it now) popping up again under new parentage. The attention of Messrs. Baird, Ayres, and Webster has been drawn to the Doulton dipping jar, which has been in long use by the firm of Messrs. Martin & Co., and others. It has been long known to chemists and photographers (and especially to the chemist) as a most useful and indispensable article.

The writer has used the following rapid solution appliance from wet-collodion days to the present time. It is exceedingly simple, and is in some respects an improvement upon Messrs. Martin's plan. It is this:—Procure a small, round, fancy wicker-basket, from four inches diameter to any depth or size, costing sixpence each upwards. Cover the outside of basket with thin calico, permanently fixed. For use, simply fill the basket with the crystals to be dissolved, and suspend it in the jug or jar, filling up whichever utensil is used with water. It is surprising how long these baskets will last, especially if rinsed under the tap after use to remove sediment and impurities.

Of course, as in the "old days," the same care is paramount in the "new times," separate baskets must be used for different crystals. But in the wet-plate days (with certain exceptions), hypo and protosulphate of iron were used in large quantities, only two or three baskets were required.

In these modern days it takes away one's breath to be informed that the Doulton jar is used to dissolve pyro; yet so it is asserted in p. 668 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1893.—I am, yours, &c.,

February 27, 1893. ATTICUS.

AMIDOL AND PYRO.

To the EDITOR.

SIR,—I have been developing some instantaneous plates in the following manner, producing excellent results. I first brought out the detail with amidol developer, then washed the plate in water, and redeveloped with the ordinary pyro developer, well restrained with bromide. You can then get any amount of density without the slightest difficulty, and splendid printing negatives.—I am, yours, &c., H. COUCH.

February 27, 1893.

THE AMATEUR QUESTION.

To the EDITOR.

SIR,—We would respectfully call your attention to a little booklet enclosed, showing what we in Ireland are trying to do to meet the amateur question. We believe many professionals look askance on amateurs, but we think a little money might be made out of them. What think you?—We are, yours, &c., ALLISON & ALLISON.

14, *Queen's-arcade, Belfast, February* 20, 1893.

[Our correspondents, who are photographers, enclose a scale of charges for the use of dark room, developing, retouching, printing, &c., for amateurs.—ED.]

SPEED TESTING.

To the EDITOR.

SIR,—After my long reply to Mr. Williams last week, there is really nothing for me to say, for he does not answer the points of my letter. Messrs. Hurter & Driffield's system of testing is the outcome of their statement of the law relating to photographic exposures, and, in simple language, is, that the opacities are proportional to the intensities of the light by which they are produced acting for the same length of time. Photometric measurements show that this statement holds good in all plates for a period of exposure according to the plate, and, outside this period, either way, the law ceases to hold good. This statement, the pith of their system, is either true or false, and those who attack their system must attack this statement. Is any one prepared to do so? If not, it is quite useless to argue the matter further. Let me advise Mr. Williams to accept the kind offer of Messrs. Marion & Co. to practically demonstrate the system to him; I promise him he will learn something.

As regards "Arcanum's" remark, I think that he argues against himself. The fact that several people told us the plates worked well to the marked speeds only show that the latitude in their camera trials was sufficient to mask the error.

Perhaps Messrs. Hurter & Driffield will do as "Ignotus" asks, and expound their system in simple language. His remarks are good and to the point.—I am, yours, &c. JAMES CADETT.

February 21, 1893.

EXHIBITION OF PHOTOGRAPHS IN JAPAN.

To the EDITOR.

SIR,—You were good enough to make an announcement in your valuable journal of the collection of photographs we had the pleasure a short time ago of bringing together from English and foreign photographers for an Exhibition in Japan.

It may now be of interest to state that we have just received information from Professor W. K. Burton, which tells us that the Exhibition will shortly be opened, and will be held both in Tokyo (the capital) and in Yokohama (the principal open port); that the enterprise is taken up with much enthusiasm (shown by a general desire to have the honour of guaranteeing the expenses of the undertaking); that the original idea of appointing three leading Japanese artists to adjudicate may have to be extended to selecting ten, as there are so many "schools" of art in Japan that it is proposed to give the designing of a bronze medal for the occasion as a competitive exercise to advanced students of the Government Art College, and that the exhibits (which were all sent out unframed) will be framed in a quiet way, and the Exhibition made attractive in every possible manner. We may add that a very fine collection of about three hundred English and foreign photographs, probably never before surpassed, was kindly contributed, in answer to our requests, by the following exhibitors:—Messrs. Horsley Hinton, Lyd. Sawyer, E. Beck R. H. Lord, Alfieri, Hollyer, Keene, Scott, H. M. Hastings, H. Baker H. P. and R. W. Robinson, F. Evans, Snteliffe, H. W. and L. C. Bennett Manafield, Harding, Douglass, Cole, Burchett, Davison, Crooke, Halford, Gregor, Wilkinson, jun., Clement Williams, Keighley, H. Stevens, Bright, Ennis, Lange, Bhedwar, Briant, Guardia, Wellington, Tyser, Smith, Van der Weyde, Calland, Lee, Bergheim, Ulrich, Dumont, Bedford (the late W.), Bridson, Terras, Cassela, Dresser, Alexandre, Colls, Strakosch, Cobb, Gale, Ramsay, Rigaux, Colard, Loppé, Cameron (including some of Mrs. Cameron's pictures), Lyonel Clark, Andræ, Watzek, Blechinger, Gèruzet, and Count Primoli, Baron Nathaniel Rotchschild, and Mrs. Main. In many cases the contributions consisted of the best work of the exhibitor, so that it will be seen that everything has been done to make a representative exhibition, and one likely to interest our Japanese co-workers in photography. We shall hope to be granted the favour of the insertion of a note or report of the Exhibition in your columns when further information is forwarded to us.—We are, yours, &c., G. DAVISON.

February 27, 1893. A. PRINOLE.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Exchange good tricycle for camera, 8½×6½, 10×8, 12×10, or hand camera.—Address, R. H. BLYTH, 4, Oxford-grove, Ilfracombe.

Will exchange a 42s. Kodak, complete (except film), for quarter-plate camera.—Address, J. W. YOUNG, Lower Gornal, Dudley.

Canvas camera case for 10×8 apparatus, new; exchange for background or studio accessories.—Address, WILLIAM HARE, Windsor Studio, Sutton, Surrey.

Will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY, 1890-2, complete, not bound, good condition, for half-plate landscape lens.—Address, E. KRAUSS, 162, King's-road, Reading.

Will exchange four backgrounds and various accessories for 10×8 rapid rectilinear lens and twelve or fifteen-inch burnishor.—Address, T. F. EYLES, Marlborough Gate Studio, Marlborough-row, Portsea.

Will exchange 12×10 camera, with three Tyler's metal slides, in good condition, for whole-plate studio camera, or portrait lens to cover whole-plate.—Address, G BROWN, High-street, Ibstock, near Ashby-de-la-Zouch.

Exchange box of transparent colours for photographs or lantern slides, not used, and three show-cases, hinged fronts, red cloth backs, painted black, about twenty inches by twenty-five inches each, for a 10×12 tripod (folding), or a single-view lens.—Address, LONDON PHOTOGRAPHIC COMPANY, New Brompton, Kent.

Will exchange a splendid folding tricycle, electro-plated throughout, fine 15×12 quick-acting portrait lens, three full-size artistic canvas backgrounds, and lecturer's stock of specially selected lantern slides, screen, frame, reading-desk, &c., for a first-class modern 12×10 landscape camera, rapid rectilinear and wide-angle lenses for same, and 8½×6½, also 3D and 5D group lenses, and 3D (Dallmeyer's).—Address, LONSDALE & Co., 45, Stroud Green-road, N.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2, *York-street, Covent Garden, London.*

J. J.—Apply to a photographic dealer.

G. G.—Received and noted. *O tempora*, &c.

INK STAINS; J. BRIAN; and others.—In our next.

DEAF.—We do not see any objection to your inscribing the cards as you suggest.

J. GOULD.—The new chemical formulæ are given in the 1883 edition of Hardwich.

M. A. R.—Ordinary silver prints placed together cannot be used for stereoscopic purposes.

E. EDWARDS.—Received. While the case is still pending, it would be improper for us to publish your letter.

W. H. WALLACE.—The camera and lenses named are excellent. We do not recommend particular makes.

PHOTOMETER wishes to know the maker of a printing-out bromide paper for testing the actinic value of the light.

A. L. S.—Consult the advertisements in the ALMANAC, where you will find descriptions of sets of apparatus at all prices.

PETER.—Schlippe's salt is not much used. It is to be had at most dealers in photographic material; it is very inexpensive.

R. SIMCOE.—There is no secret about the transfer ink used in photo-lithography; it may be obtained from every dealer in lithographic materials.

W. GOULD.—A single lens will do quite well for a hand camera, provided it is of such a focus as to cover the plate with a large aperture with the requisite definition.

BROMIDE.—1. We do not know where such gratings can be obtained. See an article last week by Mr. W. Lindsay, which may give you a hint as to their preparation. 2. Not worth the trouble on a small scale.

EASTER HOLIDAYS.—Will any gentleman give particulars of a tour in Holland—Rotterdam to Amsterdam—going and returning by different routes; five clear days there, museums and picture galleries excluded?

B. N. J.—Prints received. If they received a prize it will prove that the standard fixed in the so-called "competition" is very low. However, we have known awards to be made to pictures in no way better than these—indeed, not so good. Hence so many successful pot-hunters. The pictures returned as desired.

LINCOLN.—It is quite a mistake to surmise that rain water can be used for the same purposes as distilled water. It would be the case if it were collected where it would not be contaminated with impurities from the atmosphere; but this is never the case when it is collected from the roofs of houses, more especially in large towns.

R. ROBBINS.—If the camera has not been patented before, or previously made or described, you can obtain a patent for it. Even if it has been, you can still, under the present law, obtain a patent for it unless the sealing of it is opposed by some one. But the patent, like very many others, would turn out to be invalid if contested.

E. H. DEBENHAM (York) writes of gelatino-chloride paper: "Some photographers may be deterred from using this paper by the fear that there are difficulties connected with toning, &c. Let me assure all such that if the manufacturer's simple instructions are adhered to, there is no difficulty whatever in obtaining first-class results."

A. MCLENNON.—Almost any adhesive may be employed for mounting carbon pictures; the same with collotypes. If you prefer dextrine, there is no objection to its use, as in the case of silver prints. Flour paste may be used as well as starch paste. The latter is the mountant in most general use for carbon and collotype pictures. For large sizes the starch is made very thick and applied with a sponge.

OPERATOR.—So far as we are aware, there is no trade union society amongst photographers. An attempt, we believe, was made some years ago to form one, but it ended in failure. We quite agree with you that the system of taking "articled pupils" or apprentices with good premiums, so as to obtain labour at merely a nominal cost, if not for nothing, is very unfair alike to skilled workers and the so-called "articled pupils."

ALPHO.—Unless the apprentice's indentures are duly stamped they are not binding, and he can leave the same as any other *employé*; in fact, he is not legally apprenticed at all. So far as we can see, there is no remedy. Agreements, such as that in question, should be prepared by a duly qualified solicitor. There is an old proverb, often quoted, that the man who acts as his own solicitor has a fool for a client. This, we imagine, will turn out to be the case in the present instance.

R. REED.—White hard varnish, diluted with methylated spirit, makes a varnish that is very useful for negatives that are to be carefully handled, and is given in the ALMANAC. Being soft and brittle, it is easily abraded by rubbing with the ball of the finger, and then it forms a good medium for retouching upon. By the way, "white hard varnish" is a very indefinite article, and varies with every maker. Sandarac is its recognised basis, but in many of the commercial articles common resin predominates.

PAPIER.—If the wooden vessel were lined with gutta percha there would be no advantage in coating the gutta percha with paraffin, which, by-the-by, would not be easy of application. Either material by itself would answer perfectly. We, as a matter of economy, should prefer the paraffin. It will have no injurious action on the silver solution, and some say that gutta percha has. Certainly some samples of the common commercial article does quickly deteriorate a silver bath for the collodion process, and the pure article is not easily obtainable nowadays.

NEMO ME IMPUNE LACESSIT writes: "Last season I secured some pretty negatives of men carting, ploughing, and felling trees, &c.; also rustic houses and bits, with figures at doorways and elsewhere. I wish now to publish these. Can the persons represented stop me? They understood at the time I was a professional and intended to do so. I gave them a copy each for their trouble. This seems to me to be different from a portrait taken in the studio."—So far as we can see, the publication of the pictures cannot be legally prevented. It would, however, only be cautious to ask the permission of the parties whose portraits are included, and they will doubtless raise no objection.

PIGEONS.—"My studio has an iron roof, and I am troubled with my neighbour's pigeons settling on the same, making a noise about as pleasant as setting a saw. Can you suggest a remedy? I have used a squirt with water (large one), but to no purpose. I thought I would tar the roof, and mix tar with some ingredient, so that it would not dry, and so it would make the feathers messy. You see, people want to fly the pigeons, but I don't want them if I can avoid it."—We can quite sympathise with our correspondent, but a remedy is not so easily suggested. But still it just occurs to us that cats are rather partial to pigeons, and the latter do not like cats. Now, if "Pigeons" were to keep one or two of the feline tribe, and give them free access to the roof of the studio, and further accommodate them with a board fixed along the ridge, the trouble might cease.

C. WILTON.—The majority of copies of paintings seen in the shop windows of London, that are made on the Continent, are by the wet-collodion process. This is the process almost exclusively employed for this class of work by our Continental neighbours. The process is an orthochromatic one, of which those who employ it do not publish the details.

J. B. writes as follows: "If I entrust negatives to any person or firm for process printing for my own publication, with the understanding that the negatives are to be returned to me, is it implied that they are to be returned in the same condition, or would trade custom admit of their being stripped and reversed without my permission, and have I any legal claim against any person who, under these circumstances, returns my negatives reversed, cut down in size, and injured in other ways, so as to render them unfit for ordinary work?"—Unless permission was given to strip the negatives, they should have been returned intact. So far as "trade custom" is concerned, we know of nothing that will justify tampering with negatives without the owner's consent, therefore an action for damages might be successful. Perhaps some of our readers commercially interested in the subject will favour us with their experience.

R. O. S. says: "I wished to obtain a piece of finely ground glass, and obtained from the oil shop some of the finest flour emery, and ground a piece of glass with it and water, using a piece of thick plate glass as a muller; but when a ground surface was obtained, and the emery washed off, there were innumerable deep scratches, almost cuts, in the glass, and not the even surface of ordinary ground glass. Is not the emery I used the right kind?"—The finest flour emery will give a fine, even, ground glass surface; but it is clear that in the sample used there must have been some very coarse particles from some accidental cause or other. If a more reliable sample of emery cannot be obtained, the present one can be made available. Stir it up with a tolerably large quantity of water, and allow it to rest for two or three minutes. In that time the coarser particles will have settled to the bottom. The major part of the water and the finer particles of the emery can then be decanted, and afterwards allowed to subside. With emery so treated, though it may not be suitable in the first instance, a fine surfaced glass may be obtained.

RECEIVED:—E. Dunmore, J. Pike, and G. Gosling.

PHOTOGRAPHIC CLUB.—March 8, Mr. A. Brooker's Slides. 15, Smoking Concert.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday, March 9, Mr. J. Traill Taylor will read a paper on *Investigations in "Spirit Photography."* Visitors welcome.

THE Sutton's Process Syndicate, Limited, inform us that they have taken commodious premises at 91, Blackfriars-road, with studio and electrotyping plant, &c., and are going in for supplying half-tone blocks to the trade cheaply and quickly.

THE Bolton Photographic Society will hold an exhibition of photographs on Wednesday, Thursday, Friday, and Saturday, April 12–15, 1893. Six silver and six bronze medals will be offered for competition. Competition sheets and all other information can be obtained from Mr. J. E. Austwick, Hon. Secretary, Exhibition Committee, 10, Rushton-street, Bolton.

ON Thursday evening, February 23, the London and Provincial Photographic Association gave their annual ladies' entertainment at the Champion Hotel, Aldersgate-street, when a capital programme of songs, recitations, and instrumental music, interspersed with lantern-slide displays, was given. A feature of the entertainment was the exhibition of live objects on the screen, shown by means of a vertical lantern arrangement with a prism lent by Messrs. Newton, of Fleet-street.

MR. HORSLEY HINTON writes: "So many photographic friends have for some years past correspondeed with me at 45, Charterhouse-square, and 91, Graeechurch street, London—the photographic businesses of Messrs. W. B. Whittingham & Co., Limited (late The Photographic Artists' Co-operative Supply Association, Limited)—that I shall be obliged if you will spare me space to make known that I am now no longer in any way connected with the above business."

CHANGE OF ADDRESS.—Messrs. Hunter & Co. have acquired large manufacturing premises, containing over 10,000 square feet of floor space, situated in Dermody-road, Lewisham. The new factory comprises two distinct portions, one of which will be set apart for the manufacture of dry plates and films, and equipped with the best modern appliances, while the other will be devoted to the production of Messrs. Hunter's photographic requisites and specialities, to which will be added an electrical engineering department, embracing the manufacture of hand and power dynamos, arc lamps, and requisites for studio and other installations.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1714. Vol. XL.—MARCH 10, 1893.

NOTICE—THE "LANTERN RECORD."

Adverting to an announcement made last week in the "Lantern Record" (the monthly Supplement to The British Journal of Photography), it may be convenient if we here repeat the substance of what was there said. During the past winter the "Lantern Supplement" has met with such appreciation at the hands of readers and advertisers, that, instead of confining its appearance to the months from October to March, as was originally intended, we have decided to issue it monthly throughout the year, without intermission. The next Supplement, therefore, will appear with the Journal of Friday, April 7, and will be continued every month.

Although during the summer the lantern, among photographic societies and at public entertainments, is not so largely employed as in the winter, its uses for enlarging, and for scientific and experimental purposes are still very extensive, while the preparation of negatives for lantern slides, improvements in the optics, mechanics, and construction of the lantern, and its many accessories, and, in brief, lantern matters generally, are of constant interest to photographers and others. It will, therefore, be the aim of the "Lantern Record" to devote itself to the treatment and discussion of the optical lantern and its allied subjects as fully as possible during the forthcoming summer, so as to form a complete and unbroken record of lantern progress and practice.

HOW BUSINESS MAY BE REVIVED.

Depression in the photographic profession appears to be almost universal, not only in the Metropolis but throughout the whole of the Kingdom. So far as we have been able to ascertain, there appears to be little prospect of an immediate improvement, at least, so far as portraiture is concerned, and that has hitherto been, and still is, looked upon as the most important branch of professional photography. It is not necessary just now to speculate as to the cause, or causes, of the depression—it undoubtedly exists. It is the remedy that may, at the present time, be more profitably considered. It has been suggested that a revival of business could be brought about if some new style or size of picture could be introduced that would take the public fancy. But we fear there is but little prospect of this being done at present.

Let us see if there are not other channels into which professional photographers may profitably turn their attention. In doing so we shall, however, have to show that a very large amount of business, which ought to be and is legitimately that of photographers, has been diverted into other trades, such as lithographic and other printers. Just let us take two or three cases by way of example. Photo-lithography, to which we refer elsewhere: here a photographic negative has first to be made, then from that an image in fatty ink is obtained by the action of light on bichromated gelatine. The work is purely photographic, and up to this point is simply equivalent to that of the lithographic draughtsman when he places it in the hands of the printer—a different business altogether. Relief or "process" blocks: this is purely a photo-chemical process up to the time that the block is ready for the press. So far as separate crafts are concerned, it is exactly parallel to the work of the wood engraver. Photogravure, too: here we have to produce a negative, then make a reversed transparency, and afterwards obtain from that a negative in carbon on the copper-plate. The remaining operation is entirely a chemical one. Photography entirely takes the place of the engraver or etcher. Collotype is still more entirely a photographic process, inasmuch as the finished plate cannot, like the process block, engraved plate, or litho-transfer, be placed in the hands of their different printers. A special training for the work is necessary; for although the method of printing is analogous to that of lithography, we are given to understand that lithographic printers cannot deal with collotype plates. Woodburytype is even yet more completely a photographic process throughout. Still, all these processes are being neglected by photographers generally.

All the photo-mechanical processes that are being worked at the present time were, with the exception of some slight modifications, in the possession of photographers twenty or thirty years ago, and full details of them were published in the journals; but they did not avail themselves of them at the time, nor have they, to any extent, done so since. Other trades have, however, during the past few years taken them up, and are turning them to very profitable account.

Talbot's method of photographic engraving, for instance, was published in 1858, and that is the basis of, and differs but slightly from, the process now most in vogue. Further, the identical method described as the Talbot-Klic process, which was demonstrated the other night by Mr. Denison, was published nearly ten years ago in this country, yet it has received but little attention at the hands of professional photographers up to the present, though largely worked by others. Again, collotype, precisely as it is worked at the present day by some firms who produce the best work, was, in its entirety, fully described in the English journals more than twenty years ago. But how many really professional photographers have taken it up? Should this state of things continue to exist?

Would it not be well for many of those photographers who are now so loudly complaining of the lack of trade, to turn

their attention to some of the mechanical processes in their own businesses? None of them require much space or costly appliances for their practice beyond what is found in every portrait establishment. We surmise there are few photographers, especially in manufacturing districts, but who could often have materially increased their returns, had they the means of turning out mechanical prints at a short notice and at a moderate price. Hitherto, as a rule, when an ordinary photographer accepts an order for mechanical work, it is put out to be executed, sometimes even sent to the Continent. This generally means a delay of some weeks, and sometimes with the result that in the end the work is not done as it should have been, whereas, if it could have been executed on the premises, it could have been done in a few days, and, what is of still greater importance, would have been in accordance with the photographer's and his client's requirements.

The processes that would be most generally useful to the ordinary professional photographer are photogravure and collotype. The former is eminently suited for portraits and landscapes. There is little doubt that, if people could have veritable engravings of themselves, they would prefer them to silver prints, and would willingly pay a considerably enhanced price for them. Collotype is also good for portraiture, though it must be confessed that portraits hitherto produced by this process in England are not of a very high class; but that is not the fault of the process. It is, however, for views, reproductions, book illustrations, and for trade purposes that the photographer will find collotype most useful. Some have the idea that this process is not capable of yielding results equal to silver prints, and the notion is somewhat supported by the quantity of inferior work that is to be met with; but this, as we have just said, is not due to the process. Collotype is capable of yielding prints as good as those in silver, or those from engraved plates.

The collotype process requires no expensive plant for its working on a moderate scale. The most expensive item is the printing press. One of the form most generally in use in Germany to take plates ten or twelve inches wide costs only about twelve or thirteen pounds, and the other necessary items may be had for something less. The cost for installing photogravure was referred to last week.

PHOTO-LITHOGRAPHY FOR AMATEURS.

The full attendance at the Photographic Society's lectures on photogravure, and the evident interest evinced in every detail of the process, testifies to the awakening appreciation for this and similar processes of reproduction on the part of amateurs and photographers generally. But, while photogravure may be taken as representing the highest artistic form of such processes, as well as the most difficult to master, there are others of a similar nature which, if not capable of producing similarly artistic results, are, at any rate, applicable to a variety of utilitarian purposes, and, at the same time, form stepping-stones in a certain measure to the practical mastery of the more difficult methods. Foremost amongst these is photo-lithography.

By this title we mean to refer only to the simpler kinds of photo-lithographic reproduction, those in which photography is called in to assist in making "transfers" from line subjects, or others in which there is no natural half-tone, to be printed from an ordinary lithographic stone or its substitute. The higher branches of photo-lithography—or "collography" as it is called technically—include processes which are not only capable of yielding the most artistic results attainable by any methods, but in which the rendering of half-tone is even more perfect than in photogravure of the highest class. But these are even more difficult to work successfully, and require such an array of special materials and appliances that they are almost beyond the capabilities of the amateur or worker on a small scale.

Not so, however, the more modest methods of line reproduction, the applications of which are numerous and useful in the hands both of amateurs and professionals. For instance, we are acquainted with one amateur who executes all his own note-paper headings, monograms, and suchlike, making the transfers himself by reduction in the camera from carefully prepared originals on a larger scale, the printing being performed by a skilled litho-printer. In the same way we have seen concert programmes and similar things that have been rapidly and economically reproduced from pen-and-ink sketches, while an endless variety of similar uses will suggest themselves.

For the production of the transfers themselves scarcely anything is required that is not found in the average photographer's laboratory, lithographic transfer ink being perhaps the only special requirement. For the printing it will be better in the majority of cases to utilise the services of a practical lithographic printer, as, although the process is not a difficult one to learn, it is seldom that the practical photographer and lithographer are found combined in one individual. It is by no means an unlikely occurrence, if the photographer himself undertakes the printing, that though his own proper share of the work may be efficiently performed, it is spoilt as soon as he attempts to get into the ground of another, whereas a skilled printer would have known how to make the most of it. Some years ago, having access to a lithographic machine and the assistance of a skilled lithographer, we made, by the simple process about to be described, a series of reduced copies of line engravings, which on the smaller scale were generally said to be superior to the cheap originals from which they were made.

The first requirement is, of course, a suitable subject for reproduction—that is to say, one in which the half tone or gradation is represented by lines, dots, hatching, or mechanical grain of some sort. But this is not all; the grain, of whatever character it may be, must not be too fine, especially if it is to undergo reduction, or it will not bear inking up with the lithographic roller without clogging. In this matter a skilful lithographer would often succeed with a class of subjects that would be impossible to the mere photographer, who will do well to confine himself—at first, at any rate—to tolerably open subjects, and to altogether eschew any attempts at extremely fine work. When he has acquired some experience in making and washing up the transfers, he may, perhaps, venture on to a better class of work, and with the assistance of a practical printer he may then, perhaps, succeed in producing what might pass for fairly good line engravings or etchings.

The next step is the production of a suitable negative, and this, perhaps, forms the chief difficulty in the process. For this purpose, perhaps more than in any other process, a negative of great density and perfectly clear-glass shadows is required, the latter condition being, if anything, the more important of the two; at least, any decided veil over what should be the clear parts is far more objectionable than a little falling short of absolute opacity—if there be such a condition—in the deposit. In the old collodion days this type of negative was not at all difficult to produce, and for that reason

the wet collodion still remains in use wherever "process" work is done; but, except under special conditions, it is not by any means easy to attain to the requisite clearness and density with gelatine plates—that is to say, with the ordinary commercial rapid plates.

In order to make the best of matters as they stand, let a "slow" plate be selected. There are special photo-mechanical plates in the market, but any reliable slow plate will answer with careful treatment. Let a full exposure be given—that is to say, avoid *under*-exposure; but, on the other hand, do not go to the opposite extreme. Develop with hydroquinone, using bromide, or, better still, with pyro and ammonia, mixing the developer with a saturated solution of gallic acid instead of plain water, as described in these columns some few years back. If the latter plan be adopted, the exposure may be very much increased with advantage, and the development will be gradual, resulting in any desired degree of density without appreciable loss of clearness.

The basis for the actual transfer is paper coated with gum, gelatine, starch, glucose, albumen, or any similar substance, or a combination of them, sensitised with bichromate of potash, and carefully dried. If a special paper be prepared, a solution of gum arabic, with a little sugar or glucose to remove its brittleness when dry, may be spread thinly but evenly, by means of a brush or by floating; or a small proportion of gelatine may be mixed with the gum if a more robust layer is desired. But for our own part we prefer to use an article easily obtainable, ready to hand, namely, ordinary albumenised paper, as used for silver printing. Here we have a product in every way suited to the purpose—the chloride contained in the film does not interfere in any way—and more evenly and carefully coated than the photographer is likely to do himself, and which only requires sensitising.

This is effected by floating the paper, *plain* side downwards, on a solution of bichromate of potash, of the strength of one ounce to the pint of water, for three or four minutes, or until it has entirely lost all tendency to curl. The albumen surface should not be brought in contact with the solution, or it will be partly dissolved, and rendered uneven. As it is, great care must be observed, as the solution penetrates the paper and softens the albumen, which is thus extremely liable to injury. After floating, the paper is hung up to dry, being finished off by heat, to ensure perfect desiccation.

The exposure is made in the printing frame in the ordinary way, and is continued until a strong brown image is formed and appears to grow no darker. The object is to harden the whole thickness of albumen in the insolated parts, without allowing the white lines of the picture to be touched. If the exposure is insufficient, there is danger of the transfer washing off the paper in development; on the other hand, in the case of over-exposure, the whole image will be dirty and "smudgy."

After exposure, the surface of the print is covered as uniformly as possible with lithographic transfer ink. This is best done, if the means be at hand, by rolling it upon an inked stone, but, failing this, the ink may be applied by means of a chamois leather or silk "dabber," and spread as evenly as possible. When the surface of the print has been reduced to an even tint of black, it is transferred to a basin of clean, cold water, and allowed to soak for a few minutes. Gradually the unchanged albumen dissolves and leaves the paper, carrying with it the ink attached to the white lines of the picture, the dark lines represented by the hardened albumen remaining intact. The process may be assisted by means of a camel's-hair pencil carefully applied, but it is better to allow the development to proceed as far as possible without interference. Every care must be taken, under all circumstances, to avoid letting the dislodged ink attach itself to the paper to form smudges. If gelatine has been used in the preparation of the paper, or in case of over-exposure, it may be necessary to use slightly warm water, but it is not advisable to resort to this course unless absolutely necessary.

When the development is complete, the superfluous moisture is removed by gentle pressure between blotting-paper, taking care that the surface of the transfer is not rubbed at all. It is then ready for application to the stone or printing surface, which, as we have said, will be better done by a qualified printer, or it may be allowed to dry. The method is similar to that followed with an ordinary transfer; it is laid on the stone, damped, and passed once or twice through the press; then, as the ink is not separated from the paper by a soluble film as in an ordinary transfer, it is a desirable plan to pass a hot iron over the back of the paper once or twice, to melt the ink and cause it to sink into the surface of the stone; then redamp, pass through the press again, and strip in the ordinary way.

We have necessarily given but a brief sketch of the process, leaving the printing entirely for other hands. Our remarks are intended to be chiefly suggestive, and our readers will be able to elaborate them in such manner as best to suit individual cases.

Another "Largest" Photograph.—It seems as if this country will be well represented in the matter of large photographs at the Chicago Exhibition. The Autotype Company have just produced, for a well-known firm of photographers, an enlargement something over seven feet by four feet six inches, which is to be sent to the World's Fair. This, we are informed, is the largest carbon picture that has yet been produced on one piece of paper and printed from a single negative.

The Determination of Plate Speeds. — The recent correspondence on this subject in our pages, provoked by Mr. G. F. Williams' articles, has excited very general interest; and, as Mr. Williams is at an early date to read a paper before the London and Provincial Photographic Association in defence of his standpoint, we may expect an animated and profitable discussion, at the hands of the supporters and the opponents of Messrs. Hurter & Driffield's theories.

The Sun's Ultra-violet Radiation.—In reference to the recent experiments on this subject chronicled by us, it may be stated that the measurements were made by an electrical actinometer. The instrument was based on the fact that the ultra-violet light accelerates the dissipation of an electric charge from a cathode of amalgamated zinc. The portable instrument devised is in the form of a cylinder, which is to be directed to the sun, a charged sphere of amalgamated zinc being first inserted, and the rate of its dissipation being gauged by an Exner electroscope. Experiments were made at various heights, and it was found that of the perpendicular rays falling at Sonnblick (3100 metres above the level of the sea) forty per cent. reached that level, twenty-three per cent. of these were absorbed before reaching the next station (1600 metres), and only forty-seven per cent. of the remainder reached the level of Wolfenbüttel (80 metres).

Amateur Astronomical Photographs with an Ordinary Telescope.—At the last meeting of the British Astronomical Association, a paper by Mr. Lawrance Richardson was read, describing how these could be produced with a very simple arrangement. The need for the use of an astronomical clock is the great

drawback, but granted possession of this necessary instrument in astronomical observation, Mr. Richardson showed how the only apparatus he used was a home-made arrangement of cardboard, gummed together and fitting on to the draw-tube, by means of which he took four photographs on a quarter-plate. The telescope was not corrected for photographic purposes, but by putting the plate about a quarter of an inch outside the visual focus he obtained sharp results. He tried the effect of stopping down the aperture, and the results were at one end of their range very singular and contradictory of photographic experience. Thus, the instrument was a 4½-inch objective; when he stopped down to 3½ a sharper image was obtained; a still sharper at 2½ inches, still further improved by a 1-inch stop. But when he arrived at a half inch, the image became less sharp. By using an eyepiece, he obtained photographs of the moon 2⅓ inches in diameter. For photographing the constellations, he used an ordinary landscape camera strapped on to the object-glass end of the telescope. He stated that this was by far the easiest mode of taking astronomical photographs.

Electric Spark Photographs.—The lecture delivered at the Edinburgh meeting of the British Association by Professor Boys on this subject is now being published with illustrations in the pages of our contemporary, *Nature*, and those of our readers interested in some of the most remarkable experiments in instantaneous photography hitherto made will do well to read the paper in its entirety. Professor Boys is known as the originator of a variety of most ingenious experiments for showing the results of certain rapid, or almost instantaneous, effects of motion—his explanation of how soap bubbles burst, and so on, are to be found in his interesting *brochure* published by the Christian Knowledge Society; but the photographic representations of a bullet travelling at a speed of about two thousand feet a second are startling. The lecturer modestly called the part he had taken in producing them a subordinate one, but those who read his account will soon be aware of the ingenuity of the methods he adopted, and the originality of his ideas. Practically, the method adopted is, to cause the light of an electric spark to be diffused by a lens, opposite to which is placed an ordinary camera. The bullet passes across this field of light, and a photographic image is instantaneously secured. The details of the arrangement for ensuring that the very moment the bullet passes across the field the light shall be there cannot be put in a brief paragraph like this, but they will well repay perusal in the complete paper we quote. They are interesting, and marvellous in the highest degree.

Home-made Electric Light by Battery. — There are many who would like the opportunity of an occasional use of an incandescent electric light, but who do not care, or who have not the means, for setting up a dynamo and power engine. No doubt, battery power can be and has been used for the purpose, but this means of using electricity is open to the objection of its variability, and the mess and trouble of setting it up whenever required. But it is possible to get a very even quality of light from a storage battery (which, after all, is only a form of chemical battery, though the name of storage battery so well indicates its power that it is not likely for some time, at all events, to grow into disuse), and it is also possible to "charge" a storage battery by means of a set of bichromate cells. How to make a "Home-made Storage Battery" is recently described in an article in the New York *Electrical World*, and the paper is quoted *in extenso* in the *English Mechanic* last week. The ingenuity, and power of using tools to advantage, required to construct such an arrangement are decidedly less than what would be needed for making cameras and camera appurtenances such as numberless photographic amateurs construct. Hence, after reading the instructions alluded to, it is quite possible that in the near future our amateurs may show us not only photographic apparatus of their own construction, but also dark rooms lighted by electric lamps, fed by batteries, alike made by the same hands. The lamps themselves are now to be had at such a cheap rate that it would not be worth while to attempt their manufacture, the vacuum producer needed for their construction being a most elaborate arrangement, not to speak of filament making.

STUDIO-BUILDING.

A WRITER in these pages has, in so complimentary a letter, asked for my views on studio-building, that, much as I dislike intruding my personality on questions where great diversity of opinion exists, I cannot but respond to the best of my ability. The Editor informs me that, in a further letter, "H. L." thinks I can put the matter in a nutshell—quite an impossibility. In entering upon this subject it may be said at the outset that the conditions favouring the design of such buildings at the present day are far less restrictive than in the times when we had no quick gelatine plates. Then we had to consider how to get as much light as possible to ensure rapidity on dull days; now we have rather to arrange how to diminish the light. Hence, the battle of lean-to, ridge roof, sloping front is almost ended, for the chief factor in determining one or the other was the angle at which the dominant light struck the glass on its path to the sitter, much light being lost by reflection when the angle was considerably divergent from a right angle. Hence we may be guided by conditions of convenience alone.

As *to the shape of the studio*, the "nutshell" idea will be perhaps carried out when I say that, granted a lofty building, and plenty of skylight and sidelight, it is the blinds, and the blinds alone, that govern the light. The common plan is to make them run close to the glass, but to do this is quite unnecessary. They may run in any direction most easily managed, whatever the shape of the roof, and at any distance from it. But it should always be borne in mind that, the farther they are away from the sitter, the less the variation in the light, and when a sitter changes his position, and also when a group is taken, the more even will be the illumination over the individual sitters composing it. To emphasise this idea, let us imagine a sitter placed in the middle of a roofless room with four opaque walls. Whatever the shape of the roof, supposing it all glass, the lighting of that sitter would be, for all practical purposes, identical. As to the aspect of the main light, the north has universal preference on account of there being least disturbance from the sun. By a north light is to be understood one which falls from that quarter on one side of the sitter when he faces due east or west.

For simplicity, and consequent cheapness, of construction, a ridge roof is to be preferred, and I will therefore describe such a one, and mention the conditions to be considered in erecting it. In building any studio whatever, it will be a mistake to be governed by the mode the light falls at the time of construction, unless it be near midsummer. Many studios built in spring or autumn, or in winter, which act admirably in those seasons, may be found to be greatly inconvenient when summer arrives, the sun then being so high in the heavens that it falls upon the glass and in front of the sitter, causing fogs and streaks through, perhaps, unnoticed sunbeams that are difficult to combat.

One of the most important considerations in arranging a studio is to be able at will to illuminate by a main light either the right or the left side of the sitter. It is not always enough, if one side of the face is found the best, to turn the sitter to the light if the side turned to the shadow is the one preferred. Power must be taken to cast the chief light on either side of the face. This may be effected in two ways. The studio may have a light on each side, one to be always screened off by blinds, or its fittings may be so arranged that the subject may be placed at either east or west end. I have tried both ways. The former I have found so objectionable in summer time, owing to the difficulty experienced in keeping the studio cool, one of the sides in such studio necessarily being south, and exposed to the full sun rays almost all the day, that I have abandoned it entirely, and gain all the effects I need by using either end of the studio at will. This arrangement, it will be seen, puts out of court the once famous "tunnel studio." My present studio is built with this double light, the south being much smaller, yet I have practically disused the south light. The glass on that side is nearly wholly roofed over with opaque covering placed *outside*, and ceiled inside under the glass to improve its appearance.

Another very important matter to be thought of in selecting the position of the studio is the direction of the surrounding buildings. If the studio be built in a garden with high buildings around it, it is evident that they may fatally obstruct light in one or more directions: but, as a counterbalance, these structures may also obstruct the sun's rays,

and prevent their entering the room. When, for example, they lie at the west end, they will, if lofty, quite keep out the sun's rays after noon, and greatly assist in cooling the studio, a most important thing to be attended to. But another aspect of the case then presents itself. If they do so obstruct the sun's rays, they will also obstruct the more front light from falling upon the sitter when he is placed at the east end. I name all these points, as they will assist in forming a conclusion as to the best aspect. If such buildings prevent the due use of a north light, a studio built to face the east—sitters placed at north or south end—will answer well, for, by ten o'clock in the morning, the sun will be well away from the east end, and will not fall inconveniently into the room. If, however, there are no tall buildings at the south, it will be found that sunbeams will be painfully prominent at work. A studio I once had was built in this direction early one spring, and it was not till the summer months approached that trouble was experienced. I got rid of it by erecting a tall wood screen at the sitter's end, outside (this was a tunnel studio built thirty years ago), and between the sitter and the camera was placed, just so high as to escape the range of the lens, a wooden false ceiling to intercept the direct rays. I was some little time in discovering the cause of certain streaks on the upper part of the plate, they being confused (this was in wet-plate days) by the streaks produced when a wet plate during development is held up to the light for more than a brief moment, but eventually they proved to be sunbeams.

I think I have now thus far so dealt with general principles as possibly to aid any one in forming his own plans when on the actual site of a proposed studio, and in a succeeding chapter I will enter more into practical details.

G. Watmough Webster, F.C.S.

A NEGLECTED DEVELOPER.*

Some years ago I tried a number of experiments with a view of adapting the hydrosulphite developer to gelatine plates without in any material way altering its original form and its simplicity of preparation, but I failed to secure any very conspicuous success, as the less energetic solution formed with sodium sulphite proved too slow, and the objectionable zinc salt formed an obstacle in the way of the other. Since that period, however, there have been introduced a large number of substitutes for pyro, and it is by no means impossible that, by the use of one or other of these instead of pyro, the objectionable precipitation may be obviated. This, at any rate, forms one direction in which it may be worth while to experiment.

But, failing success in that direction, we may look in another, that is to say, we may try the use of a solution from which the zinc has been eliminated or which has been produced without the assistance of zinc or other metal capable of forming insoluble deposit. For this purpose we have fortunately the choice of two or three different plans.

First of all we may employ the hyposulphurous acid itself, which is easily separated from the zinc, though its extreme instability scarcely renders that plan worth trying. Or we may separate the hyposulphite of sodium from the objectionable zinc-sodium compound, and this, though not a very easy process for those not accustomed to chemical manipulations, at least supplies us with a tolerably definite and stable product, which, if the demand arose, would, no doubt, become an article of commerce. Lastly, we may use, instead of zinc, a metal which forms no basic compounds similar to that of zinc.

The exact composition of the hyposulphite does not seem to be thoroughly agreed upon. In Watts' Dictionary I find it mentioned as Na II SO_2 while in a recent edition of *Fownes*, edited by Watts, the same authority speaks of it as $Na_2 SO_2$; the former has the composition of an acid, the latter of a neutral salt. The fact that either the acid or neutral sulphite, when submitted to the action of zinc, produces a solution possessing developing powers, renders it possible that there may exist two hyposulphites analogous in composition to the sulphites. The following is the method of preparing the salt in a state of isolation.

Let the concentrated solution of acid sodium sulphite be submitted to the action of zinc for half an hour, and then decanted into a flask containing about three times its volume of strong alcohol, and closely stoppered. The zinc-sodium salt, being insoluble in alcohol, is thrown down almost immediately, and, when the crystals have separated themselves from the liquid, the latter must be again decanted into a flask which it quite fills, and once more closely stoppered or sealed. In the course of a few hours the flask will be filled with a mass of fine colourless crystals, which must be rapidly separated from the liquid, pressed between folds of linen, and dried in a vacuum, as so strong is their affinity for oxygen whilst moist that they become quite hot, and are reconverted into acid sulphite. When dry, however, they are comparatively little affected by oxygen.

The solution of this salt possesses all the decolourising and reducing action of the free acid, than which, however, it is much more stable, although, when in solution, it rapidly reverts to the condition of acid sulphite. If it be desired to use the acid itself, it may be separated from its sodium salt by means of oxalic acid. It forms a yellow solution, which rapidly loses its power, being converted into sulphurous and thio-sulphuric acids with liberation of sulphur. Or the acid may be prepared by digesting zinc in the aqueous sulphurous acid of commerce, in which case, however, it will most probably be useless for gelatine plates owing to the presence of zinc in solution.

Probably the best plan of preparing a solution which does not cause a veiling of the gelatine film, and which yet obviates the trouble of preparing the crystallised hyposulphite, will be to reduce the bisulphite by means of another metal than zinc, which does not form the objectionable precipitate. For this purpose nothing seems better suited than sodium itself, the only objection to it being its comparatively high cost, which, however, at the present day, is not an insurmountable difficulty. In such a solution, instead of the zinc-sodium sulphite accompanying the sodium hyposulphite, we should, of course, have only sodium salts, none of which would be likely to cause any trouble in the direction mentioned, unless, perhaps, it be the thiosulphate. This, however, would, we think, require the presence of some free acid, other than hyposulphurous or sulphurous, to cause any deposition of sulphur during the period of development, although it is not quite safe to predicate what might or might not occur with the oxidation of the liquid.

At least the experiment is worth trying. I some months back obtained very promising results with the crystallised hyposulphite, and only relinquished my experiments in consequence of the trouble involved in its preparation. I have more recently been induced to take the matter up again, and shall probably have more to say on the subject at no distant date.

The advantages to be anticipated in the use of such a developer are, chiefly, cleanness of action, freedom from stains, and good quality of image, together with most excellent keeping properties in the solution itself. For be it understood, although the hyposulphite itself may quickly revert to its former condition of bisulphite, its extraordinary preservative action upon the pyro or other reducing agent protects that from oxidation, so that it is not impossible that a stock solution of pyro may be made which only requires the contact with zinc or sodium to supply it with energy without the addition of alkali.

But, beyond these, I believe a far more energetic developer for short exposures may be the outcome of the inquiry, while the possibilities that surround an acid developer form as yet entirely new ground.

I see in last week's issue, in the report of the Photographic Society's meeting, that Mr. Chapman Jones has pointed out the fact that amidol is capable of development in the acid state. This is one of the points on which I have been relying in my search for a more energetic developer, but the bad weather and the state of my health have not allowed me to pursue my experiments recently. Amidol, like pyro, is incapable of development alone, but both in the presence and with the assistance of a sulphite even if acid, possess developing power. How far the vastly greater reducing action of sodium hyposulphite will work in with amidol to make it *really* the most energetic developer extant remains yet to be seen, but from what I have observed already amidol seems to offer a far better look-out than pyro, and to work in a more cleanly manner than the latter in the combination.

W. B. Bolton.

* Concluded from page 117.

ON THE TONING OF SOLIO PAPER.

[Photographic Club.]

I HAVE thought that, instead of giving you a paper on the combined toning and fixing, it would be preferable to give you a few hints on the general toning of Solio paper, in the manufacture of which I am personally interested.

We have now arrived at that point where the new printing-out paper is no longer in the experimental stage. It is largely used by the best photographers, both here and in America, and all speak in glowing terms of its superiority over albumen. This dear old friend albumen has had its death-bell tolled many a time before—certainly it has been the case every year during the last ten years—and yet it has lingered on, dying hard at the last. I think every one must see around them that albumen is giving place not only to the new printing-out papers, which must resemble it in appearance, but also to platinotype, bromide, and kindred processes.

As this is to be a practical paper, I do not intend to dwell too much upon the *pros* and *cons* of the process. With this paper we have the greatest range of tones that the most fastidious can desire. Of course, as with albumen, it is of the first importance to have a good negative. Having secured this, it is easy to secure a good print; but there is no doubt that with the new printing-out paper there is a far greater range to be obtained than with any other process. We have also at our command the capability of giving to our prints either a glazed or dead matt appearance with but very little trouble.

On the question of permanency, there can be no doubt there is a greater chance of achieving this than with albumen, which we all know is so liable to go wrong; but to attain this, as with all photographic manipulations, it is necessary that due care be exercised with the various stages through which the print has of necessity to go. To say that a Solio print is absolutely permanent would be taking a great responsibility upon myself, for in this mortal world of ours anything on paper could not be so; however, I will say we can obtain a reasonably permanent result. The fading of prints is, I believe, more often caused through unsuitable mounts and bad mountants than through any inherent defects in the prints themselves.

As with all new processes, it is necessary that we take some trouble to understand the little peculiarities incidental to its working; and, when these are once mastered, you will be surprised at the simplicity of the whole thing. In the printing paper before us we have chloride of silver, in conjunction with a definite organic salt of silver, held in suspension in a vehicle composed mainly of gelatine, and this is coated on a paper with a baryta surface, which prevents it sinking into the fibres of the paper, and we have a more brilliant print, and the elimination of the hypo is more easily effected. To get even prints, and to prevent uneven toning, it is absolutely necessary that the paper should not be allowed to become damp before printing, and, when separate toning and fixing baths are employed, care should be taken that the hands are not contaminated with hypo during the preliminary washing and toning, otherwise red stains will inevitably be the result.

As this paper is peculiarly susceptible to a diffused light, great care should be exercised in handling it in a very subdued light, both before insertion in the printing frame and during examination of the print, otherwise the high lights and purity of the resulting picture will soon be destroyed. It is not necessary to carry the prints to such a depth in printing as is the custom with albumenised paper, as the loss is not so great in the subsequent toning and fixing.

Now we come to the all-important question of toning. What bath shall we use? I think the first to engage our attention is the combined toning and fixing, about which there is such a divided opinion as to the permanency of the prints produced from it. There certainly is a distinct charm in the use of a combined toning and fixing bath, especially as no previous washing is required, the prints being taken direct from the printing frames and immersed in the one solution. There are amateurs who do not, and will not, use separate fixing and toning baths when there is one to be had that will do everything that is required in one bath. As long as too many prints are not toned in one bath, there is no danger of less permanency than with any other bath; but, if the gold is exhausted, the toning proceeds with the lead, and probably sulphur also, in which case the prints *may* possibly change, but I do not think they would fade. The chances are they may become darker, especially should there be any sulphur in the atmosphere, and I fancy there is a good deal in London. This will probably attack the lead, and form sulphide of lead. The opinion of any chemist here to-night on this matter would oblige. I have prints here which have been standing about on the mantelpiece of my sitting-room for over six months, and show no signs whatever of any change.

The formula recommended by the Eastman Company is as follows:—

Stock Solution No. 1.

Hypo	6 ounces.
Potash alum	1½ „
Sodium sulphate (Glauber's salts)	4 „
Water, make up to	60 „

First dissolve the hypo and alum in the water, then add the sodium sulphate.

Stock Solution No. 2.

Gold chloride	15 grains.
Acetate of lead (sugar of lead)	50 „
Water	7½ ounces.

Note.—An orange precipitate is formed in No. 2 solution, which, however, redissolves on its being added to the No. 1 solution.

To form a combined bath take of—

Stock solution No. 1	8 ounces.
Stock solution No. 2	1 ounce.

Do not use until the mixture has become quite clear.

In all solutions composed of hypo and alum it will be found that there is always a slight white precipitate. This, however, does not interfere with toning. This bath is very useful indeed for giving soft prints from hard negatives. It is not advisable to attempt to produce purple or black tones with this bath.

For those who prefer a separate toning and fixing bath, and one that will produce warm black tones, there is nothing better than the sulphocyanide bath. In order to have this bath under greater control, the addition of acetate of soda is of very great advantage; not only does it slow down the toning action, but the prints are not so liable to take that very objectionable blue surface tint which sulphocyanide, *per se*, is so apt to produce; the tones of the prints can be more closely watched. Where possible, it is certainly better to tone by daylight rather than by artificial, as with the latter it is far more difficult to watch the various changes of tone. Of course it must be done in very subdued light. As I said before, no hypo must come anywhere near the prints during the toning, otherwise the prints will be irretrievably ruined with red stains that will refuse to tone.

Owing to the softening action of sulpho-cyanide on the prints, they should be washed in two changes of water, and then passed through a bath of alum water (alum half an ounce, water twenty ounces). After this they should be well washed in three changes of water, and then placed in the toning bath, as follows:—

Stock Solution A.

Sodium acetate	600 grains.
Water	20 ounces.
Gold chloride	15 grains.

Stock Solution B.

Ammonia sulphocyanide	50 grains.
Water	20 ounces.

For use, take of A two ounces, B two ounces, water four ounces. Allow to stand one hour before using.

The toning may be stopped at any stage by immersion in a bath of salt:—

Common salt	1 ounce.
Water	32 ounces.

For securing still greater control and regularity of toning, it is advantageous to use two-thirds of an old bath and one-third of a new one, omitting the water.

After removal from the salt bath, the prints should then be transferred to the fixing bath. This should not be made too strong.

Fixing Bath.

Sodium hyposulphite	3 ounces.
Sodium sulphite	1½ „
Water	20 „

The addition of sulphite is to preserve the purity of the tones.

There are some amateurs, in contradistinction to those who will have the greatest simplicity, who prefer formulæ of the greatest complication (take, for instance, some of the developing formulæ published), and it is for these that I bring forward the following not too complicated method of toning, in two toning baths, the second being a toning and fixing combined.

First tone very slightly indeed to a light brown in the following the prints having been previously washed, as usual):—

Potassium chloro-platinite	5 grains,
Sodium chloride	40 „
Citric acid	40 „
Water	20 ounces,

and immediately transfer direct to the combined toning and fixing bath as first mentioned in my paper until the desired tone is obtained. This produces tones of a rich, warm black; but, if purple tones are desired, tone first in the sulphocyanide, and then follow with the combined bath. Certainly the tones produced by it are very fine.

Where prints are desired of a nice sepia, tone a little deeper in the platinum bath, and fix as usual in the ordinary way. Care must be taken not to go beyond the brown stage. Prints produced in this platinum bath only are best finished off with a matt surface. As my paper is intended to be devoted to toning only, I will leave the subject of finishing, &c., to some other member to take up.

J. B. B. Wellington.

DEVELOPMENT OF ROLLABLE FILMS.

Before the Putney Photographic Society on Monday, February 20, Dr W. J. Sheppard in the chair, Mr. J. B. B. Wellington, of the Eastman Company, gave a demonstration on *Development of Rollable Films*. In a short preface he gave a history of the improvements of these films, culminating in those manufactured by the Company at the present time. The chief advantages claimed were extreme lightness, portability, and the convenience of being able to carry 100 exposures, very great advantages when travelling. Having brought a roll of exposed films, Mr. Wellington showed how very plainly their new roll-holder marked the divisions between the exposures, thus getting rid of a difficulty which had been experienced with the earlier patterns. Proceeding with the demonstration, he first soaked the films in water, which certainly caused them to lie quite flat during development. At least a dozen films were treated simultaneously, being placed face downwards, and care taken to keep them constantly moving by transferring those from the bottom to the top, in the same way as prints in a toning bath. This treatment is essential to ensure even development. The developer used was the pyro-soda recommended by the Company. Mr. Wellington stated that, in cases of under-exposure, better results would be obtained by long development than by increasing the quantity of soda. After development, the negatives were rinsed and placed in an acid and alum clearing bath, washed thoroughly, and fixed. The final washing completed, the films were placed face downwards on an opal slab or glass plate, and squeegeed to get rid of the superfluous moisture. They were then pinned down at the corners and allowed to dry spontaneously. The best way to store them was under pressure between the leaves of an album or book. During the discussion, Mr. Wellington stated that various marks which undoubtedly occurred in their films some time ago would not now appear, as great improvements had been introduced in their manufacture.

THE STEREOSCOPE AND STEREOSCOPIC PHOTOGRAPHY.*

No doubt some persons will at first find considerable difficulty in combining the two pictures when they have been mounted in this way, and this is because, as a rule, the eyes have a greater tendency to a near convergence than to a more distant one. When this is the case, the lenses of the stereoscope, if they are adjustable for separation, should be separated slightly until the pictures can be combined, and then slowly brought together again to the required positions. If the lenses are not movable, the best plan will be while looking through the stereoscope to push back the pictures as far from the lenses as the instrument will permit, and it will be found that while this is being done they will appear to approach one another. When they are apparently superimposed, pull them forward again slowly, and if the eyes are kept intently fixed upon them while this is being done, they may be drawn forward until the view is seen quite sharply without appearing to separate again. In many of the cheaper forms of stereoscope, instead of a pair of lenses, the two halves of a single lens are employed mounted so that their thin edges are together. Whole lenses are preferable, but they must be of equal focus. Sir David Brewster recommended the use of halves of a single lens, not only in the stereoscope, but also in the binocular camera, for taking the photographs, because of the difficulty of obtaining two lenses of equal focus. He contended that it was impossible to obtain the necessary mathematical accuracy unless this was done; but, whatever may have been the case then, there is no difficulty now in obtaining lenses that are sufficiently accurately paired for all practical purposes.

* Concluded from page 138.

The earlier stereoscopic photographs were taken, as you are no doubt aware, with a single camera and lens, the apparatus being moved a suitable distance between the exposures; and if it is not desired to photograph moving objects, this plan may still be adopted. It is not necessary to move the whole camera and stand. All that is required is that the tripod should have a rather larger top than usual to permit of the camera being slid about three inches between the two exposures. Even this is not absolutely necessary. Mr. Traill Taylor has pointed out that it is sufficient if the camera be slightly rotated after the first exposure. I have tried this myself, and find a very slight rotation is all that is necessary; but I would not recommend this method in preference to the use of a divided camera and a pair of lenses. This is no doubt the apparatus that all those will use who, like myself, wish to obtain their results with the greatest ease. Such a camera may be used either in the hand or upon the tripod, but in either case it must possess several good qualities in order to be satisfactory in use. If it is for the tripod it should have a swing-back and rising front, and some means of adjusting the separation of the lenses. It should open out to focus when eight or nine inch lenses are required to be used, and close into three inches or less when a pair of wide angles are necessary. If it is to be used in the hand, many of these advantages may be sacrificed to lightness and portability; but special attention should be directed to the shutter and the view finder. In both forms it is, above all, necessary that a good spirit level should be fitted, and careful attention paid to its use, for although in a single photograph we may easily trim the top and bottom to correspond with the horizon line, it will be found not nearly so simple a matter to counteract the effect of carelessness in this respect in a pair of stereoscopic pictures.

Opinions are somewhat divided as to the size of plate that it is desirable to use. Personally, I think that the advantage of a plate larger than the standard size, $6\frac{3}{4} \times 3\frac{1}{4}$, will not often be found, but I must tell you that some gentlemen of very great experience recommend a larger. Mr Traill Taylor advises 8×5, which certainly permits a greater separation of the lenses when it is desired. Other sizes which may be used are $7\frac{1}{2} \times 4\frac{1}{4}$, $6\frac{1}{2} \times 4\frac{3}{4}$, and $6\frac{1}{2} \times 4\frac{1}{4}$. It is generally conceded that for all ordinary purposes of stereoscopic photography a pair of single lenses will answer equally as well as the more expensive doublets, even disregarding the somewhat theoretical advantage of the former of giving greater brilliancy because of the smaller loss of light by reflection. But, of course, where a large angle of view has to be included, a pair of short-focus doublets will be necessary, and there will be a slight gain in the use of doublets where it is desired to obtain the maximum amount of definition with a large aperture of lens, as, for example, in photographing moving objects.

It will be found that those pictures which have been taken with lenses of about five-inch or six-inch focus, present in the stereoscope the most natural appearance, and for this reason, that the eyes of the observer are then placed at about the same distance from the pictures as the lenses were from the plate when the view was taken, viz., about five or six inches, and the perspective therefore coincides with what we observe in nature.

If shorter focus lenses are used, as they must be for many subjects, then the perspective is bound to appear somewhat exaggerated, and objects will appear smaller than they should do.

It may be suggested that for the examination of these pictures lenses of short focus should also be employed in the stereoscope, and I know of no reason why this should not be done. The amount of separation that there should be between the lenses by which the photographs are taken has been the subject of much discussion. Three to three and a quarter inches is the usual distance, but I am of the opinion myself that it should not so much exceed the distance between the centres of the eyes, usually about two and a half inches; and it will be found that if a very near object, eight or ten feet away, is photographed with a greater separation than this, a strained and altogether unnatural appearance of relief will result when the pictures are seen in the stereoscope. Of course, if it is desired to represent distant objects with the relief due to those near at hand, it is necessary that the points of view should be very widely separated; but, if it is desired merely that the pictures when seen in the stereoscope shall present the same appearance as the view itself presented from the position at which the photographs were taken, then the rule may be laid down that for an ordinary landscape with near foreground the distance of separation should not be more than three inches nor less than two and a half inches.

As a stereoscopic camera makes its two pictures independently by separate lenses, it will be seen that each picture is inverted independently of the other. Therefore it is necessary, if the negatives are to be printed from by contact, either to divide and transpose them before printing or to divide and transpose the prints, unless each end of the negative is printed from alternately. Which is the most convenient way will depend

upon whether it is desired to make prints upon paper or transparencies upon glass. If paper prints are wanted, then it is generally recommended to print from the two negatives in the usual way on to one piece of paper, and when the toning, fixing, washing, or other processes have been gone through, and the prints are dry, to divide and transpose them, mounting the print which appears on the left-hand side, as they lay together on the table before you, on the right-hand side of the mount, and the right-hand print on the left-hand side of the mount.

If it is glass transparencies that are required, then it will be found easiest to print alternately from each of the two negatives; that is, to print from the left-hand negative on to the right-hand side of the transparency plate, and from the right-hand negative on to the left-hand side of the transparency plate. By means of a printing frame which is specially constructed for this purpose, and which may be procured from any dealer in photographic apparatus, and by using with it a set of cardboard guides, such as I have here, and which you may easily make for yourself, this may be done rapidly and easily.

Care must be taken that each of the pictures is given an equal exposure, and I find, myself, that this may be done with sufficient accuracy by burning one inch of magnesium ribbon at a measured distance from each negative. Stereoscopic transparencies may be made in this way that will be good enough to satisfy the most particular; but there is another way in which they may be produced that is, perhaps, superior in some respects, and is equally convenient when the work can be done by daylight. This is by copying the negatives with a divided camera, and a pair of short-focus lenses. This method obviates the necessity for transposing the pictures, for each negative is independently inverted by each lens, just as the picture itself was inverted when the view was taken. Another advantage of this method is, that one is able to arrange, with the most perfect accuracy, the desired distance of separation between similar points in the two pictures, which it is practically impossible to do exactly when they are printed by contact, owing to the fact that the glass of the negative and the glass of the transparency plate is seldom cut to the exact size. It is hardly necessary to mention that, when this way is adopted, the pictures may also be slightly enlarged or reduced in copying if it is desired. It is not necessary to have a special copying camera for this purpose. The camera and lenses with which the pictures were taken will answer almost equally well if it is attached to a board, at the end of which the negative is supported in a divided box. The arrangement which I use myself is, as you see, made on this principle.

The effect of a stereoscopic picture is very much enhanced if, when it is seen through the stereoscope, it presents the appearance of being viewed through an opening. This may be produced in a transparency by having the openings in the mask at somewhat nearer centres than are the pictures themselves, and with paper prints by so trimming them that, when they are mounted, there is a little more of the view on the left-hand side of the left-hand picture than there is on the left-hand side of the right-hand picture. The reason why doing this should cause the picture to appear as if it were viewed through an opening will be seen if it is remembered that we estimate the distance of an object by the amount of convergence of the optic axes necessary to see that object, which becomes greater when the object is near at hand than when it is remote. The openings in the mask, being at nearer centres than the pictures themselves, are seen with greater convergence, and consequently appear some distance in front of them. The same may be said of the edges of paper prints; when they are at nearer centres than the pictures, the mount appears to be in front of them.

The amount of separation determined upon between the centres of the pictures should, for the reasons I have before mentioned, always be measured between two similar points in the distance, altogether disregarding the foreground; and here I am sorry to say that I find myself at variance with a gentleman who has by his persistent advocacy done a great deal in the last year or two towards bringing the stereoscope into favour again, Mr. Chadwick. In his *Stereoscopic Manual*, in which will be found much practical and useful information, he says: "It must be observed in these instructions that in all measurements it is the foreground which must be taken into account, and the distance will take care of itself." I claim that what should be done is the very reverse of this. All measurements should be taken between similar points in the distance, and the foreground will then take care of itself. The foreground must be right if the distance is correctly placed.

The difference may be a small one, and it may be that when Mr. Chadwick's instructions are intelligently followed the results will not be greatly different.

There is, however, this to be said. If a view was taken in which was included a very near foreground indeed, it is quite conceivable that if Mr. Chadwick's instructions were followed we might find similar points in the distance so widely separated, that for the images of them to fall on corresponding points in each retina the optical axes would have to diverge if the pictures were examined in a stereoscope of the usual pattern.

It should always be remembered that the stereoscope shows us its most remarkable effects when the photographs that are seen by its aid are placed at such a distance of separation that they are seen with the same convergence of the optic axes as the actual view itself was from the position of the camera in taking them, and when the lenses of the stereoscope are of such a suitable focus that the pictures are seen sharply, clearly, and easily at a distance from the eyes equal to the focus of the lenses that produced them. When these conditions are complied with, and they will be complied with if the methods I have indicated are adopted in the production of the photographs, then it is impossible to imagine a more perfect realisation of the view represented than that which will be seen when the pictures are examined by the aid of a suitably adjusted stereoscope.

J. A. Butler.

A CHAT ON LENSES.

[Before the Photographic Section of the Croydon Microscopical and Natural History Club.]

On March 3 Mr. W. Low-Sarjeant delivered *A Chat on Lenses*. After a brief explanation of the elementary laws of optics, Mr. Sarjeant described the properties of the six varieties of lenses, and also of a seventh, called a "crossed" lens (a double convex lens, having its two curved surfaces of different radii).

In photography, the use of a lens composed of a single element was attended with two great disadvantages, viz., chromatic aberration, or the non-coincidence of the visual with the chemical focus, shown by a want of definition in the photograph; and spherical aberration, producing a similar result, owing to the rays of light passing through the margins of the lens intersecting at different points instead of at one and the same point. The first-named was corrected by the addition of another element with a different refractive index (crown and flint glass were the two elements commonly used), and the latter by the addition of a second lens, reversed, to correct the aberration of the first, as in a rectilinear combination; or it could be practically eliminated in the single or landscape lens, by using a diaphragm of relatively small size compared with the diameter of the lens.

The purpose and uses of the stops were then explained. With a single lens, owing to the office performed by the stops, it was advisable to focus with the same stop it was proposed to use in exposing.

The focal length of a lens was measured from its optical centre, the position of which, in the several forms of lenses, was shown by diagrams. To find the focal length of a lens—information often desired for various purposes—several methods of obtaining an approximately correct result were given. Focus a distant object in the camera, and the distance between the screen and the optical centre of the lens would be, roughly, the focal length; or, focus some object, getting the image the same size, and the distance between the screen and the object would be about *four* times the focal length.

The comparative advantages of the use of long and short-focus lenses were then discussed. A long-focus lens was most suited for ordinary outdoor work, as the natural proportions between near and distant objects was better preserved in the photographs taken with it.

The "chat" was illustrated by a large number of diagrams, and was listened to with much attention by the members. The questions which were afterwards discussed showed that they had been enlightened on many hazy points, and would, consequently, be enabled in the future to use their lenses to better advantage.

PRACTICAL REMARKS ON LANTERN-SLIDE-MAKING.

[Dundee and East of Scotland Photographic Association.

At the fag-end of a meeting last session, Mr. Baird passed through the lantern for me a number of my slides, interesting chiefly because made by some of the less-used processes; and, as I have been repeatedly asked by members of the Society to show them again, I have extended the idea somewhat, and pose to-night rather as an experimentalist than a practical slide-maker.

When I take up a process, I generally keep at it until I have made what appears to me the most of it; in any case, I never stop short of being able to produce presentable results by it. In many instances I have gone on until such time only as I had mastered the process and produced one or two slides by it. It frequently happens that a process may be capable of giving very fine results at times, and yet not such a process as one would care to work constantly. In such cases, it is excellent practice to make a small study of the subject, and after attaining success to "leave it for fresh fields and pastures new."

You will please understand, therefore, that the slides which are to be shown you are not shown as models of what slides ought to be, but merely as fair specimens of the various processes they are to illustrate.

Almost every process requires (if one is to make the most of it) a

special quality of negative. It follows from this that I have had to pick out from my negatives one suitable for the process in hand rather than one artistically good. Let no one, therefore, go away, saying there is nothing special in this slide or that slide; the production of a pretty picture was not always the aim of the experiment.

While, therefore, safeguarding myself against the imputation of putting these slides forward as being something specially fine, I, nevertheless, claim that they represent fair average work of the various processes touched upon, and such as any one designing to work any of these processes may attain to, with the moderate care which the average amateur bestows on his work.

As to the precise practicability in every-day work of these out-of-the-way processes, I will speak more particularly later on. My remarks will apply to slides in collodion wet and dry (but not with collodion emulsion, with which I have done very little), carbon, gelatino-chloride, gelatino-bromide, powder process slides, Alpha and albumen. I include the better known processes for comparative purposes.

As conclusion to this introduction, I may say that most of the slides have been made quite recently, that is to say, I have prepared the most of them to refresh my memory for, and to serve as illustrations to this, paper.

Collodion Slides.

With the exception of slides done by the Woodburytype process, collodion is the process adopted by probably ninety-nine per cent. of the professional slide-makers. It seems absurd, therefore, to include this as one of the "out-of-the-way" processes. It is so, however, in reality as far as the amateur is concerned. From time to time attempts are made to show how simple the whole thing is, and how unobjectionably simple it truly is, but not unobjectionable. What are the claims made on behalf of the collodion slide? They are these:—First, absolutely pure high lights; second, vigorous shadows; third, good gradations; fourth, agreeable colour. These good qualities a collodion slide generally has, but there is one good quality which a slide ought to have which the vast majority of collodion slides have not, that is, transparency in the shadows. I maintain that with *suitable* negatives gelatino-bromide does come within measurable distance of a collodion slide with a tithe of the trouble. To test this point, we will ask Mr. Baird to place the two slides marked 1 and 2 in the lantern. No. 1 is a collodion slide by Wilson of Aberdeen, a master of the art of slide-making; No. 2 is a gelatino-bromide slide from one of my own negatives on a commercial gelatino-bromide plate.

I maintain, and I think you will agree with me, that, while there is a difference, the collodion slide is not immensely better. If collodion cannot do *very much* better than gelatino-bromide, I hold that, to the amateur, the extra mess and trouble simply exclude collodion.

My remarks heretofore have related to wet collodion, but very fine slides may be made on dry-collodion plates, bath prepared.

Slide No. 3 was made as follows:—A plate of glass was cleaned, and coated with collodion, dipped in a bath of silver thirty grains to the ounce, and then washed, flooded with an infusion of pure coffee, and dried. After exposure under a negative to gaslight, the transparency was developed with acid pyro and silver. It came up the colour you see it, no toning being necessary. Of course, it was fixed in hypo.

Various preservatives, other than coffee, may be used, and different colours obtained in the slide. An infusion of tea gives a brownish tint, and tannin gives a very fine purple-blue—better, I think, than a wet-collodion plate toned with a sulphide.

I sometimes wonder why it is that dried bath plates are not supplied by the dealers. They are extremely easy and certain of preparation, would compete with gelatine plates in cost, and, preserved with a solution of albumen, are hardy enough to stand pretty rough handling.

My best collodion slides have been prepared by this dry method. I selected this one to show the peculiar colour got by a coffee preservative. For those who care to try the collodion process, I would advise a preservative of ten grains of tannin, and ten of sugar candy, to an ounce of water. Plates so prepared give excellent slides.

Carbon Slides.

We pass on now to the consideration of carbon slides. Carbon is said to be *the* process for producing slides of the two extremes—best and worst. I must say that no process in photography came so near to going up my back (as the saying goes) as the production of carbon slides. The Autotype Company, in their manual, say that *very fair* slides may be produced by the carbon process. I think that this is over-modestly stated. Of course, a good deal depends upon what qualities one likes in a slide; but, for myself, I only wish I could produce all my slides in carbon.

Scattered throughout photographic literature are articles on the production of slides in carbon without number. According to most of the writers, it is an easy process, according to all a beautiful one. To read the commonplace and general directions given would lead one to suppose that mistake was impossible. Methinks some of those who have written on the subject have never made carbon slides. I cannot give you a better idea of the troubles one may meet, and how they may be overcome, than by giving you a short history of my own experience.

When I first determined to try the making of carbon slides, I was even then a fairly efficient printer in carbon, and had plenty of material by me. I had no special transparency tissue, it was true, but had I not read again and again that ordinary tissue would do excellently—indeed, in some cases, better than the special transparency tissue? I made the experiment. Result, universal flatness and weakness. I tried a denser negative. Improvement, but not much. Then I would intensify the slide. How I laboured at this! At last, after a great many failures, I got one good picture. Mr. Baird will show it as slide No. 4. This slide, after development, was soaked in an infusion of logwood, lightly washed, and soaked in a weak solution of sulphate of iron.

The great trouble in this staining process is this, that, do what you will, your high lights take on the stain. I am aware that, theoretically, the high lights in a carbon slide ought to be bare glass; but, practically, there is an imperceptible skin—enough, when stained, to spoil the slide.

The picture on the screen is absolutely the only one I ever got with pure high lights by this staining methods. I then sent for the special transparency tissue, and wish I had done so at first.

The special transparency tissue carries much more pigment, and pluck and density are now with suitable negatives quite possible.

My method of producing carbon slides is as follows:—I cut a dozen or so pieces of tissue by means of a tin shape to exactly three and one-eighth inches square. I make a solution of bichromate of potash, one ounce in thirty ounces of water, and place the tissue in this—"over the head," so to speak. When they are quite soft and limp I take them out one by one, and place them face down on a piece of plate glass, and by means of a roller squeegee drive off the free solution hanging about them. I then take them from the glass, and place them face up on a blotting pad. Upon this they are placed in a locked press, and in the morning they are generally dry and ready to print. Much stress is laid upon the rate of drying, and being in a room free from fumes of gas. Working in this way, I have never had any trouble, and even in a moderately small press, if it is not damp, the tissue will dry in a night's time, and be out of the way of light, fumes, or any other injurious influence. I have never found it necessary to dry the tissue on collodion plates. In the morning the tissue is printed under the negative. In mounting the tissue on the glasses for slides I had two troubles. First, the tissue would sometimes wash up and, secondly, air bells would get between the tissue and the glass in spite of everything I could do. I cured these faults as follows:—If the glasses are thoroughly scoured with a clean rag and common whiting under the tap, and the surface not touched again with anything under the sun till the tissue goes on, it will stick like glue. As for the air bells, mount the tissue on the glasses under water which has been heated and then allowed to cool, and there will be no more trouble. *En passant*, I may say that to those who are annoyed with air bells under their gelatino-chloride prints the same method will put an end to their troubles.

In developing carbon slides, beware taking too hot water to them. I am convinced that we would hear less of reticulation if more caution were used in this particular. As I am making no pretence to a complete guide to carbon slide-making, I content myself with these few practical remarks on the process. Even a suitable negative (and too much stress cannot be laid upon this), carbon slides, in my opinion, cannot be beaten. If it be asked, What is the special kind of negative? the answer is, that the negative must be extremely dense, with good gradation and very clear shadows. A hard black and white negative useless for any other process is about the thing for a carbon slide.

I may say that transparency in the shadows is the chief virtue in a carbon slide as against the other processes. Mr. Baird will pass through one or two carbon slides unstained.

Gelatino-chloride and Bromide.

I have little to say on the gelatino-chloride slide. Altogether, I have not used more than four or five dozens of this plate, and, while the results were generally very fine, the developers were a pest to make up, besides being somewhat expensive. The variety of colour is very considerable, but not very thoroughly under control—at least, that was my experience. I was not so much taken with the process as to take to it as a standard method of slide production. Mr. Baird will show a few on the screen.

As to gelatino-bromide, that being the general method of slide production in use by the great bulk of amateurs, I would make a few general remarks only. In the first place, given a good negative, I have produced first-class slides by almost every advertised brand of lantern gelatino-bromide plate. At this moment, if I had to produce a slide specially fine, I would only stipulate to have the information of the maker's name. I have gone into this question pretty thoroughly, and am convinced there is little to choose between the various brands—I mean in the possibility of getting good slides from them. When I hear many complaints about bad plates, I always feel inclined to ask for a sight of the negatives which are being printed from.

There is a very widespread idea that a good slide can be made from any kind of negative by simply timing the exposure properly. This, I think, is erroneous. If you want clear, sparkling, high lights with rich luminous shadows, you must have a tolerably vigorous negative with the necessary gradation in it.

However it comes about, I find I get better results by intensifying my negatives first. I bear this in mind in development, of course, and am content with a somewhat feeble image. I think I see all through better what I am doing this way. So long as you can see easily through

the plate during development you are not working in the dark, but long before the negative is thick enough to do without intensifying the most of the plate is absolutely opaque, and you cannot tell how far the process has gone, perhaps much further than you want. I think the great secret of slide-making is in having a good negative. To keep up a kind of consistency, Mr. Baird will pass a few gelatino-bromide slides through the lantern.

The Powder Process.

The next process upon which I would make a few remarks is known as the powder process. I am not aware that any one actually makes his slides by this process; but, as it has a certain interest and is an exceedingly beautiful process, I have made a fresh slide and will say a few words on the subject. To those who do not know anything about it, I may briefly say that the process is this:—A clean glass slide plate is coated with a watery solution of gum arabic honey, and bichromate of potash. The plate is dried on the top of the dark-room lamp, and immediately exposed to daylight under another transparency. After a variable time depending on the light, from twenty seconds in direct sunlight to minutes in the shade, the plate is taken to the dark room, removed from the frame, and a small quantity of impalpable powder placed upon the surface. A fine soft camel's-hair brush is now used to spread the powder over the plate, and in a few minutes it will be observed that the powder begins to adhere to the surface of the plate in an irregular way, in fact it is a picture that is being developed. The explanation of this apparently extraordinary phenomenon is simple enough. The solution of gum arabic and honey is ordinarily very much prone to absorb water from the atmosphere and become sticky. When the bichromate of potash is added to it and the sun acts upon the mixture, it loses this property of becoming sticky. It follows from this that a plate coated with the mixture and exposed under a transparency loses its adhesive nature in proportion to the effect of light upon it, so that those parts exposed to the sun take on no powder but remain pure glass, which makes your high lights on the contrary, the shadows having been protected from the light room get adhesive when exposed to the air and hold on to the powder when it is brushed over it. Since a transparency must first be produced by some other means, the powder process would seem to be "a round-about road for a near cut;" but do not forget that a powder picture is first permanent; second you may develop at one part and leave another soft and hazy; and, thirdly, you have absolute control over the colour.

Having nothing else beside me at the time, I developed the picture shown with common soot from the chimney, which, as you will see, gives a kind of sepia tint. If any of you have not worked this beautiful process, let me urge upon you to spend some of your spare time upon it when the light gets good. I can promise you a real "eye-opener," as the Americans would say, when you see the picture develop the first time. It is simply astonishing. Please do not judge the capabilities of the process from this specimen. When I was working at it three years ago, I made two or three dozen of beauties, but have since given one away here, and another there, till I had not one slide left. I had, therefore, to make this one, and one cannot be expected to turn out a perfect slide at the first shot. Plumbago is often used as a developing powder; to my mind it gives an unpleasant colour to a transparency. There used to be sold a powder for this process, for the production of burnt-in enamel—just the very thing for transparencies. I wish I could have shown you a transparency developed with it—a beautiful, rich, soft photographic purple. I do not, for a single moment, imagine that any one would adopt the powder process as a regular method of making lantern slides, but a trial of this beautiful process would well repay the time and trouble spent on it.

Alpha Plates.

I have done a good deal with Alpha plates, and like them immensely. I have two practical hints to give which might be of service to those intending to try them; and the first is, that a very much softer and superior image is developed with carbonate of potash and hydroquinone than when the caustic soda is used. The second point is, that superior tones are got by simply adding a little gold to an alkaline fixing bath than by using a separate toning bath, or even the combined toning and fixing with sulphocyanide.

I had intended to say something on albumen slides; but it occurs to me that already this paper is long enough, and the days of albumen too long past to be of much interest. It is a difficult process to work, but yields magnificent results; not, however, better than some of our modern processes, which are infinitely less trouble.

In conclusion, the opinion which I hold at the present time is that, for the amateur, commercial gelatino-bromide in skilful hands is everything that can be desired for cold tones. If warm tones be required, let him make his negatives suitable for carbon, or, failing that, use Alpha plates. I have already said that I attach ten times the importance to the negative that I do to the method of slide-production.

J. K. Tulloch, M.B.

BLACKHEATH CAMERA CLUB EXHIBITION.

This Exhibition was held on Friday and Saturday, March 3 and 4, the Judges being Messrs. Cembrano and Pringle, and the Rev. F. C. Lambert. In the Members' Class Mr. E. Hawkins took the silver medal for *Autumn at Frognal*, in which, to our thinking, the effects were more wintry than autumnal. Mr. A. W. Young's bronze medal for *An Interior* was honestly earned, lighting, exposure, development, and printing of the subject combining to produce a technically faultless photograph. Mr. W. F. Butcher's Parisian enlargements, Mr. Sydney Spencer's small Swiss views, and Mr. Henry Sandland's animal studies, lent excellence to a class which is generally most in need of it. In Class C (open; landscape, seascape, &c.) Mr. Spencer obtained honourable mention for some small Zermatt Valley views, in which the detail and truth of gradation were very noticeable. In the same Class Mr. F. L. Parsons showed the *Blowing up of a Pontoon Bridge at Tewkesbury by a Torpedo*, the fragments being cleverly caught. We liked Mr. Leslie Selby's view of a corner of *Greenwich* as showing what good pictorial effects may be often secured out of unpromising materials. A bronze medal went to Mr. S. J. Beckett for *Gudvanger, Norway;* he also showed several of his Hackney exhibits. We admire the tastefulness Mr. Beckett displays in his mounting and framing. Mr. H. E. Farmer's Rochester Cathedral views struck us as being a little chalky. Mr. Charles Moss obtained honourable mention for a capital little *Surrey Brook* meandering across a well-selected bit of landscape, the silver medal going to Mr. T. M. Brownrigg for a *Winter Sunset on the Shore*, quite in the style of Mr. Gay Wilkinson. In Mr. Brownrigg's *Early Morning on a River*, however, the sun seemed uncommonly high in the heavens.

In Class D, Mr. H. W. Bnsbridge's *Portraits* were uncommonly good, and Mr. Bhedwar's *Fair 'Fruit-seller* and *To Think and Ponder When Apart* were in his best style. For the first-named he received a silver medal.

The bronze medal was gained by Mrs. S. Frances Clarke for a charming study, *Sympathy*, one lady condoling with another over the intelligence contained in a just-opened letter. The attitudes of the figures were capital, while the facial expressions were perfect. We should be inclined to regard this delightful picture as by far the most meritorious in the Exhibition. Mr. C. F. Archer's *Grandpa* was a most natural study of a venerable old gentleman.

In the class for hand-camera work, Mr. J. H. Anderson secured the silver medal for some river views printed on rough paper, and Mr. W. Thomas the bronze for similar subjects. The class was small but good.

The gold medal in the Championship Class went to Mr. B. Gay Wilkinson for *The Peaceful Evening Hour*, the class including Mr. Tavener's flower studies, Mr. Byrne's portrait of Dr. W. C. Sellé, Mrs. Clarke's *Aha!* Mr. Warncuke's Pall Mall *Portraits*, Mr. F. W. Edwards *Westminster Abbey*, &c., Mr. Brownrigg's *Storm on Derwentwater*, Mr. Lord's *How's That?* several of Mr. Dresser's, Mr. Gear's, Mr. Ralph Robinson's, Mr. Bhedwar's, and Mr. C. Court Cole's pictures.

In the Open Lantern Slides Class the awards were Mr. Brooker (silver medal), Mr. George E. Thompson (bronze), Mr. E. G. Lee (hon. mention); Mr. Hawkins (silver), Mr. Field (bronze) being successful in the Members' Class. The loan collection of pictures comprised a large yacht picture by Messrs. West & Son, several of Mr. Birt Acre's Barnet Fair cattle studies, and the ubiquitous but always welcome Wave picture (lent by Messrs. Elliott & Son).

The limited space at our disposal this week not only obliges us to omit mention of many other admirable pictures that were on view, but also to be as brief as possible in our remarks upon those we have noticed. In closing our reference to this capital Exhibition, however, we must not omit mention of the useful and compact little displays of apparatus, lanterns, &c., by Messrs. Butcher & Son, Messrs. Noakes & Son, and Messrs. Platt & Witt, which were on view in the Hall.

FILLEBROOK ATHENÆUM PHOTOGRAPHIC EXHIBITION.

This Exhibition, which was held at Leytonstone on Wednesday and Thursday last week, differed from most others, in that there were only two classes, namely, one for exhibits which had not previously gained medals, and one for those which had. Both classes included lantern slides, for which, however, the Judges (Messrs. Cembrano, W. L. Colls, and J. A. Hodges) declined to make any awards. A third class of non-competitive exhibits, which included such works as H. P. Robinson's *Dawn and Sunset*, several of Mr. Horsley Hinton's pictures, and contributions from Dr. P. H. Emerson, Mr. B. G. Wilkinson, Mr. Alex. Keighley, and others, materially helped to enhance the quality of an Exhibition already excellent from the circumstance that most of the competitive pictures were fit survivals from the innumerable exhibitions which have been held since last autumn.

In Class I Mr. L. C. Bennett received a bronze medal for *The Cress Gatherer*. In *The Pet Peacock* (a lady toying with one of those gaudy

fowls), *In Love with her own Wondrous Voice* (a Parsee lady accompanying herself with a guitar-like musical instrument), Mr. Bhedwar showed his customary command over graceful poses and technique. But the downward-turned foot of the lady on the top of the step in *Home from the Well* was so distorted as to detract from the merits of the picture as a whole. The Exhibition was so poor in portraiture that Mr. Byrne's ever-delightful *Studies of Children*, and a large direct picture of two young people passing as *Sweethearts*, were very welcome. Mr. C. A. Brightman's Gloucester and Wells interiors and exteriors struck us as being very fine, even in the presence of some of Mr. F. W. Edwards' best work, that gentleman taking a bronze medal for a large Westminster Abbey interior, and the choir at Canterbury. It is a pleasure to examine such careful, conscientious architectural work as the two gentlemen named, Mr. C. H. Oakden, Mr. H. E. Farmer, Mr. W. Howell (who gained a silver medal for a view of the South Entrance at Canterbury Cathedral), and others showed here. By judicious printing, Mr. A. Jeffreys had produced quite a realistic and chilly effect in his riverside study of a *February Morning* (silver medal), a similar award going to Mr. A. Keighley for *The Breath of Winter*, and to Mr. Leslie Selby for *Evening Calm*, both subdued-toned studies of the subjects. Mr. Keighley's *His Little Joke* (an old fellow exchanging smiles with two women) had the true spirit of humour; but the same gentleman's *Sunlight and Soap* (an outdoor washing scene) was scarcely worthy of him in any sense. The last remark applies, with some qualification, to Mr. Ralph Robinson, who, in *A Sudden Squall* (an old woman retreating before the wind on the seashore), *In Summer among the Flowers* (a small, uninteresting child against a background of flowers), and *All Illumined with a Rustic Glory* (a lady seated in the open, in company with a dog), hardly soared above the commonplace. Mr. Robinson, however, made ample amends in *Making Friends* (silver medal), a farmyard scene in Normandy, presumably, where the efforts of the woman to soothe a startled calf and a frightened child, half hiding behind her dress, tell a simple story forcibly and directly. The composition and general treatment of the picture were excellent. In addition to the gentlemen named, other exhibitors of good and generally well-known work were Messrs. J. H. Avery, Golding, Gottlieb, C. S. Roe, J. Kidson Taylor, &c.

In the champion class, Mr. Ralph Robinson was successful with his picture of Mr. G. F. Watts; the class included Mr. Bhedwar's *Feast of Roses* and *Naver* Series, Mr. Dresser's *At Work: Ploughing*, Mr. Lord's *How's That*, and other well-known works. On the whole, the Exhibition, especially to local residents and those unfamiliar with exhibition photography, must have been highly appreciated. A better average of quality it is not often our lot to encounter.

THE NEW CENTRAL PHOTOGRAPHIC CLUB.

On Monday evening last, March 6, a public meeting of those interested in the formation of the New Central Photographic Club, which was referred to in our issue of the 24th ult., was held at the Memorial Hall, Farringdon-street, E.C. Mr. John Howson was voted to the chair, and the attendance, which was a large one, included Messrs. J. H. Avery, A. F. Stanley Kent, E. J. Hughes, R. G. Fenn Kidson, W. E. Ward, H. Snowden Ward, H. Ransom, T. E. Freshwater, F.R.M.S., F. W. Hindley, A. Dolland, G. Lamley, R. Child Bayley, A. Cowan, W. Fenton Jones, H. E. Farmer, E. J. Wall, J. A. Hodges, C. H. Oakden, B. J. Edwards, A. C. Edwards, T. E. H. Bullen, A. E. Hayman, T. Samuels, J. O. Grant, L. Medland, A. S. Newman, R. Beckett, J. S. Teape, G. H. James, R. P. Drage, E. Benest, W. H. Barnes, W. D. Welford, Charles Bilton, and many others.

Mr. Thomas Bedding (the Hon. Secretary, *pro tem.*) having laid the outlines of the proposed Club before the meeting, a long discussion on the details of the scheme took place, and finally an Executive Committee was appointed to (1) draw up a set of rules; (2) to arrange for suitable premises; (3) to determine the financial basis upon which the Club is to be floated; and (4), generally, to arrange a working scheme to be submitted to a future public meeting.

The Executive Committee have already met to carry out the terms of the instructions given at the above meeting, and in the course of a week or two another public meeting will be called for the purpose of considering the decisions at which the Committee will have arrived.

Numerous promises of membership were received in the room, making a total, with others sent by letter, of about eighty—a remarkably good number for one evening.

The following comprise the Executive Committee:—Messrs. Birt Acres, Robert Beckett, R. P. Drage, A. C. Edwards, T. Fall, T. E. Freshwater, F.R.M.S., John A. Hodges, J. Howson, William Fenton-Jones, Charles H. Oakden, E. J. Wall, H. Snowden Ward. The Hon. Secretary (*pro tem.*) is Mr. Thomas Bedding, 2, York-street, Covent Garden, W.C.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 3699.—"Improvements in Stand for Photographic Cameras." H. W. Taunt.—*Dated February* 20, 1893.

No. 3791.—"Improvements in Gratings or Screens for Photo-mechanical Printing." Complete specification. M. Levy.—*Dated February* 21, 1893.

No. 3804.—"Improvements in Electro-photography." J. Waring.—*Dated February* 21, 1893.

No. 3847.—"Improvements in the Production of Lantern Slides and other Transparent Photographic Images, in which are also contained an Improved Means of Transferring Photographic Reproductions to Porcelain, Metal, and other surfaces." R. Mitchell.—*Dated February* 21, 1893.

No. 3919.—"An Improved Pneumatic Shutter for Photographic Purposes." A. Philburn.—*Dated February* 22, 1893.

No. 3964.—"Improvements in or relating to Photo-mechanical Printing." W. R. André, W. R. H. Sleigh, and A. B. A. Sleigh.—*Dated February* 23, 1893.

No. 3989.—"Irvine's Improved Twin Lens Hand Camera." J. Irvine.—*Dated February* 23, 1893.

No. 4030.—"Improvements in Shutters for Photographic Lenses." F. Shew.—*Dated February* 23, 1893.

No. 4057.—"An Improved Photographic Camera for Portraiture and for Studio Work." J. V. Robinson.—*Dated February* 24, 1893.

No. 4065.—"Improvements in the Construction of Hand Cameras and Dark Slides therefor." W. Middlemiss.—*Dated February* 24, 1893.

No. 4141.—"An Improved Photographic Printing Apparatus and Process." U. S. Rush, H. L. Jenkins, and W. G. Gosslin.—*Dated February* 24, 1893.

No. 4167.—"Improvements in and connected with Extension Linkages for Photographic Cameras and other Collapsible Apparatus." G. Wishart.—*Dated February* 25, 1893.

No. 4183.—"Improvements in Photographic Cameras." T. Miller.—*Dated February* 25, 1893.

No. 4188.—"Improvements in Electric Retouching of Photographs, and in Apparatus therefore." R. Kennedy.—*Dated February* 25, 1893.

No. 4214.—"New or Improved Apparatus for the Manufacture of Films, more especially intended for the Manufacture of Films for Photographic Purposes." W. H. Walker.—*Dated February* 25, 1893.

SPECIFICATION PUBLISHED.

1892.

No. 19,581.—"Photographic Shutters." Clarke.

PATENTS COMPLETED.

Improvements in Means for Raising and Lowering and Securing in Position Studio Camera Stands and Other Objects.

No. 5672. Walter James Boughton, King-street, Thetford, Norfolk. *January* 28, 1893.

My invention, a studio camera stand for photographers or others, or any article required to be raised up and down, to be kept in position wherever wanted without the aid of set screws. My invention consists of two upright standards grooved for cords, with cross feet, connected by two cross bars; in between the bars is a spindle, with cords connected, to raise and lower the platform between the two standards, a wheel on spindle to raise and lower with wedge arrangement.

Improved Portable Photographing Apparatus.

No. 6631. Jules Carpentier, 20, Rue Delambre, Paris, France. *January* 28, 1893.

This invention has reference to a small portable apparatus for taking photographs, which has the general configuration of a binocular opera-glass, the one barrel of which serves as the photographing camera, while the other serves for sighting, the glasses at the small ends of the barrels being the object lenses. The two barrels are connected at their small ends by a cross frame, in which is a sliding shutter, by means of which the object lens of the camera can be momentarily uncovered for taking the photograph.

This shutter has for this purpose an opening, which, when in its inward position, is situated on the inner side of the object glass, while, when in its outward position, it is on the outer side thereof.

The shutter is acted upon by springs tending to draw it into its inner position, and when drawn out into its outer position it is held by a trigger catch, on releasing which with the finger it is drawn rapidly by the springs into the inner position, thereby momentarily exposing the sensitised plate in the camera. In order to prevent such momentary exposure from also taking place when drawing the shutter outwards, there is provided a small slide on the shutter, which covers the opening thereof while the shutter is being drawn outward until the opening has passed beyond the object lens, when a stud on the shutter comes in contact with the end of a slot in the frame, and it is thus held while the outward motion of the shutter is completed, whereby the opening becomes uncovered by the slide, which, on the inward motion of the shutter, moves back with it, leaving the opening uncovered.

The two barrels of the apparatus are fixed on to a rectangular box, in which is a sliding drawer, to which is attached a stem, projecting to the outside, where it has a button, by means of which the drawer can be drawn from that side of the box which is opposite the camera barrel to the other side.

The end of the drawer opposite that to which the rod is attached is not closed, but from the opposite sides two small claws near the top project into the open end. The bottom of the drawer is also open, and two slightly curved blade springs extend from the closed end of the drawer along the open bottom.

In this drawer are stored a number of sensitised plates, each of which is contained in a thin sheet metal frame, which frames separate the plates from each other. Each of these frames carries a number marked on a recessed part thereof, and the number of the bottom frame in the draw will be visible through a red eyeglass fixed in the bottom of the box opposite the sighting object glass, when the drawer has been drawn to that side. The frame carries a light spring which presses the sensitised plate against the rim of the frame, and thus holds it securely in position. For introducing the frames with their sensitised plates into the drawer, the bottom part of the end of the box on the camera side is made as a door, and, on opening this, the frames are then slid in, one on top of the other, over the before-mentioned curved springs at the bottom, which, when the box is full, press the uppermost frame and its plate slightly into the larger open end of the barrel which constitutes the camera, stops being provided for preventing the entrance of the frame to an extent exceeding its thickness. The door of the box being closed, the apparatus is ready for taking a photographic impression on the said plate, after which the drawer is drawn outward by its rod, whereupon the uppermost frame with its plate, being held by the stops as described, will remain in position while the others slide from under it with the drawer, and when this is entirely withdrawn the said frame, losing its support, will fall to the bottom of the box. On now pushing the drawer back again, the said frame will pass in between the curved springs and the undermost frame of the pile in the drawer, and will thus become the bottom plate, while the second uppermost one will at the same time be pressed into the camera as above described, in order to be exposed at the next operation. In this way, by moving the drawer backwards and forwards after each exposure, each plate is in its turn brought automatically into the camera, while the preceding one is brought automatically to the bottom of the box.

The sighting barrel of the apparatus is, by preference, constructed with a concave object glass, and with the before-mentioned semi-convex red eyeglass in the bottom of the box for observing the object to be photographed.

It may, however, have a photographic lens and a transparent screen, like an ordinary camera.

The negatives taken in the above-described instrument are, of course, on a miniature scale; in order to obtain therefrom positives on an enlarged scale, I provide an apparatus of the following construction:—

A rectangular box has at bottom a frame in which is a movable plate, and which can open away from the box on hinges, like a door, being held close by a spring catch. The sensitised paper is placed upon the movable plate, and is held in position by being pressed by the plate against projecting ledges on the box by the closing of the door. On the upper side of the box is fixed a metal tubular extension, the upper end of which is adapted to receive the small negative taken in the first-described apparatus. At a suitable distance from the negative the tubular extension carries a partition, in the centre of which is an object lens, by means of which an enlargement of the picture of the negative is thrown on to the sensitised paper at bottom.

The top of the tubular extension is closed by a cap, which is removed for the length of time required for the exposure, and is then replaced while the apparatus is being taken to the dark room, where the sensitised paper is removed and treated in the usual manner.

For making this apparatus more compact for carrying, the tubular extension is made removable from the box, and is fixed in position by a bayonet joint or other fastening.

Improvements in or relating to the Regulation of Photographic Shutters.

No. 19,581. Joseph Thacher Clarke, Boston, Massachusetts, United States.—*February* 4, 1893.

My invention relates to photographic shutters of that class in which the duration of the exposure is governed by a pneumatic piston and cylinder, acting as a brake of variable effect.

Hitherto the differentiation in the action of such pneumatic brakes has been attained in two ways, either by varying, by means of a tap or of a movable cap valve, the orifice through which the compressed air is permitted to escape from the cylinder, or by so shifting the position of the piston arm in relation to the working parts of the shutter that the leverage exercised by the shutter spring upon the piston is changed, and the length of the piston travel is thereby altered.

My invention has for its purpose to provide an improved pneumatic shutter in which the requisite differentiation of the brake is effected in a third and novel manner. While dispensing with the valve for regulating the outflow of air from the cylinder, and while leaving the leverage between the shutter spring and the piston unchanged, and the length of play of the piston unaltered, I obtain the variable speeds of my pneumatic brake by sliding the air-compressing chamber or cylinder to and fro along the axis of the piston rod in such wise that the piston is caused to plunge to a greater or less depth into the cylinder, the retarding effect of which is thus restricted to a longer or shorter part of the travel of the piston. In this movement of the air-compressing chamber, relative to a piston of fixed travel, lies the gist of my invention.

The movable air-compressing chamber, or sliding cylinder, being provided with no variable outlet, is preferably made to fit the piston somewhat loosely, so that the air compressed therein by the movement of the piston may gradually escape between its inner walls and the sides of the piston. In the event of the leakage thus provided between the piston and the cylinder being found insufficient, a further outlet may be provided by piercing one or more small apertures in the walls of the cylinder. These apertures may be so arranged as to gradually cut off the outflow, and consequently to increase the resistance of the air remaining in the cylinder, as the piston passes them on its travel.

The air-compressing chamber may be constructed as a plain cylinder closed at its base, like a stopped organ pipe, so arranged as to slide along the line of play of the piston, permitting this to move, at the one extreme, both forwards and backwards without entering it, and thus without compressing the air within it, or, at the other extreme, to traverse its entire course within the closed cylinder, under pneumatic restraint. Or, while arranged to slide in the manner indicated, the air-compressing chamber may be made with a slightly conical bore, so as to gradually alter the amount of air leakage between its walls and the sides of the piston as this latter is caused to penetrate more or less deeply within it. Such a slightly conical bore will render the pneumatic retardation more or less appreciable, according as the piston travels along a more or less constricted portion of the bore.

In either case it is preferred (although the principle of the invention is in no wise dependent hereupon) to make the air-compressing chamber greater in length than the travel of the piston, cutting out longitudinal slots or otherwise perforating all that portion of the tube through which the piston travels when the cylinder is so withdrawn as to exercise the least possible restraining effect. Through these slots or perforations the air, displaced by the movement of the piston, finds free escape, and hence exercises no retarding influence. The rails formed by the strips remaining between the slots may serve as guides for the piston during that portion of its travel in which it does not enter the unperforated portion of the air-compressing chamber.

The piston may be connected with, and receive its motion from, any portion of the shutter worked by the shutter spring. Thus, if the shutter plate be of that type which performs an entire revolution for each exposure, the piston may work upon a cam or eccentric, the position of which in relation to the centre of revolution will determine the play, forwards and backwards, of the piston. If, on the other hand, the shutter be of a type moving to and fro across the lens aperture, the piston may be advantageously made to work in a slot in the shutter plate, or be connected therewith in any other convenient manner. The piston can, if preferred, be directly connected with the operating spring of the shutter plate, as is well understood. In shutters of the type last mentioned the piston will be moved backwards, *i.e.*, away from the air-compressing chamber, by the act of winding the shutter spring, and will differentiate the length of the photographic exposure only during its forward travel.

The adjustment of the air-compressing chamber, for the purpose of setting the speed of the shutter, may be performed in any convenient manner, either by direct action of the fingers upon the cylinder itself, or, as in the case of hand cameras with closed fronts, by means of an intervening lever or other shifting device. A scale, indicating the speed to which the shutter is set, may be engraved, or otherwise marked, either in connexion with the cylinder or with the moving lever.

It is obvious that the principle of my invention may be retained, although the relative positions of cylinder and piston be so reversed that the former is connected with some moving portion of the shutter and the latter adjusted by sliding along the line of travel.

One of the notable advantages of my improved pneumatic shutter is that, even in protracted exposures, the lens aperture is opened (and in the case of shutters of the before-mentioned circular type is likewise closed) with the maximum rapidity of the shutter. This is due to the fact that the piston is permitted to commence (and in shutters of the circular type likewise to terminate) its movement without restraint from the pneumatic brake, the retarding effect of which is not brought into action until after the shutter has been passed aside from the lens aperture by the unrestrained force of the shutter spring. The character of the photographic exposure is hereby greatly improved.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 13	Camera Club	Charing Cross-road, W.C.
,, 13	Darlington	Trevelyan Hotel, Darlington.
,, 13	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 13	Lantern Society	20, Hanover-square.
,, 13	Norfolk and Norwich	Bell Hotel, Norwich.
,, 13	North Middlesex	Jubilee House, Hornsey-road, N.
,, 13	Putney	Boys' Gymnasium, Charlwood-road.
,, 13	Richmond	Greyhound Hotel.
,, 14	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 14	Derby	Smith's Restaurant, Victoria-st.
,, 14	Great Britain	50, Great Russell-st. Bloomsbury.
,, 14	Hackney	206, Mare-street, Hackney.
,, 14	Manchester Amateur	Lecture Hall, Athenæum.
,, 14	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 14	Paisley	9, Gauze-street, Paisley.
,, 14	Rochester	Mathematical School, Rochester.
,, 14	Stockton	Mason's Court, High-street.
,, 15	Brechin	14, St. Mary-street, Brechin.
,, 15	Bury	Club Rooms, 13, Agar-street, Bury.
,, 15	Leytonstone	The Assembly Rooms, High-road.
,, 15	Manchester Camera Club	Victoria Hotel, Manchester.
,, 15	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 15	Southport	The Studio, 15, Cambridge-arcade.
,, 15	Southsea	3, King's-road, Southsea.
,, 16	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 16	Camera Club	Charing Cross-road, W.C.
,, 16	Glossop Dale	
,, 16	Greenock	Museum, Kelly-street, Greenock.
,, 16	Hull	71, Prospect-street, Hull.
,, 16	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 16	Oldham	The Lyceum, Union-st., Oldham.
,, 16	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 17	Cardiff	
,, 17	Croydon Microscopical	Public Hall, George-street, Croydon
,, 17	Holborn	
,, 17	Leamington	Trinity Church Room, Morton-st.
,, 17	Maidstone	"The Palace," Maidstone.
,, 18	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 2.—Mr. W. H. Harrison in the chair.

Mr. Edgar Clifton, being unwell, was unable to deliver his promised lecture on *Cameras, Tripods, and Dark Slides*, and it was postponed accordingly.

THE QUESTION BOX.

1. "Are ferro-prussiate prints permanent? if not, can their permanency be increased in any way?"

The CHAIRMAN said blue prints were very much affected by alkalies.

Mr. G. W. ATKINS had some by him which were made ten years ago; they had been varnished, and were as good as ever.

2. "A dry plate, developed, fixed, and washed in the usual way, was dried off with spirit; when dry, large patches of a whitish deposit were noticed on the film next to the glass. Is this detrimental to permanency of negative, and what is the cause? This has only been found when working with the new spirit, and does not appear to affect the printing of the negative."

Mr. W. E. DEBENHAM thought that insufficient washing was the cause.

Mr. G. T. HARRIS had been troubled in the same way, but found, however, that the deposit disappeared in varnishing.

3. "What would be the best printing paper to send to the Gold Coast, as platinotype, silver, and bromide paper are spoilt by damp in less than a week?"

Mr. T. E. FRESHWATER said he had seen prints which had been done on silver paper set out ready sensitised to India, and which seemed to stand well.

Mr. DEBENHAM would suggest the use of collodio-chloride paper.

Mr. J. S. TEAPE said that if the silver prints were coated with a weak solution of gelatine on both sides, left to dry, then again coated on both sides with a spirit varnish, he thought they would be as permanent as could be desired, even in a climate like that of the Gold Coast.

Messrs. P. Everitt and F. W. Pask were again appointed delegates to represent the Association on the Affiliation Committee.

The HON. SECRETARY announced that on March 16 a large collection of lantern slides (including some astronomical), illustrative of South Africa, would be shown.

North Middlesex Photographic Society.—March 1, First of a series of Elementary Technical Classes, Mr. J. MCINTOSH taking charge.—He explained the different sorts of lenses, their uses, and how to test them; the stops, their uses, and their relation one to another as regards exposure, the camera, swing-back, rising front, showing and explaining various tests; he also touched upon plates, and made a point of the advantages gained by backing the same. These classes are given expressly to help beginners, free of charge; any gentleman wishing to attend should make application to the Hon. Secretary, Mr. G. Gosling, 13, Lausanne-road, Hornsey. An outing has been arranged to Hampstead for Saturday, March 11, which will be attended by several members of the Society to give practical instruction in the use of the camera in the field, and will be followed on Wednesday, March 15, by an evening for developing the plates exposed.

Harringay Photographic Society.—March 2, Mr. Towers occupied the chair.—Mr. MORGAN, representing Messrs. Fuerst Brothers, gave a demonstration with amidol. In introducing this comparatively new developer, Mr. Morgan said its advantages were extreme energy, its very small bulk, and it does not require an acid clearing bath for bromides. The demonstrator successfully developed a half-plate (Edwards' isochromatic plate), and Thomas's lantern plate, and some bromide paper. Mr. DENNETT said he liked the brown tones as produced by pyro for the ordinary negatives, and Mr. Towers said, though the lantern slides and bromides were perfect, he should prefer pyro for ordinary negatives. Some excellent enlargements, done by Mr. A. R. Dresser, and developed with amidol, were shown. Mr. Morgan strongly recommended the concentrated stock solution, and he also said there was quite as much control with amidol as any other developer.

Hackney Photographic Society.—February 27, Mr. F. Houghton in the chair.—Mr. Hudson handed up a home-made shutter. The working was, however, too too stiff in its action. Mr. A. Barker presented slides to the Society for lending out. Mr. Grant showed some print-out opals. A discussion ensued on the desirability of the Society being represented at the forthcoming Crystal Palace Exhibition. The matter was referred to the Council to be thrashed out. Mr. VINING asked: "What is a simple way of obliterating portions of a negative so as to omit some in printing and without leaving a hard line?" Mr. GRANT said that Mr. H. P. Robinson described the method in his book. Mr. AVENS asked: What had the Society done about the proposed new lantern lenses? Through the kindness of one or two members it was decided to purchase two, made by Messrs Swift. A series of prize slides were then shown, after which slides by Messrs. A. Barker, S. J. Beckett, Dean, Grant, Hull, Moore, Harvey, Roofe, Tavener, and G. W. Wilson, of Aberdeen, were shown.

Croydon Camera Club.—February 27.—It was announced that the Judges appointed for the forthcoming Exhibition were Colonel J. Gale and Mr. T. J. Bright.

Halifax Camera Club.—February 28.—Mr. J. E. Jones introduced the subject of *Landscape or Tourist Photography*. Mr. JONES described at some length the apparatus best adapted for the tourist. He did not believe in the long-focus camera when on tour; the double extension was never required out of doors, and every ounce of *impedimenta* weighed heavily at the end of a day's journey. A small lamp, with non-actinic medium, was very useful for changing plates, with the window covered up with the focussing cloth. He had found the best way to store plates or films after exposure was to place a thin sheet of non-actinic paper, cut to size of plate, between every two plates, films to the paper. Films have an immense advantage over plates on account of weight. A very slow plate had certain advantages in landscape work, but for all-round work a moderately quick one was more desirable. He always carried a bottle of Kay's Coaguline, which he found very useful in cases of accident, such as the breaking of the focussing screen, &c. He had used various kinds of lenses, including the single landscape, but he found nothing like Ross' rapid symmetrical, which he invariably used at about *f*-22. He considered the legs of the tripod and the focussing cloth great nuisances, and, as a partial remedy for the latter, exhibited Houston's focussing cloth holder. His plan was always to use a normal developer, and, if a picture did not come out without all sorts of dodging, he did not think the plate worth further trouble. He had often been annoyed by crowds of people standing round when about to expose, and recommended, as a remedy for this, that one's wife should be sent round with the hat, which he considered would be effectual in making them move off. Mr. Jones also described the difficulties he had experienced in passing his apparatus through the Customs on one of his Continental tours.

Leeds Photographic Society.—March 2, Mr. John H. Walker (President) in the chair.—Mr. W. D. WELFORD read a paper on *Practical Hand-camera Work*. While he agreed with most workers that the hand camera should not take the place of the stand camera for really fine work, it had its place and department in which it excelled, such as street scenes, character and life on the sands, in the market-place, &c. He got about seventy slides passed through the lantern illustrative of this, which were pronounced excellent. Mr. Welford, like many others, is often asked: "What is the best hand camera?" but, like most men of experience, states that there is no universal pattern, but that nearly all (of the better class, at any rate) in the market are good, each possessing special merits of its own, but he has a preference for those having automatic changers for either slides or films.

Dundee and East of Scotland Photographic Association.—March 2.—A paper, entitled *A Few Practical Remarks on Lantern-slide Making*, was read by Dr. J. K. TULLOCH (see page 152.) During the lecture a large number of slides were exhibited, illustrating the various processes referred to. A series of American slides were sent for exhibition, as were also a number of members' slides. Beginners' Slide Competition:—1. J. S. Lawson; 2. Rev. E. J. Gough. Special (each competitor having had the same three negatives):—1. T. L. Wynd; 2. J. D. Cox.

Glasgow Photographic Association.—February 17, Mr. William Lang, jun., F.C.S., President, in the chair.—To a large and appreciative audience Mr. W. LAMOND HOWIE, F.C.S., delivered his well-known lecture, *To Ober Ammergau and Back in* 1890. March 2, Mr. J. CRAIG ANNAN gave a practical demonstration of carbon printing, and developed several prints on paper, glass, and opal. A new printing-out lantern plate was shown to members, and a series of new standard lens fittings was exhibited and explained by Mr. W. S. HOBSON, of Messrs. Taylor, Taylor, & Hobson, Leicester.

Leith Amateur Photographic Association.—February 28, Exhibition o members' work taken during last year.—The PRESIDENT (Mr. William Dougal) said that this entertainment had now become an institution in their midst which was eagerly looked forward to by those interested in art. The Association, although numbering only forty members, was looked upon in the photographic world as one of the most go-ahead societies in Scotland. The works to be shown were, in his judgment, superior to those of any previous Exhibition. Some 213 slides would be exhibited on the screen, being an average of thirteen to each exhibitor, or fully five for each member, while in the largest societies in the kingdom the average per member was one only. The views were of the usual varied character—Newhaven fisher-wives and men in their picturesque garbs and occupation, landscapes and architectural subjects, together with fine sea pieces, a thrushes' nest with eggs, &c. One set of copies of engravings after Turner, Wilkie, &c., seemed to please many of the large audience. The Exhibition, which was assisted by instrumental and vocal music, was brought to a close with a couple of dozen from the Hon. Secretary's fine collection of slides of the series "Burns, his Homes and Haunts," which received well-merited applause.

Hobart (Tasmania) Photographic, Science, and Art Association.—January 20.—The SECRETARY read a letter from Dr. T. J. Barnardo, the founder of the Homes for Destitute Children, in which that gentleman thanked Mr. F. J. Paterson (a member of the Association) for his kind donation of Tasmanian lantern slides. Dr. Barnardo said that the slides will prove a source of great interest, and he will take care that they are exhibited throughout his Homes. Mr. PATERSON delivered a lecturette on *Ilford Printing-out Paper*, and stated that he had never had a single failure. The beautiful pictures shown by the lecturer were greatly admired, and proved that Mr. Paterson was an expert in this particular style of photographic printing. Mr. N. OLDHAM followed with an instructive lecturette on *Photographic Chemicals*, in which he described their manufacture and various uses, also pointing out how to avoid impure varieties and overcome failures. A number of new styles of cameras were placed upon the table for inspection, as well as a good number of lenses and shutters.

FORTHCOMING EXHIBITIONS.

March 22, 23	.....	Leicester and Leicestershire Photographic Society, Co, operative Hall, High-street, Leicester. Hon. Secretary-H. M. Porritt, 66, London-road, Leicester.
April 5–8	.....	*Croydon Camera Club, Braithwaite Hall, Wellesley-road, Croydon. Hon. Secretary, G. R. White, 55, Albert-road, Croydon.
,, 10–29	.....	*Crystal Palace. The Executive, Crystal Palace, S.E.
,, 12–15	.....	*Bolton Photographic Society. Hon. Secretary, J. E. Austwick, 10, Rushton-street, Bolton.
,, 17–29	.....	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.
May 4–6	.....	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

COLLOTYPY—A HINT TO PHOTOGRAPHERS.

To the EDITOR.

SIR,—It seems remarkable that photographers as a body have not taken to this process as a means of increasing their business. I think that I am not far from the truth when I state that at the present time photography as a business is not very remunerative. I am well aware, however, that there are a great many who can command high prices for the excellent artistic work which they produce, and who know nothing of the fluctuations of the trade which is the worry of their less favoured brethren. The average photographer who has to depend upon the ordinary public finds considerable difficulty in making ends meet; and to such a new style or a new process proves a veritable godsend.

Now, collotypy is purely a photographic process, and the operator who knows his business thoroughly has little to learn to enable him to prodnce good work; all the apparatus and materials are already at hand, with the exception of the printing press.

The dark room with its sink and dishes require no alteration; the manipulation of the gelatine, glass plates, &c., is at the finger-ends; and the same light which prints out the picture on the P. O. P. makes ready the printing plate for the press; and, moreover, the fashion has set in long ago for black-and-white pictnres.

Not many weeks ago a paragraph went the round of the photographic magazines, in which the writer spoke of collotypes as superior to silver prints. I have no hesitation in stating that, when they are carefully produced, they are much superior to platinotypes, and not to be mentioned in the same day with those flat grey and white things which are often exposed in show cases as samples.

There are a thousand-and-one ways in which a good business man could turn this process to account. Suppose, for instance, that the local team has succeeded, after several protests, in bringing home the Challenge Cup, it follows that it must be photographed, and the photograph put up for sale. Now, if it is produced by any of the ordinary processes, the price is so high that only a very few are bought, perhaps not more than a dozen; indeed, when the fire of enthusiasm begins to die out, it requires hard pushing to induce even those members of the club whose kicking won the honour, to purchase a copy. Whereas, if they be produced to sell at a sixpence, the thousands who paid that sum for admission would readily buy them up. It is well known that the cheaper an article can be produced the greater the number of sales will be effected; and it does not require much of a business eyesight to perceive that the cheap article invariably admits of a larger margin of profit than the costly article, which only covers working expenses.

I have no intention of taking up space in multiplying examples, yet how easy it would be for the wide-awake photographer, with a press which takes a large plate, say 16 × 20 ins., to put down ten or a dozen different negatives, and by a series of masks produce with twelve pulls of the press as many dozen C.D.V. or cabinet portraits.

I trust that these few words will prove a useful hint to some of your readers, who, from the state of the trade at present, are sometimes sailing in shallow waters.—I am, yours, &c., GILBERT CLARKSON.

March 4, 1893.

DETERMINATION OF PLATE SPEEDS.

To the EDITOR.

SIR,—Since my original communication hereon, I notice that more than one of the dissentient writers invite me to discuss with them on matters of theory which are irrelevant to the subject of my experiments as set forth in my articles.

I considered I had already disproved any assumed concordance between the theory and the practice of determining speeds of plates by the Hurter & Driffield method, and such was the courage of my opinions that I offered to submit *everything* to impartial jurors. This challenge has not been taken up.

Lest it might be thought I was making a "safe" or "empty" offer, I propose to carry the matter still further, and I have to-day written to the Secretary of the London and Provincial Photographic Association, offering, if the subject is of sufficient interest, to read a short paper, and illustrate it by the experiments I scheduled in my original article.

This will show your readers that I, at any rate, have faith in my convictions to determine me to carry this matter to an issue.—I am, yours, &c., G. F. WILLIAMS.

March 7, 1893.

To the EDITOR.

SIR,—Messrs. Hurter & Driffield have been good enough to explain their views and conclusions, so that they can be "understanded of the people," in a little pamphlet which may be obtained from Messrs. Marion for the asking.

For fuller information we are referred to the original papers in the *Journal of the Society of Chemical Industry*; but this publication is not sold in parts, and it is necessary to buy a whole volume (or, maybe, volumes).

If Messrs. Hurter & Driffield would enlarge their pamphlet so as to contain the details of their methods (the mathematical reasoning we will take on trust), and, at the same time, deal with the commoner criticisms and misunderstandings, they will add to our many obligations.—I am, yours, &c., AN AMATEUR.

March 6, 1893.

AMIDOL.

To the EDITOR.

SIR,—Rather late, I have been perusing the discussion on amidol which occurred at the Photographic Society of Great Britain's meeting, as printed in the January issue, of the transactions, some remarks on which may not be misplaced.

Mr. G. L. Addenbrooke, after relating that he "had had a good deal of experience with amidol," made some remarks thereon, in which he attributed to the free sulphurous acid in a developer, prepared with meta-bisulphite of potassium, restraining powers. This was objected to by Mr. Mackie, who "could not understand how free sulphurous acid could act as a restrainer in a developer, as, on adding alkali, it would combine with it, and no longer remain in a a free state." In reply to which, Mr. Addenbrooke said, "The sulphurous acid was too weak to combine."

It seems to me a pity that no better-informed member took part in this discussion, the gentlemen above quoted evidently not having watched the reports of experiments by photographic experts, which put quite a different aspect on the development with amidol than that apparently existing in their minds.

They evidently have no knowledge of the recent examination of acid development by Messrs. A. & L. Lumière, which shows that certain organic developers, derivatives of Mars yellow, certainly develop in acid formulæ. These are diamido-phenol, triamido-phenol, pyrogallic acid, oxidroquinone, and diamido-naphthol.

Many years ago Captain Abney proved acid development possible with a pyrogallic acid formula, rendered distinctly acid with hydrochloric acid.

I may perhaps be permitted here to refer to an amidol formula for transparency work which I gave in the last issue of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC which is very distinctly acid, and efficient, nevertheless, for its purpose—in fact, it seems to me, that certainly for transparency development an acid formula is preferable. I am under the impression, from the moderate experience I have had with it, that it very much adds to the brilliancy of the clear parts of the transparency.—I am, yours, &c., HENRY E. DAVIS.

Camera Club, Charing Cross-road, March 7, 1893.

NATIONAL PHOTOGRAPHIC EXHIBITION JUDGES.

To the EDITOR.

SIR,—We have the pleasure to inform you that the following gentlemen have consented to act as Judges at the above Exhibition, which opens on Monday, April 10, at the Cryatal Palace:—

Hon. Slingsby Bethell,	F. Stanley Little,
Valentine Blanchard,	Peter Macnab,
J. Pattison Gibson,	H. L. Noel-Cox,
F. Mason Good,	Francis Powell, R.W.S.,
Richard Keene,	F. P. Slingsby Roberts,
Dr. Lindsay Johnson, M.A., BSc.,	Leslie Thomson,
W. Lang, Jun.,	F. York.
Edgar G. Lee,	

Your kind insertion of this letter will be esteemed by—Yours, &c.,

S. G. BUCHANAN WOLLASTON, CHARLES W. HUSTINGS, } *Executive.*

Crystal Palace, March 6, 1893.

SCULPTURESQUE PHOTOGRAPHY.

To the EDITOR.

SIR,—I read with interest your able article on "Sculpturesque Photography" which appeared in the JOURNAL of January 27, since which I have been devoting my attention to practising the same. I have tried various means; among them the one advised by the editor of one of the papers devoted to photography, and with moderate results, its great drawback being the trouble to the sitter and the time which it occupies in getting ready, which is against its practicability.

This last few days I have been trying the method patented by Messrs.

G. B. Bradshaw & Co., Altrincham, and am delighted with the results, and would call the attention of more practical workers to it.

In your issue of December 3, 1892, you call attention to the inquiries of a correspondent for a new style of photograph which amateurs could not produce. Your answer was, that the idea was excellent; but where was the picture to be found beyond the scope of the amateurs? Now, sculpturesque photography is a beautiful art, and could be easily made fashionable. Is this the long-wanted picture which amateurs could not imitate? If they were refused patent rights, it might be.—I am, yours, &c., W. TIPPING.

Sutton, Notts.

THE LANTERN SOCIETY.

To the EDITOR.

SIR,—I read in the "Lantern Supplement" to your JOURNAL of March 3 that a correspondent has been inquiring as to the existence and prosperity of the Lantern Society. May I be allowed, as President, to inform him, through your JOURNAL, that it is progressing very steadily and surely, and doing active work? Our fortnightly meetings since October have been very well attended. Several learned and scientific men have most generously given us lectures and papers on varied and interesting subjects, not necessarily or always connected with lantern work, or even photography in its different phases. On these occasions our lantern has been requisitioned to assist the lecturer as far as possible. Our public meetings and exhibitions of slides, in a very large and fine room at 20, Hanover-square, appear to give great pleasure to our members and their friends. Ladies attend frequently, and, I may remark, *en passant*, are eligible as members. Mr. E. M. Nelson, F.R.M.S., now President of the Quekett Microscopical Club, our able chairman, as well as our Honorary Secretary, Captain C. E. Gladstone, R.N., spare no pains to make both our formal and informal meetings as instructive and entertaining as possible. I had the pleasure at our last meeting of thanking Colonel Gale, Mr. Edgar Lee, and several other gentlemen for so kindly giving our Society the opportunity of admiring some of their most beautiful pictures; so true were they to nature in her most difficult aspects, and so perfect in photographic teaching, &c. We shall have pleasure in welcoming your correspondent to our next meeting open to visitors, in order that he may judge of our activity and earnestness in the work which we have undertaken. Captain Gladstone and our curator of slides will be happy to furnish any applicant with our rules, &c., as well as particulars of our loan collection of slides, &c.—I am, yours, &c., SLINGSBY BETHELL.

Brooks' Club, St. James's-street, March 6, 1893.

PHOTO-INTAGLIO ENGRAVING IN THE UNITED STATES.

To the EDITOR.

SIR,—In the issue of your JOURNAL dated December 2 is published a review of a communication recently made by me to the Franklin Institute regarding a certain improvement or innovation in the matter of photo-intaglio engraving, the tenor of which is of a nature to call for a reply.

The assumption, made on the basis of my reference to the retouching of intaglio plates, that I am, or have been, ignorant of the state of the art in Europe, is unfounded. I have before me specimens of unfinished and finished work of this character from a number of European establishments, showing the work of the retoucher; but this should be superfluous in view of the fact that the retouching to which I adverted is recognisable by an expert eye in practically all published work of this character.

The statement made on the basis of my having applied for a patent on the method in question that my communication "reads very much like an advertisement" is scarcely just. Permit me to reply that I have many excellent British precedents in that respect, including the names of all the foremost English contributors to the advancement of the photographic arts.

It is furthermore predicated of me that I am ignorant of the state of the art even on this side of the Atlantic, because it is "certainly a novelty to be told that a dried gelatine film can be printed from as an intaglio plate." What I stated is an absolute fact. I have myself frequently printed from a gelatine relief plate—it could scarcely be called a film—dried after washing out, in which condition such plates of gelatine have both depth and firmness enough to stand many impressions in the printing press. Both the "wash-out" and "swelled" gelatine methods were regularly employed in my daily practice up to 1881, and then replaced by the etching processes. I have not, indeed, utilised such gelatine films as intaglios, but there is nothing in the nature of the case to render such procedure impracticable for, at least, a limited number of prints. To any one familiar with the "wash-out" gelatine process, my statement will not be a novelty.

With regard to my reference to Paris as leading in the production of intaglio work, I will only say that the question at issue is largely a matter of opinion and of taste, "*De gustibus non est disputandum.*"—I am, yours, &c., LOUIS EDWARD LEVY.

Philadelphia, December 29, 1892.

[Owing to defective postal arrangements, the above communication only reached us a few days ago. We shall have a few remarks to offer on the subject in our next number.—ED.]

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

PHOTOGRAPHS REGISTERED:

Alfred H. Scott, Twickenham.—*Photograph of D. Alder, veteran postman of Twickenham.*

John Stuart, Glasgow.—*Three photographs of the interior of the late Dr. Bonar's study at 20, India-street, Glasgow.*

Simeo & Holme, Wellingborough.—*Two photographs of Hind Hotel, Wellingborough, in 1856. Two photographs of Market-street, Wellingborough, in 1856. Four photographs of Princess Kaiulani of Hawaiian Islands.*

WOULD-BE MEMBER.—See "Lantern Notes and News," last week.

SPRING.—Return the films to the makers; they will, doubtless, give you fresh ones for them without demur.

F. R. E. (Weymouth).—The Pamphengos lamp is made by Mr. W. C. Hughes, Brewster House, Kingsland, N.

J. W. C.—Mr. Denison is not a professional photo-engraver, and does not work for the trade as you have been erroneously informed.

HECTOR MACLEAN, MARCUS P. FUCHS, J. R. SINGER, C. RAY WOODS, PERPLEXED, and others.—Received; thanks. In our next.

INK STAINS.—Try the effect of a dilute solution of either citric or hydrochloric acid for removing the ink stains from the photographs.

EXPERIMENT says: "Can any reader give the formula for white ink for writing on glass so that it will not only write, but etch the surface?"

SOLE RIGHTS.—If you have copyright in the picture, then by registration you can proceed for damages if another person makes copies thereof.

RUPERT HOLLETT.—It is the object-glass of the telescope that must be used; and, of course, the camera must be erected at the eyepiece end.

AJAX.—The iodo-albumen process is described in the JOURNAL for June 17 of last year. So far as we know, it is not now worked commercially.

"LANTERN RECORDITE."—You were misinformed; the "Lantern Record" will appear during the summer months. See editorial announcement elsewhere.

"H. LEWIS" ("Brooklyn, U.S.A.").—You are too deliciously simple if you imagine that we cannot penetrate such a poor disguise. Try again.

C. PORTER.—You would be rendering yourself liable to prosecution by making and exhibiting lantern slides of the engravings named without permission.

TALC.—Mica is being introduced by Mr. Rudowsky as a support for negatives and positives, and therefore would answer for lantern pictures. It is, however, very expensive yet.

PUZZLED PHOTOGRAPHER.—However much their admirers may like fuzzy photographs on paper, we do not think they are likely yet to introduce lantern slides from the negatives to a general audience.

R. O. S.—If the mounts were guaranteed by the vendor, or his agent, to have no injurious effect on the photographs, and you can prove that they have had, you have a good cause of an action at law for damage to your reputation.

W. J. CLUTTERBUCK.—Solutions of ferrous oxalate and mercuric chloride may be ordered of any dealer. For use, employ the latter at the strength you receive it, and dilute the former with three times its volume of water. If you desire to make the solutions yourself, the quantities are given in the ALMANAC.

B. W. C.—1. An attachment for keeping the tripod perfectly steady has been patented by Messrs. George Mason and A. L. Henderson. Send us a description of yours, and we will say if it is patentable. 2. Apply to Mr. H. N. King, 4, Avenue-road-villas, Goldhawk-road, W.

STONE & WILKINSON asks: "What is the best reagent to use to precipitate the silver in the washing of P.O.P.? Have tried H.Cl. and Na Cl without effect."—If the substances used do not throw down the silver, though we should have thought they would, use sulphide of potassium—liver of sulphur.

J. WAITE.—The pictures are very good, but they would have been infinitely better if they had been printed by the platinotype process. Winter effects are never well represented by being printed on albumen paper and toned to a warm brown tint. The cold tones of platinum are best suited for winter pictures.

F. BRAIN.—If you have proper retouching medium and pencils, and have read all that has appeared in the JOURNAL during the last few years, and yet do not get on, we should advise you to have a few lessons from a practical retoucher. We cannot, of course, without seeing examples of the failures, indicate the causes of them.

J. LANE.—We cannot tell what your slides are like as regards quality, from such a vague—or, indeed, any—description. Join a photographic society that has lantern nights, and exhibit your slides among those of the other members. Volumes of criticism would be worthless as compared with that way of finding out whether the slides are good or bad.

W. A. T.—1. The formula given in the ALMANAC is the best published. 2. Many professional photographers sensitise their own paper because they consider they get better results than buying it ready sensitised. It is also, to them, more economical. 3. Yes, if the wooden vessels are coated with paraffin or other impervious material that has no injurious effect on the silver solution.

P. CASEY.—Your local chemist and druggist is in error. Sulphate of soda is not what you want, and it is not the same thing as sulphite of soda. It is the latter you must have. Better obtain it from a dealer in photographic material. If you succeed in obtaining it from a village druggist it is very doubtful if it will be of good quality, and unless it is it is useless for photographic purposes.

A. HORTON.—1. Expose the cleaned surface of a glass plate to the fumes of fluoric acid, which are generated from fluor spar and sulphuric acid in the bottom of a lead or guttapercha dish. 2. There is no rule for placing the stop in your lens. 3. The rays from opposite sides cross the axis after transmission through the first lens of the combination. Axial rays meet only at the focal plane.

C. SLADE.—In photographing an interior, if the camera is placed directly facing the mirror at the end of the room, so that it is reflected in it, the apparatus will necessarily show in the photograph; but, by a little judgment, the camera may no doubt be so placed that its image is not reflected on to the lens. An alteration of a few inches in its position will often be sufficient to get over the difficulty.

OMICRON.—The stains are caused by the prints being stored so long in a moist condition. Stains precisely the same as these can be produced at will by keeping prints in a pile closely pressed together for two or three weeks according to the temperature. The more perfect the washing the quicker are the stains likely to appear, particularly if the conditions favour mildew. In future, we suggest the prints be dried prior to delivery.

A. Y. E.—The design for the studio is so good, that we can suggest no real improvement upon it. With regard to the other question, we can offer no opinion, as the law, as regards building is not the same in different districts. As the erection will be a conspicuous one, we should advise you to consult, with the plans, the surveyor to your local authority before commencing to build. By doing so you may save yourself a lot of trouble and delay.

A. S. BONE.—An ordinary typographic press, such as the "Albion press" you possess, will answer quite well for collotype printing. Indeed, this is the form of press that is extensively used by collotype workers in this country. Power machines are necessarily expensive. They vary from about two hundred and fifty pounds to double that sum, according to size and maker. The power required to drive them is not great. A gas engine of one horse power would be equal to working a couple of moderate size.

LIONEL HARTMAN asks: "How can I obtain particulars of a kind of photograph introduced many years ago? It was a crystal cube, with portrait inside, and I believe it was called the 'Casket Portrait,' and done only by the inventor at a studio at Charing Cross. If it was patented, what year about was it?"—The Casket portrait was the invention of Mr. H. Swan, and was patented by him in 1862. The number of the patent is 3249 for that year. The specification, giving full particulars, costs eightpence.

EDMUND STIRLING (Philadelphia) writes: "I was greatly interested in the letter of Mr. Haes in your issue of February 10, in which reference is made to flexible steel tubing and its uses in connexion with the lantern. I would be under renewed obligations to you if you could advise me where I could get samples and specific information as to such tubing. Do you know whether it can be had in this country?"—In reply: Particulars of the tubing are given in the "Lantern Record (Supplement)" for March 3.

T. MATHIA writes: "1. I have a set of moist water colours, which have become too dry to work easily. Will it do to mix them with honey or glycerine? I might say that I use them for colouring bromide prints. 2. How to make them transparent for lantern slides? 3. Where can I get lantern slides on hire?"—1. It would scarcely be worth the trouble to attempt to remix the colours. Possibly, if they were kept for a few weeks in a very damp place, they would absorb moisture, and somewhat regain their former condition. 2. Unless the pigment is a transparent one, there is no means of making the colours so. The colours generally employed for lantern slides are oil colours, specially prepared for the purpose. 3. From those who let lanterns and slides on hire.

PHOTOGRAPHIC CLUB.—March 15. Smoking Concert. 22, *New Cameras* Adjourned Discussion on *Combined Toning and Fixing Baths.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Ordinary Meeting, March 14, at 50, Great Russell-street. *Naturalistic Photography*, by Mr. P. H. Emerson, B.A., M.B.

WE have received the price list of Mr. C. F. S. Rothwell, who has opened premises at 8, St. Mary's-street, Deansgate, Manchester, as a general dealer in photographic apparatus and chemicals.

THE Harringay Photographic Society are arranging for a public lantern night. Admission will be free by ticket, to be had of all dealers or by enclosing ½*d.* stamp to Mr. C. Frith, 8, Cavendish-road, N.

MR. E. G. LEE writes: "In the list of awards in your issue of February 10 last, *re* the Photographic Society of India's Exhibition, held in Calcutta, the award to me of a silver medal for twelve lantern slides is not included. I received the medal from Calcutta this morning (March 6)."

MESSRS. R. W. THOMAS & CO. have appointed Mr. S. Herbert Fry to demonstrate the virtues of the Sandell plate, their new multiple-coated and patented film. Secretaries of photographic societies who wish to fix a date for a demonstration should write to Messrs. R. W. Thomas & Co., Thornton Heath, Surrey.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—March 16, Monthly Lantern Night, 200 slides illustrating South Africa, to be exhibited for the first time in this country. Visitors welcomed. 23rd, Technical Lecture. Mr. Edgar Clifton on *Cameras, Tripods, and Dark Slides.* 30, Mr. W. J. Rawlings on *Reversed Negatives for Process Work*, demonstration.

THE Imperial Dry Plate Company, Limited, inform us that during the past twelve months they have been continually enlarging their premises and purchasing every modern labour-saving machine. These alterations and additions have been pressed forward, so that their factory, in its finished state, will compare favourably with the best-fitted plate factories in existence. The management offer, during the present month, to send samples of their plates to any one on receipt of the mere cost of postage.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—A meeting of Committee was held in the rooms of the Photographic Society of Great Britain on March 3, Mr. A. Mackie in the chair. There were four applications for assistance by loans or grants, all of which, after careful consideration, were granted. Messrs. A. Mackie and R. Child Bayley were appointed to wait upon the husband of one of the applicants with a view to inducing him to go into a hospital, and so give his wife an opportunity of resuming her work as photographic spotter and mounter, and so recovering from their present extreme poverty. One loan was to enable an operator, who had been long out of work, to pay his arrears of debt at his lodgings, and to take a situation which he had already obtained; another, to enable a process worker, who had been out of work for many months, and who was penniless, to obtain camera and apparatus whereby he could undertake work for which he had already orders sufficient in quantity to ensure him a living. In the fourth case, of an operator out of work and with a large family dependent on him, a small grant was made for immediate necessities, with a promise of more if he should be unable to obtain work. The total grants amounted to a little over 10*l.*

EFFECTS OF IMPURE OXYGEN ON THE LIMELIGHT.—Mr. Kenneth S. Murray, of Brin's Oxygen Company, writes: "In your article on these works (see 'Lantern Supplement,' March 3) there is one subject referred to, viz., the effect of impure oxygen on limelight, with regard to which I am afraid I could not have expressed myself clearly to you. What I intended to convey was, that in the tests mentioned, although there was an inferiority in the illumination of the disc thrown by the lime supplied with the low-quality oxygen, this inferiority was less than had been anticipated from the disparity in the quality of the two samples employed. The increased consumption which you mention was most marked. I may, perhaps, emphasise the point by stating that, in a test made between two samples of oxygen of 92·4 °/₀ and 67·0 °/₀ quality respectively, the consumption of the low-quality oxygen was just 50 °/₀ more than that of the high-quality gas, and the illuminating power was even then considerably less, and this was especially marked in the delineation of shadows thrown on the illuminated disc. I consider the difference in qualities of oxygen is more appreciable in the actual consumption of the gases than in their illuminating effect on the lime; but, apart altogether from the question of consumption, I consider a gas of only 60 °/₀ purity would spoil any lantern show. I am conscious of not having explained myself sufficiently on this point, and shall be much obliged if you will kindly put the matter right in your next issue."

ROUND WEST LONDON WITH CYCLE AND CAMERA.—Before the West London Photographic Society, on February 28, Messrs. Stein and Varden read their joint paper on *Round West London with Cycle and Camera.* After detailing how a few members of the Society had banded themselves together into a cycling division, the authors dwelt on the advantages of combining cycling with photography. The cyclist did not feel the weight of his camera, for it was carried on his machine. The paper was profusely illustrated by the lantern, the slides being from photographs by the joint authors, commencing with a short series of pictures illustrative of the evolution of the modern cycle. The authors described very happily a circular cycle trip that could be easily managed in one day, starting from Chiswick and taking their audience, in imagination, through Acton (or Oaktown), Ealing, Hanwell, Perivale, Greenford, Northolt, Harrow, Pinner, Eastcot, Northwood, Ruislip, Hillingdon, Uxbridge, Cowley, West Drayton, Longford, Harlington, Hayes, Heston, Osterley, Isleworth, Brentford, Boston Road, Strand-on-the-Green, and back to Chiswick by way of the Mall, Hammersmith, and Stamford Brook Green. The journey thus indicated was described in detail, with much interesting information about the places visited, both as regards their past history and present appearance, and, in the interests of those members who require a plentiful supply of landmarks to guide them, the authors mentioned by name the many wayside inns they encountered on their journey. The run described included but a part of the Western District of London, and there were other routes of equal interest, embracing such places as Esher, Weybridge, Ripley, Virginia Water, Windsor, Kingsbury, Roe Green, Preston Green, Stanmore, and Whitchurch.

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MIXED DEVELOPERS.

It occasionally happens that a batch of plates is met with which, without being actually bad, requires some special kind of development to secure a satisfactory image. This is far less frequently the case at the present day, since the manufacture of commercial plates has been brought to a degree of uniformity, than was the case a few years back, for it is the practice in most of the large establishments to test each make of emulsion before spreading any considerable quantity, and any such doubtful lots are either rigorously rejected, or, if the quality be such as to admit, mixed with other lots of opposite character.

We came across such a sample of plates a few days back, a small lot which had been made for experimental purposes, and which, according to a memorandum on the package, had been found wanting in density, though otherwise good. This seemed a favourable opportunity for testing the capabilities of some of the newer forms of developers which had not been available at the period the plates were made, an opportunity of which we at once availed ourselves.

The particular batch of plates was some seven years old, a fact which in itself would be considered amply sufficient to throw doubt upon the quality of the films; but we may remark *en passant*, that, given a good plate to start with, that is to say, a plate that has been properly treated in manufacture, more especially in the removal of all soluble matter from the emulsion, age alone does not necessarily produce any deterioration. We say "*age alone*," because it is obvious that, if the conditions of storage have been such that other complications are introduced, any sort of change may be anticipated; but, if properly cared for, we have never found mere age to appreciably deteriorate a good gelatine film. With dry-collodion plates the case was altogether different, as by the gradual decomposition of the collodion itself, frequently aided by the nature of the organifier or so-called preservative, a constant change or decomposition was going on.

At the time the plates were made the only developers practically available or, at any rate, in general use were alkaline pyro and ferrous oxalate, and we presume that both these, but certainly the former, in its various modifications, had been tried before the plates were put away as faulty. These were again tried just in order to ascertain if the original qualities of the films remained, and so far as the mere density, or rather want of it, was concerned, they answered directly to the character appended to them; that is to say, while very rapid —rather remarkably so—and perfectly clean in working, they were absolutely useless for printing purposes, owing to the want of vigour. This was more particularly the case with ferrous oxalate, and the best result—if a scarcely appreciable difference in density can be so called—was obtained with pyro and potash.

The first of the more modern developers tried because the first in order of introduction was hydroquinone, and with this a very decided increase of density was produced at first attempt, and with an ordinary formula. But the improvement was accompanied by an alarming reduction in sensitiveness, not, be it understood, a mere prolongation of the time required in development—a not unusual feature of hydroquinone—but a direct impossibility, with a given exposure, of obtaining anything like the same amount of detail, even though the development was extended over a couple of hours.

Nor was this the only difference in the behaviour of hydroquinone. Instead of the clean, delicate, image produced by pyro or iron, the newer solution gave in every instance a coarse and patchy effect, which at first sight seemed to arise from stains, but which on closer examination proved to be due to the form of irregular development for which hydroquinone is remarkable, especially with paper positives. We have no record of the composition of the particular films under treatment; but, as at the period of their manufacture chloride of silver was not an unknown or unusual component of the negative emulsion, it is very probable that the presence of some chloride would account for the irregularity.

Eikonogen and amidol both failed in producing any appreciable increase of density as compared with pyro, indeed the former appeared, if anything, inferior in that respect. As regards sensitiveness, there was no apparent falling off as in the case of hydroquinone.

As, after ringing the changes on the variations of the different formulæ, hydroquinone proved to be the only one capable of any increase of density, but accompanied, as we have described, by loss of sensitiveness and other defects, it occurred to us to try a double or combined development in which hydroquinone played the part of intensifier. Mixed solutions of hydroquinone with pyro and eikonogen have been employed with a certain amount of advantage—especially in America—in cases where one or other alone has failed to produce adequate vigour; but, before trying the mixed solutions, they were applied separately, pyro, eikonogen, and amidol respectively being first applied with a view of getting out the detail, and hydroquinone following as the intensifier. The behaviour of the particular batch of plates under this treatment was peculiar, for it was found in every instance that the solution first applied stamped its individual quality upon the image, and the subsequent application produced literally no

effect. In other words, hydroquinone failed entirely as an intensifier when thus attempted.

In another set of trials, in which the hydroquinone was used first in order to get a certain amount of vigour, while eikonogen was subsequently applied to bring up the detail, the effect of the first solution was the only one that was apparent; for the hydroquinone not only still exhibited its want of energy or capability of bringing out detail with a short exposure, but actually prevented the eikonogen doing so — in fact, it appeared to act in very much the same manner as a strong dose of bromide. Such being the effect of separate applications of these two solutions, it was not considered worth while to try others in conjunction with hydroquinone in the same manner.

The mixed solutions were, however, finally tried, and, while there was no practical advantage apparent in the case of pyro and hydroquinone, pyro and eikonogen, or any combination of amidol, eikonogen, and hydroquinone, in conjunction gave a decidedly better result, so far, at least, as the production of density without loss of sensitiveness was concerned. So far as that, indeed, was concerned, all was as it could have been wished; but unfortunately the irregularity in development which characterised hydroquinone alone still prevailed, though to a lesser extent. The point, however, to be specially noticed is that the retardent action of the latter disappeared when it was used in the presence of eikonogen, although it existed when the two were used separately.

Another peculiarity in the action of the mixed solution upon the old sample of plates under experiment was the production of what at first appeared to be dense fog, but which proved to be a deposit of very fine *loose* matter that was easily and perfectly removed by rubbing the film with the finger. This, together with the irregularity in development, we take to be due, in great measure, to the composition of the films, for on repeating the last experiment (with the mixed solution) with a sample of commercial plates rather wanting in vigour, the beneficial action in securing additional density was again noticeable, while the other peculiarities were altogether absent.

It seems, as far as we have gone, that any advantage there is to be gained from a combination of developers will be in the use of mixed as distinguished from separate solutions. This being the case, it will be desirable to inquire how such mixed solutions will keep, especially as the practice seems to be gaining ground of using the same quantity of solution for a succession of plates.

LENS FOG.

Of all subjects important to the production of clear, crisp photographs, that which forms the title of this article has had perhaps the least attention. Yet, in its many forms, it is the cause of as many defective negatives as any that can be named, short of those inevitable to absolute want of experience. The one example most familiar is that of flare, which, as all know, arises from the diaphragm being improperly placed; but the number of lenses still sent out by makers of position in the optical world which yet suffer from this defect is, to say the least, something remarkable. It is merely localised fog, arising from the lenses, and so embraced in our title; any lens possessing the defect should be returned to the maker at once upon its being noticed, with, if possible, a print taken by its means and showing the flare.

Another potent fog-producer is the presence of a single scratch on a surface of one of the lenses. Many plates may be taken, and the effect of the scratch be imperceptible, yet on some particular day, under conditions favourable to the performance of this defective portion of the instrument, it is possible for a negative to be hopelessly ruined; the vagaries a scratch is capable of indulging in are occasionally most singular. The most favourable condition is seen to be when the lens is exposed to a great flood of light; and, again, will fog be produced when taking interiors if a strong beam of light impinges upon the lens from some unnoticed side-light—a window or otherwise. We have seen fog brought about by a reflected light from some bright object in the field of view striking the surface where the scratch lies. It is, however, but to draw attention to the evil to discover a remedy. If the scratch be painted over with opaque paint—black varnish is as suitable as anything—all danger is obviated. The performance of the lens will not be interfered with, except to the extent of reducing the light passing through it. As a scratch whould be an exceedingly large one that would occupy the hundredth part of the surface, it follows that the consequent loss of light in such case—a hundredth—is not worth discussing.

Akin to this cause of fog is that condition brought about by careless use and handling; the surface is covered with a multitude of fine, almost invisible, scratches, and these, when the lens is flooded with light, will cause the image to lose considerably in brilliancy and crispness. It is remarkable that we do not hear more of such defects than we do, for the carelessness with which some operators dust and polish the lenses of their objectives is simply appalling. When a lens is damaged in this way, there is no remedy but to send it to the maker. It is a mistake ever to attempt, as is sometimes recommended, to polish it up with rouge, putty powder, &c. If the polishing is sufficient to remove the scratches, it means removing the surface to the depth of the deepest scratch, which, slight though it may be, is quite sufficient to alter the original curves, on the correctness of which the performance of the lens depends.

Another frequent example of lens fog is brought about by the brass mounting near the lens showing through the original coating of black given to it by the maker, the result being that the rays of light entering or leaving the lens suffer reflection or refraction at the bright part, and cause veiled images; for it must be remembered that a very slight amount of light is sufficient to act upon the plate. When this reflected light falls upon the shadows, as it does equally with the lights of the picture, it may easily be sufficient to cause fog, at a time, too, when the real cause may have remained unnoticed. When large portrait lenses are in question, this wearing away of the dead black of the instrument is usually seen in the outer rim of the back cell. Let any one, with camera set ready for exposure, remove the ground glass, insert his head under the focussing cloth, and examine the state of the lens. He will often be surprised at the amount of light reflected from this rim, and it is self-evident that all extraneous light visible inside the camera to the eye placed in such a position must fall upon a plate, and produce a greater or less amount of veiling, according to its intensity.

But both for portrait and landscape work, where the quicker kind of lens is used—that in which the posterior and anterior compounds are separated some considerable distance—there arises a frequent cause of fog, before which this last-mentioned cause becomes absolutely insignificant. We refer to the state of the inner surface of the brass mounting. Whether from the gradual entry of dust through the diaphragm slot, the interior being often thus coated; whether from the original

coating being insufficiently matt—a by no means infrequent condition—or from occasional wiping of dust from the interior, it very frequently happens that the light falling through the lens upon this imperfectly blacked surface illuminates the whole of the plate, and it is rigidly impossible to produce a perfectly clear negative with rich shadows, the often discussed "clear glass in shadows" being then uniformly conspicuous by its absence. We should advise every possessor of a large lens to examine it in a suitable manner when the instrument is pointed to the view or portrait. We shall be surprised if the condition of the surface, and the amount of light it reflects, will not often be a revelation. The subject is one of the very greatest importance, and we find cannot be completely treated in a single article; hence we propose shortly to return to it with some practical suggestions bearing on the disease and its remedy or remedies.

Daguerre's Cook.—In the last number of the *Paris Photographe* there is given a reproduction of the portrait of his cook, taken by Daguerre. It was one of the first photographs he executed, and was presented to the Académie des Sciences in 1844 by M. Arago.

Antidote for Cyanide of Potassium.—The records of suicides in recent years show that cyanide is still the fashionable poison among photographers. Dr. Kossa says that permanganate of potash transforms the cyanide into cyanate, which is said to be inoffensive.

Antiquity of Amidol or Diamidophenol.—According to an article in the *Wochenblatt*, diamidopenol or amidol, both as chlorhydrate and sulphate, was originally prepared by T. Gauche in 1869 by the reduction of dinitrophenol by means of iodide of phosphorus Since then the body has been extensively studied, Hemilian, in 1875, showing that by the reduction of the dinitrophenol the salts of diamidophenol were formed, and, not as Gauche thought, those of diamidobenzole.

Photographic Properties of the Salts of Cerium.—According to the *Moniteur*, Messrs. A. & L. Lumière have obtained photographs by the aid of the salts of cerium. Cerium, it is said, forms two series of compounds like iron and manganese, the ceric and the cerous, the ceric salts having the property of being reduced to the cerous state under the influence of light. It will be remembered that Messrs. Lumière have taken advantage of a similar property of the manganic and cobaltic salts to produce positive impressions.

The Synoscope Wide-angle Lens.—At a meeting of the Société Française de Photographie on February 3, M. A. Gorde exhibited a wide-angle lens of very short focus, called the Synoscope. The lens, he says, embraces an angle of 135° (!!), its focus for a plate 13 × 18 cm. (7¼ × 5¼ inches about) being about 3¼ inches, for 18 × 24 cm. 10 cm. (about 4 inches). M. Gorde says that these foci are about the shortest known for the sizes of plates covered. The largest aperture available is about *f*-20, which being, he says, relatively large, allows of instantaneous pictures of interiors with magnesium being taken.

Fine Art in America.—According to a daily contemporary, out of nine hundred and fifty paintings, by western artists, that have been offered for exhibition at the World's Fair at Chicago, the Committee have rejected no less than eight hundred and forty. Unless the Committee have set a very high standard for the work, this does not say much for the ability of American painters. That our American cousins do appreciate fine art there is no question, as is proved by the high prices they sometimes pay for the works of European artists, also by the large sale that photogravures of high-class paintings, that are produced in France and Germany, meet with in the States.

How to Disperse a Crowd.—Every out-door worker has, at times, experienced the annoyance of small crowds of people collecting in front of the camera when ready for exposing. Many dodges have, from time to time, been published for getting rid of them; the latest, however, which is certainly original, comes from the Halifax Camera Club, where, at its last meeting, Mr. J. E. Jones recommended "that one's wife should be sent round with the hat, which he considered would be effectual in making them move off." Very likely it would. But the method suggested presupposes one to have a wife—and, having one, that she would or could be made to go round with the hat. We should advise some of our married friends to try it on, and report the result.

The Forthcoming Solar Eclipse.—It is to be hoped that the two British eclipse expeditions—the one to Brazil, the other to the West Coast of Africa—will be favoured with fine weather on the 16th prox. The work on this occasion, we are told by Mr. E. W. Maunder, is to be almost exclusively of a photographic nature—photographs of the corona itself and its spectrum. One of the advantages of this eclipse is its unusually long duration, over four minutes and a half. This, if the weather be propitious, will enable a greater number of negatives to be secured than on other occasions. It would be exceedingly dispiriting to the astronomers to make such long journeys without result. Such, however, has been the fate of some expeditions as far as photography is concerned.

Art in the Lantern.—At the present time lantern exhibitions are restricted almost entirely to photographs from nature, such as landscapes, street views, and the like. This frequently renders a long exhibition somewhat monotonous before it reaches the close. Now, if the slides from nature were occasionally interspersed with a few copies of works of fine art, it would often prove a relief to the audience. One cannot help thinking, when looking at the magnificent copies of painting to be seen in the shop windows, that are produced on the Continent, what excellent lantern slides could be made from the negatives. Although it might not pay commercially to have to take negatives specially for lantern purposes, there is no reason why the negatives now in use for contact printing should not be employed with camera printing. On the Continent the lantern is not in such extensive use as it is here, and it is for that reason, perhaps, slides of the kind are not forthcoming. If those enterprising houses that publish the popular reproductions of paintings were convinced there would be a sale for lantern slides of the same subjects, there would soon be a supply in the market. Any how, the matter may be worth consideration.

"Trusting to Honour." — A correspondent directs our attention to the following advertisement of a provincial photographer:—"Trusting to honour. A bold experiment never before tried. Can only succeed by the result being so beautiful that you cannot resist it. Send me any portrait, no matter how old or faded, of yourself or friend, that you really value, and I will return you, entirely free of cost, one of my new style large porcelain-type portraits—an exact reproduction, artistic, lasting, beautifully finished, and handsomely framed—entirely on approval. If you do not wish to possess it, I will trust to your honour to return it to me; but, if you do (of which I feel sure), I will accept the very reasonable sum of 1*l.* 1*s.*, and trust to your honour to remit the same. I will stake my honour and 50*l.* that I will not damage your copy to the slightest extent, and return it post free and safely packed. Address, ——— Cabinet portraits copied same size, or enlarged from *cartes-de-visite* on same terms, viz., approval. Specially note.—This is not a two-guinea free pastel portrait, which may be a take-in, but exactly the opposite in every way. Give us a trial, as there is no risk to yourself in any way whatever, and you will have the opportunity of purchasing, at about half its value, a portrait that will be certain to please, and which you will probably find a joy for ever." We have only one

remark to make, and that is, that we should like to see the element of "honour" entering more largely into competition among professional photographers than this and other recent advertisements would indicate as prevalent.

Photo-Intaglio Engraving in America.—In our last issue Mr. Louis E. Levy has a reply to our comments on a paper of his that appeared some time ago in the *Journal of the Franklin Institute*, the greater part of which, as we said, was devoted to decrying the methods of photogravure as at present followed in Europe, and belauding an alleged new method of his own, which he did not describe, but said it formed the subject of a patent. Mr. Levy seems hurt at our suggesting that he appeared ignorant of what is being done in the matter of the highest-class photogravure on this side of the Atlantic, particularly as to the amount of hand work there is on high-class modern plates. His letter now confirms our previous impression, for we cannot imagine him making an intentional misstatement. We have had many opportunities of examining plates immediately the photo-chemical operations in some processes, and the photo-electro in others, were completed, as well as seeing them carried through from the beginning, in some of the best houses both in England and on the Continent. These have disproved Mr. Levy's ideas as to the amount of hand work that is now required. Until our correspondent told us, we were unaware that European establishments issued "unfinished and finished work." Those we know let no unfinished work leave the premises. With reference to the practicability of a gelatine film being printed from as an intaglio plate, Mr. Levy says: "I have not, indeed, utilised such films as intaglios." Possibly, when he attempts to do so, he will find there is a difference between reliefs and intaglios, even when only a limited number of impressions are concerned. Regarding the statement in the paper, "In only one establishment, and that in Paris, has the work been brought to a high degree of quality," our correspondent now quotes an old Latin proverb, "De gustibus non est disputandum." But we were not dealing with questions of taste, but matters of fact. Probably Mr. Levy is unaware that this is not the only journal that commented on his belauding his process without saying anything at all interesting about it.

SOLUTION-MAKING.

This subject seems to be very attractive: but if every one who, in response to our esteemed Editor's wishes, contributes to the British Journal Almanac what he considers to be useful memoranda of practice, is to be exposed to covert sneers and openly expressed accusations of making false claims, the responses would quickly fall off. As a matter of fact, when the Photographic Convention met in Chester, and a considerable number of members did me the honour to go through my place, studio, dark room, laboratory, toning room, and various workrooms were open to them. Most of them saw the Doulton dipping bucket, and in use for dissolving sulphite of soda, and expressed themselves highly pleased with the action of what, to them, was a novelty.

The principle of the method of solution is of historical age (I used it myself over thirty-five years ago), and it goes without saying that the particular application of the dipping bucket is only one of a hundred plans that may be adopted for the same end. It is not every photographer who possesses such acquaintance with laboratory work as, like Messrs. Martin & Co., to be able to look down upon the rest of their photographic brethren as "needing instruction in the elementary operations of their business," if the perforated dipping bucket should be a novelty to them. I am, however, surprised that the mere fact of "thoughtless assistants" breaking off the handle of the buckets should oblige such a talented firm to adopt another course, which they call simpler and more efficient, in lieu of repairing the breakage. If those who have any thought of acting upon this recommendation will take my advice, they will not adopt it. I long ago tried the plan (but in a more workmanlike way, the canvas being attached to a ring of cane, and thus quickly shipped and unshipped), and dismissed it for the dipping bucket, which is a far quicker and simpler method, and to be preferred, especially when *rapid* solution—the point of the original recommendation—is desired. I will not insult the intelligence of the readers of this Journal by supposing it is needful to explain how to form a substitute for a broken handle when the original support is knocked off.

The most striking point about Messrs. Martin's communication is their own statement that they make their hypo solution fresh every day. Every one practically familiar with the chemistry of hypo is aware that it is quite easy to keep the solution free from injurious decomposition for several weeks. The best way of arranging for fixing operations is not to make the solution daily, but to store a large quantity in a tank, and convey it in pipes provided with taps—"lay it on," in fact, like water. I claim no originality for this plan, but it would be far better for a "general photographic works" than the primitive hand-to-mouth plan of making it daily, and carrying about the place. A hundredweight cask of hypo has a few holes bored by a brace and bit round the sides at one end, and is then placed in the tank, supported, partly immersed, at the perforated end. Solution is soon made, and a tank with sides little over two feet square will suffice for a twenty per cent. solution of a hundredweight of the salt.

"Atticus" appears to be one who is readily amused: but, as he is ignorant of the difference between a dark room and a laboratory, and from his letters it would be inferred does not use sulphite in making stock solutions of pyro, and when he does make it uses his dark room for the operation, he is evidently of no account! Surely the readers of The British Journal of Photography take no interest in the amusements of this kind of person, who, further, seems to have a specially original copy of The British Journal Photographic Almanac, for it contains, according to his letter, statements on a particular page not to be found there in any other copy.

G. Watmough Webster, F.C.S.

JOTTINGS.

The unalterable ass who beats the drum for the *Shoptician and Spectacle-sellers' Gazette* seems to be in doubt as to whether the owner of the *nom-de-plume* at the end of these "Jottings" is a lady or a gentleman. It is so agreeable to the anonymous journalist to be taken for one or the other, that I am peculiarly pained to have to deny the compliment of a choice to my critic—who is neither.

Mr. Jones—the only Jones, I should think—has been giving the Halifax Society his ideas on landscape or tourist photography. "He did not believe in the long-focus camera when on tour." Why? Has Mr. Jones never experienced the want of a long-focus lens out of doors? "The best way to store films or plates after exposure was to place a thin sheet of non-actinic paper between every two plates." Why *non-actinic* paper? "He considered the legs of the tripod . . . . a great nuisance." Where does the "nuisance" come in? and why not include the camera, the dark slides, and the lens in the same category, Mr. Jones, or use what the Irishman would call a one-legged tripod? "He had often been annoyed by crowds of people standing round when about to expose, and recommended as a remedy that one's wife should be sent round with the hat, which he considered would be effectual in making them move off." If *I* were among the crowd, my readiness to move off would be largely governed by the lady's personal gifts; but I should like to have the ladies' views on the suggestion. On the whole, Mr. Jones's photography is superior to his gallantry—but not very much.

I hear a meeting of Exhibition Judges is to be held, with a view, I suppose, of arriving at a common basis of action for their future guidance, and the preparation of rules to be observed by societies holding exhibitions. The ridiculous airs and graces which several judges have given themselves lately proves that there is as much need for rules and regulations for *them* as for societies and individuals: and I hope therefore that the search lights of the photographic press will be turned on their proceedings, so that the game of mutual admiration does not go too far. It seems to me that in late years the principal qualifications for a judge at photographic exhibitions are two, namely, (1) that he should have produced a few passably well-selected and composed photographs, indifferently focussed and exposed,

and printed to look as much unlike a "photograph" as possible; and (2) that he should have foisted lengths and lengths of nebulous twaddle on Art—with a capital A—on the readers of the photographic papers. The worst of it is that people of this kind get so imbued with the notion that their way of making pictures by photography is the right one, that any one who thinks otherwise, and proves the faith that is in him by exhibiting, stands very little chance of an award against those who prefer to look at nature through a ring stop.

Contact photographs, with the tones broken up by the interposition of ruled gratings between the negative and paper when printing, are, to my mind, so distinctly effective, that I should not be surprised if the public, being gently inclined thereunto by a little of the push and assiduity with which, alas! so few modern photographers are endowed, did not take kindly to them, and the oft-expressed aspiration for a new style of portrait, which has appeared in these pages of recent years, be fulfilled. During a brief visit to the States last year I saw several grated photographs, produced, I think, by a New York photographer. They were on albumen paper; but I can conceive that on bromide or platinotype, where, as a rule, the contrast between the lights and the shadows is more accentuated, much more effective results can be secured. The preparation of suitable screens is no easy matter for the ordinary photographer, and it would, I think, be worth somebody's while to take the matter in hand commercially and supply screen negatives with a small variety of grains. But I would not give much for Mr. W. Lindsay's idea of securing the grain by sifting powdered emery on a gelatine surface, however much it might effect a resemblance to photogravure on albumen or gelatino-chloride. It seems to me that more evenness and regularity of grain would be likely to be obtained by mechanical ruling, while I am doubtful of the artistic success attending any attempt to impart the dominant features of a photogravure to a "surface" print.

The great Amateur *versus* Professional controversy seems to die a hard death. No professional photographer worth his salt need be alarmed at the progress of amateur photography, for if a man who devotes his days and nights to photography, and has the wholesome knowledge that his daily slide and the Sunday's dinner depends upon the measure of his application to his profession, cannot acquire a range of ability fifty times greater than the non-professional photographer who simply follows the art as a hobby, then has he mistaken his vocation, and is only fit for the hod. The sneering at amateurs as such by several of your recent correspondents strikes me as in the highest degree puerile. I applaud Messrs. Allison, of Belfast, who, on March 3, write you that they are endeavouring to make a little money out of amateurs by issuing a scale of charges for the use of dark room, developing, &c.; but I have no patience with W. Tipping, who, on March 10, appears to yearn for a new style of picture which amateurs could not "imitate." As if that, *per se*, would popularise portrait photography with the general public one tithe more than at present! If your correspondent wants a process which amateurs do not work, why does he not turn his attention to the neglected processes which you described a couple of years ago, among which he will find several admirable methods suitable for portraiture? By the way, I wonder if Mr. Byrne, Mr. Winter, Mr. Vanderweyde, Mr. Crooke, and Mr. Warnenke care a rap how much amateurs "imitate" them. Not likely.

Advance, Australia! An enlargement, fourteen feet six inches by six feet three inches, for the Chicago Exhibition, quite snuffs out the big enlargements which have recently been executed in this country for the World's Fair. I wonder if anybody buys—and pays for—these mammoth pictures? A man who could afford space for hanging them could afford to have big paintings, I suppose, and would have them. I like enlargements—"not too much enlargement, just enlargement enough"—but, when they are measured by the yard, I fail to see their beauty or utility for ordinary purposes. Still, "sweet are the uses of advertisement."

COSMOS.

GEORGE WASHINGTON WILSON.

One by one, and in an increasingly rapid sequence, the men who made photography are passing away.

There is no one whose name has ever been associated with all that is excellent in the art department of photography that stands so high as that of George Washington Wilson, of Aberdeen. When he first issued his singularly beautiful stereoscopic views, it was at once universally felt that a real artist had arisen, one who would aid in elevating landscape photography from the somewhat low state of mediocrity in which it existed. In his pictures were concentrated the highest development of

artistic beauty and technical skill, and they became models for imitation; and it is to this, in many cases slavish, imitation that we owe a marked and rapid progress as soon as his gems of art came to be known and studied. "Quite Wilsonian" was, and still is, a term frequently applied to photographs having a certain style of technique. Imitation is rightly said to be the sincerest form of flattery, and we know of some who did not disdain to follow Mr. Wilson's footsteps in such a literal fashion as, having one of his views in hand, and observing the relation of one portion of the scenery to the other, to eventually by this means discover the identical spot where his camera had been planted, and there also plant their own tripods.

In early life Mr. Wilson studied in the Art School, Edinburgh, and for some years he followed the profession of miniature painting, an avocation in which he attained a considerable measure of success. His reason for abandoning that art is rather remarkable. We learn from a local paper that just as he had begun to make a name for himself photography was discovered, and the impression became common that portrait painting as a profession was doomed. Mr. Wilson was apparently of that opinion, and threw aside palette and easel for the camera. He became one of the pioneers in photography, and was among the first to apply it to landscape. It is said that he had the honour of taking the first photograph of the Queen and the Prince Consort at Balmoral in 1850. His services were frequently requisitioned at Balmoral after that; and one notable group of Royal personages includes the late Emperor Frederick (then the Crown Prince of Prussia) at the time he was courting the Princess Royal, and so gratified was the Prince with the character of the work produced

by Mr. Wilson that he commissioned him to execute a series of water-colour sketches representative of Deeside scenery for presentation to the Princess Royal. When passing through Aberdeen in the Jubilee year, the deceased Emperor (still Crown Prince) paid a visit to the premises of the Messrs. Wilson, and, recalling the circumstances referred to, entered into a long and friendly conversation with the deceased.

After commencing business as a photographer he made numerous expeditions to notable parts of Scotland, and his views obtained on these occasions became widely celebrated. They were taken by the wet-collodion process (which he worked in a little portable tent), and in which he was an adept. By this he secured admirable instantaneous effects with fine skies. About seven years ago he retired from the active pursuit of photography, leaving three of his five sons to manage the large business now established. This, within the past few days, has been formed into a limited company, the necessary negotiations to that end having only been brought to a termination on the 9th inst, on the morning of which day he died very suddenly at his residence, Queen's Cross, having been in town on business the day previous. He was seventy years of age when the sad event occurred. When he retired to bed the previous evening he was in his usual health, but at one o'clock in the morning he had an epileptic seizure and expired soon afterwards.

After his retirement from active business, he once more took up the brush, and painted the portraits of several citizens of eminence. Mr. Wilson was a member of the Chamber of Commerce, and had represented one of the wards of the City in the Town Council. He was also a Director of several companies in Aberdeen.

It is needless to speak in terms of eulogy of his works—that has been done by the world during a long term of years; and through them, although now dead, he yet speaketh. As we have said, he was seventy years of age at his death, which took place on March 9. He is survived by a widow, four daughters and five sons, to all of whom we tender our sympathy.

The portrait we here give is a striking likeness, and was among the last that was taken of the eminent photographic artist.

ON THE PRODUCTION OF BLACK AND WHITE NEGATIVES BY MEANS OF ARTIFICIAL LIGHT.

III.

The great aim in black and white work being to produce negatives having much contrast, *i.e.*, clear glass for the blacks and the utmost density for the whites, it follows that the greatest care requires to be observed in the matter of development. A worker, however, will often be puzzled to account for the varying behaviour of the plates he exposes on what at first sight appear to be almost identical subjects. There is, however, a great difference in the behaviour of various samples of white paper. This can be easily proved by taking a sample of snow white, upon which some design or handwriting has been effected by means of Indian ink, and alongside of this place, say, a sheet of printed matter from any ordinary book or publication, and exposing the plate on both simultaneously. On development a considerable difference may be apparent in the densities. There is a golden rule, however, to follow in all cases, viz., to stop development before any reduction in the blacks begins to take place. This is not by any means a difficult thing to do, but it means the utmost care must be taken to give a full exposure, but not by any means an over-exposure for the method of development it is intended to adopt. Full density is seldom or ever acquired by development alone. Provided, however, sufficient attention has been given to the proper lighting, and a small stop used in the lens, with a correct exposure, a very considerable amount of density will be easily acquired before there is the least sign of any veiling over in the blacks or transparent portions of the negative. This must be carefully looked for, and development arrested the moment the least signs are noticed.

A worker will now see how necessary it is that the utmost precautions be taken to guard against any strong light entering the camera, except that which is conveyed to the sensitive plate by the lens and which forms the image. This I pointed out in a previous article. Sometimes unsuitable lenses are employed for copying. No lens should be used that conveys any light to the sides of the camera, or, in other words, that considerably more than covers the size of the plate being used. When it is considered that exposures of minutes' duration have frequently to be given, it will be at once obvious that any reflected light from the sides of the camera would be certain to cause deterioration to the transparency of the negative. This is a very frequent cause of defect, even in ordinary work; but in black and white subjects it is one of the most insidious defects met with, and when it occurs no perfect results can be obtained.

Whenever, after due attention has been given to the matter of correct exposures, &c., it is found that degraded negatives are still being produced, this defect should be looked for.

I have said that it is but seldom sufficient density is acquired by development alone. This means that all, or nearly all, negatives intended for black and white prints require to be intensified, and this being so means that the utmost care should be bestowed in the treatment of the plate during development.

With so many excellent formulæ for development in the hands of every worker, it might seem unnecessary for any one to recommend one in preference to another, because it is quite possible for a worker to turn out as good negatives by a certain formula, the working of which he daily practises and is therefore conversant with, as any one else can do by a different formula entirely. This undoubtedly is so in the all-round working of photography, but I find in black and white work I have succeeded in getting quite different results by the employment of a formula different in many respects from that used for other classes of work.

Some years ago I was forcibly struck, when reading a formula which I think was first given to the world by Mr. Leisk, that it appeared to me to be just the right one for black and white negatives. I can strongly recommend this. Here it is :—

Make up the pyro by adding nine ounces of saturated solution sulphite to one ounce of pyro, then add sixty grains of citric acid; label A.

Dissolve four ounces of carbonate of soda, 288 grains of sulphite of soda, forty grains of bromide of ammonia in thirty-two ounces of water; label B.

Attention must be given that these quantities are carefully weighed.

In conjunction with this formula, a clearing bath should be provided, as follows :—

Add two drachms of strong acetic acid to one pint of water.

Most workers of any experience will readily understand that some plates require considerably more pyro to gain extra density than others; therefore, practice alone will show the quantity of pyro to use to each ounce of soda solution. As a rule, however, it will be found that when the developer is very strong in pyro and bromide, and the exposure has been so regulated for such, the best results are got. I have frequently gone as far as two drachms of pyro to each ounce of soda, with an addition of bromide of ammonia over and above the quantity in the formula.

With a good isochromatic plate, this will yield plenty of density to allow of complete opacity when the plate is intensified. The great advantage of this formula is that it never stains the plate. When it is seen that the utmost range of density has been acquired without any reduction in the blacks, the plate is sponged gently by means of a plug of cotton wool with a quantity of the clearing solution. This will remove all developer from the surface. Do not wash the plate at this stage, but, after sponging off the developer, place it straight-away in the bath of clearing solution above given. This prevents any staining that would probably occur were cold water applied to the plate, the surface of which still contained some portion of the pyro developer. The plate should be kept in the clearing bath for at least some minutes.

From the clearing bath the plate is well washed under a running tap, and is then fixed in *freshly* mixed hypo.

If strict attention is paid to these particulars, a beautifully clean bright negative is the result.

A dirty or previously used fixing bath should be avoided. It may not be generally known, but a discoloured fixing bath will stain a plate, provided it remains in such only a very short time.

Some workers use a clearing and fixing bath made up by adding to about twenty ounces of hypo solution of proper strength two ounces of saturated solution of sulphite of soda, to which has been added one drachm of hydrochloric acid. This is a very useful fixing bath for ordinary work, and keeps the bath free of discolouration for some time after being used; but I fancy I never get such good clean results when the intensification stage is reached, after plates have been fixed in such. An alum bath also is better dispensed with when plates have to be intensified.

Some workers advocate the use of a gallic acid bath for the exposed plate previous to development, and claim that by its use the utmost amount of density and contrast is obtained. I know one worker who speaks very highly of its use in conjunction with a certain brand of plates, but I can confidently recommend Mr. Leisk's formula, which I have described. It is cleanly in its results, and yields bright and sparkling negatives.

So much for the formulæ. Now let me refer to a very important factor in development that is seldom or ever taken into consideration even by experienced workers. I refer to the important influence a

variation of temperature in the developing solutions has in the results obtained. We often hear expressions of dissatisfaction made about this or that plate being bad, or this or that developer being all wrong, or the light must have been awfully bad to-day, or some other such ejaculations having reference to the difficulty experienced in getting a plate to develop up with the usual amount of detail; or it may be the other way about, such as, after getting into a certain way of working with some particular brand of plates, all at once things get into a different groove, and quite a change comes over the behaviour of the plate, although, as far as can be judged, everything has been conducted just as before. I am quite sure this puzzle has bothered many an amateur who looks upon himself as a full-fledged worker, and yet somehow they cannot discover the reason of the different behaviour of the plates.

To those having experience of this, and who would like to solve the problem, let me suggest the following experiment:—

Take two plates, and expose them on any given subject under exactly the same conditions in every respect; proceed into the dark room and mix up sufficient developer in one cup to develop both plates, they being placed in different dishes. Proceed to develop with the formula I have given one of the plates with the developing solution at a temperature of about 38° Fahr. Mark how slow the development proceeds, and how for a long time only the high lights put in an appearance, and in many instances, even with a full exposure, the utmost difficulty is experienced in bringing out the shadows, the result being a negative violent in contrasts, with every appearance all through of being under-exposed, although such has not been so by any means. Now take the other plate, which has been exposed under exactly similar conditions, and with the other portion of the developing solution exactly the same proceed to warm the porcelain developing dish by placing it in hot water, and whilst the dish is warm pour in the developer, so as to raise its temperature. Now place in the dish the plate and proceed to develop, and mark what a distinct difference at once becomes apparent. There is now no talk of under-exposure, but, on the contrary, the plate will very possibly come rushing up and show every sign of being over-exposed.

Here, then, in the matter of altered degrees of temperature of the developing solution, we have a considerable power for ringing the changes in the way of getting violent contrasts when desired, and in the production of negatives from black and white subjects. We can do much in the way of keeping clear glass for the blacks by a judicious use of developing solutions of a low degree of temperature, at least, for a portion of the time the plate is being developed, and if desired, the temperature can be raised by merely flowing the solution into another dish, which is standing in warm water. In my hands this alteration of the temperature of the solution *during development* has proved a great boon in many cases, for, by a judicious use of such, not only can density be got to begin with, but the amount of detail that will eventually be brought out is sometimes quite surprising. When copying ordinary photographs, or other similar subjects, it is very necessary to get pluck and vigour in the high lights before detail is out, and it is got better by this means than any other I know of.

In winter-time, much may be done by warming the developing dishes, for in such weather as we get up here in Scotland, where we have a long spell of cold weather, often for weeks together the developing solutions will stand as low as 38° Fahr., and sometimes even lower; whilst in summer-time a supply of iced water, to cool the dishes at the start, helps wonderfully in gaining various ranges of tone in the negatives.

T. N. Armstrong.

"SPIRIT PHOTOGRAPHY," WITH REMARKS ON FLUORESCENCE.

[London and Provincial Photographic Association.]

The presence of smoke may be considered as implying the existence of flame. Spirit photography, so called, has of late been asserting its existence in such a manner and to such an extent as to warrant competent men making an investigation, conducted under stringent test conditions, into the circumstances under which such photographs are produced, and exposing the fraud should it prove to be such, instead of pooh-poohing it as insensate because we do not understand how it can be otherwise—a position that scarcely commends itself as intelligent or philosophical. If in what follows I call it "spirit photography" instead of psychic photography, it is only in deference to a nomenclature that extensively prevails, and not as offering a surmise from any knowledge of my own as to what is matter and what spirit, or the distinction between mind, spirit, and matter, for in truth I don't know. I approach the subject merely as a photographer.

Origin of "Spirit" Photography.

Before I proceed, a few words on the origin of spirit photography may not be out of place. In March, 1861, W. H. Mumler, the principal engraver in the employ of Bigelow Bros. & Kennard, the leading jewellers of Boston, when whiling away an idle hour as an amateur photographer, had a form other than that of any one present developed on his collodion plate. He surmised that it arose from an image having been previously on the plate, and its having been imperfectly cleaned off. Subjected to a more thorough cleaning, the form again appeared more strongly marked than before, and he could offer no other explanation than the one given. It got noised abroad through the press that a spirit had been photographed, and although Mumler strove to suppress the misrepresentation, as he regarded it, yet he eventually succumbed to popular demand, and took two hours a day from his regular work, devoting them to photography. This he had to extend to the whole of each day, entirely discarding his regular profession. Many men of eminence sat to him, most of whom he did not know at the time. He seems to have encouraged his sitters in the adoption of such test conditions as they deemed satisfactory. The figures that usually appeared on the plate with the sitters were, if I rightly infer, those on whom the sitters' minds had been set. That eminent portrait photographer, Mr. Wm. Black, of Boston, so well known all over the world as the inventor of the acid nitrate bath, undertook to investigate the *bona fides* of Mumler's methods. Through a friend, who had just previously sat and obtained a figure, Black offered fifty dollars if Mumler would operate in his presence and obtain a picture. Invited to come, the acute Black critically examined camera, plate, dipper, and bath, and had his eye on the plate from the moment its preparation began until it was sensitised and locked in the dark slide, removing it himself from the camera and carrying it into the dark room, where, on development, a figure of a man was seen leaning on B.'s shoulder. Black was wonder-stricken, and got away the negative, no charge whatever having been made. Mumler now claimed publicly to be a spirit portrait photographer, and as such he eventually opened a studio in New York, having previously satisfied Silver, Gurney, and other photographers as to the genuineness of his claims, never hesitating to operate in their galleries if required, and with their apparatus and chemicals. Mumler was arrested in New York; whether on the ground of witchcraft or of endeavouring to obtain money under false pretences, I am at present uncertain, but his trial was the sensation of the day, and numerous witnesses were examined. He was honourably acquitted.

Some Investigators of the Subject.

In this country, several who are amateur photographers have investigated this subject with more or less success. These include some F.R.S.'s, scientists, artists, and others. I question whether any have so persistently done so as the late Mr. John Beattie, of Clifton, and his friend, Dr. Thompson. Mr. Beattie was a skilled professional photographer of the highest eminence, who sometimes, prior to his death, had adopted the views of the spiritualistic school. The figures he obtained on his plates were much blurred in outline, some being misty in the extreme. I possess some two or three dozen of these taken by, or in the presence of, Mr. Beattie, whose intelligence, honesty, and powers of observation no one would venture to doubt. Many such photographs are claimed to have been produced by Hudson, a professional photographer, formerly of the Holloway-road, and I submit for examination a work by the late Miss Houghton, containing fifty-four of Hudson's spirit photographs.

There are many ways by which, assuming the genuineness of only one of all spirit photographs hitherto produced, the spurious article may be made even better than any alleged real ones I have yet seen. A plate secretly impressed previous or subsequent to being placed in the camera fulfils the condition; so does one at the back of which is placed a phosphorescent tablet in the dark slide. Pressure on the surface, such as by that of a Woodbury relief film, also causes a developable image; in short, trickery in a whole variety of forms may and has been impressed into the service.

Photographing the Invisible.

The higher department of fluorescence may with success be employed. Here is something to which believers in the visibility of spirit forms to a camera are quite welcome. At the time, and *apropos* of the Mumler trial in New York, I wrote that a good many absurd things have been said *pro* and *con* on the subject; but a writer in the latter category, who asserted that anything that is visible to the eye of the camera, and thus capable of being depicted by photography, must therefore necessarily be visible to the human eye, was surely ignorant of that important branch of physics popularly known as fluorescence. Many things are capable of being photographed which to the physical eye are utterly invisible. Why, for that matter, a room (visually dark) may be full of the ultra-violet rays of the spectrum, and a photograph may be taken in that dark light. Objects in a room so lighted would be plainly visible to the lens of the camera—

at any rate, they could be reproduced on the sensitive plate, while at the same time not an atom of luminousness could be perceived in the room by any person possessing ordinary or normal vision. Hence the photographing of an invisible image, whether it be of a spirit or a lump of matter, is not scientifically impossible. If it reflect only the ultra-violet rays of the spectrum, it will be easily photographed, although quite invisible to the sharpest eye.

Again, Cromwell F. Varley, F.R.S., well known as one of the most eminent of electricians, says (*Eclectic*, June, 1871), when passing a current of electricity through a vacuum tube, the results of which were indicated by touches of light about the poles: "In one instance, although the experiment was carried on in a dark room, this light was so feeble that it could not be seen, and the operators doubted if the current were passing. But photography was at work, and in thirty minutes a very good picture was produced of what had taken place. This," he says, "is a remarkable fact; indeed, it borders on the wonderful that a phenomenon invisible to the human eye should have been, so to speak, seen by the photographic lens, and a record thereof kept by chemical agency. It is highly suggestive, and we may anticipate that it will be turned to good account by practical philosophers."

Fluorescence.

Some very striking phenomena in photographing the invisible may be produced by the agency of fluorescence. Figures depicted upon a background by one or other of certain substances I shall presently name, although invisible to the eye, may become visible to the camera. Of these, the best known, although not the most effective, is disulphate of quinine. Such a solution, although to the eye it is colourless like water, is to the camera as black as ink. Fill three phials respectively with water, quinine, and common writing ink, and you have two whites and one black; but photograph them, and you have two blacks and one white. The camera has reduced the transparent quinine solution to the colour of the ink. Those of you who may care to experiment in this direction, please take notice that the quinine must be acidulated with sulphuric acid, and that hydrochloric acid, even a small trace, will destroy this property. Among other substances that are fluorescent, or that change the refrangibility of rays of light, are mineral uranite, certain salts of uranium, canary glass, alcoholic solution of chlorophyll, æsculine, tincture of stramonium seeds, and of turmeric. There are others known to be still better, but my experiments in this direction are yet too incomplete to warrant my even indicating them.

Let me for a moment enter the realm of speculation, and assume that there are really spirits invisible to the eye but visible to the camera and to certain persons called seers or clairvoyants only. Might we not suggest that there is some fluorescent compound in the eyes of such persons not present in those whose eyes are normal, and that it is to this they owe their seeing powers? Some of you may probably be aware that Dr. Bence Jones and other philosophers have actually established the fact of such fluorescent substances being found in some eyes. May this throw any light upon the recognised fact of certain animals being able to see in the dark?

When the subject of fluorescence is more thoroughly investigated (it is a discovery of Sir D. Brewster, who was followed by Herschel and Professor Stokes, and is as yet but of yesterday), we may hope for a vast accession to our knowledge of subjects as yet very slightly understood.

At the Bradford meeting of the British Association for the Advancement of Science, in 1873, Dr. Gladstone, F.R.S., demonstrated before the Mathematical and Physical Section what I have said respecting invisible drawings on white cards having produced bold and clear photographs when no eye could see the drawings themselves, and I brought away back to London these photographs, and, for aught I know, may have them still.

A Lady's Joke.

To prevent this disquisition from being too dry, I will here introduce a fanciful sketch I wrote *apropos* of Dr. Gladstone's demonstration at the time mentioned:—

A mischievous young lady of scientific proclivities who attended the meeting of the British Association, and who was addicted to practical joking, listened attentively to Dr. Gladstone's observations upon the properties of quinine referred to, and having carefully noted the discussion that followed, reasoned within herself thus: If solution of quinine can make invisible marks upon paper which will come out black in a photograph, it ought to do the same when applied to the skin. So she procured some of this solution, and upon her fair brow she painted with it a death's head and cross bones. These, of course, were invisible to human vision. Thus prepared, she went to a photographer to have her portrait taken. All went right until the operator went in to develop the plate, when she soon heard an altercation between the photographer and the attendant boy, in which it was evident that the latter was being charged with having coated an old or dirty plate.

A second negative was taken, with this result, that the operator, after bestowing a puzzled, affrighted look at the lady, rushed downstairs to the principal of the establishment. Both returned to the dark room, and a third negative was taken, when it became evident that intense excitement was being produced in the dark room. After an excuse to the lady about there being electricity in the atmosphere which had affected the chemicals, she was requested to sit once more.

Scarcely had the plate been developed when both photographer and assistant rushed out from the dark room, pale and excited, and explained that on the brow of the sitter in each negative was emblazoned the insignia of the King of Terrors. The negatives were produced, leaving no doubt of the fact. What was to be done?

The sitter hinted something about not being disposed to be made a fool of by one who she was satisfied was a spirit photographer, and that she, for one, would not allow herself to become the victim of such absurdity. This upset the equanimity of the photographer, who expressed his earnest conviction that she was an emissary and personal friend of the common enemy of mankind.

"I shall look in again to-morrow," said the lady, in her sweetest tones, "if you promise not to play any of your silly ghost tricks upon me."

"Not for ten thousand worlds," said the artist, "shall you ever set foot within my studio again."

"Oh," she laughingly rejoined, "I shall drop in through the roof and visit you some day when you are disengaged;" and with that she departed.

"I knew it!" gasped the photographer. "I felt a sulphurous odour the moment I came near her. Send immediately for my friend, the Rev. ——, and get him to offer prayer, and free the studio from the evil influences remaining after a visitation from one whose feet, although clad in boots, would, if examined, be found to be cloven."

Some Personal Experiments.

For several years I have experienced a strong desire to ascertain by personal investigation the amount of truth in the ever-recurring allegation that figures other than those visually present in the room appeared on a sensitive plate. The difficulty was to get hold of a suitable person known as a sensitive or "medium." What a medium is, or how physically or mentally constituted to be different from other mortals, I am unable to say. He or she may not be a photographer, but must be present on each occasion of trial. Some may be mediums without their being aware of it. Like the chemical principle known as catalysis they merely act by their presence. Such a one is Mr. D. of Glasgow, in whose presence psychic photographs have long been alleged to be obtained. He was lately in London on a visit, and a mutual friend got him to consent to extend his stay in order that I might try to get a psychic photograph under test conditions. To this he willingly agreed. My conditions were exceedingly simple, were courteously expressed to the host and entirely acquiesced in. They were, that I for the nonce would assume them all to be tricksters, and, to guard against fraud, should use my own camera and unopened packages of dry plates purchased from dealers of repute, and that I should be excused from allowing a plate to go out of my own hand till after development, unless I felt otherwise disposed; but that, as I was to treat them as under suspicion, so must they treat me, and that every act I performed must be in presence of two witnesses, nay, that I would set a watch upon my own camera in the guise of a duplicate one of the same focus—in other words, I would use a binocular stereoscopic camera and dictate all the conditions of operation. All this I was told was what they very strongly wished me to do, as they desired to know the truth and that only. There were present, during one or other of the evenings when the trials were made, representatives of various schools of thought, including a clergyman of the Church of England; a practitioner of the healing art who is a fellow of two learned societies; a gentleman who graduated in the Hall of Science in the days of the late Charles Bradlaugh; some two extremely hard-headed Glasgow merchants, gentlemen of commercial eminence and probity; our host, his wife the medium, and myself. Dr. G. was the first sitter, and, for a reason known to myself, I used a monocular camera. I myself took the plate out of a packet just previously ripped up under the surveillance of my two detectives. I placed the slide in my pocket, and exposed it by magnesium ribbon which I held in my own hand, keeping one eye, as it were, on the sitter and the other on the camera. There was no background. I myself took the plate from the dark slide, and, under the eyes of the two detectives, placed it in the developing dish. Between the camera and the sitter a female figure was developed, rather in a more

pronounced form than that of the sitter. The lens was a portrait one of short focus, the figure being somewhat in front of the sitter was proportionately larger in dimensions. I submit this picture. It is, as you see a lady. I do not recognise her or any of the other figures I obtained as like any one I know, and from my point of view, that of a mere investigator and experimentalist, not caring whether the psychic subject were embodied or disembodied.

Many experiments of like nature followed; on some plates were abnormal appearances, on others none. All this time Mr. D., the medium, during the exposure of the plates was quite inactive. After one trial which had proved successful, I asked him how he felt and what he had been thinking of during the exposure. He replied that his thoughts had been mainly concentrated upon his chances of securing a corner seat in a smoking carriage that night from Euston to Glasgow.

How the Psychic Figures Behaved.

If the precautions I took during all of the several experiments, such as those recorded, are by any of you thought to have been imperfect or incomplete, I pray of you to point them out. In some of them I relaxed my conditions to the extent of getting one of those present to lift out from the dark slide the exposed plate and transfer it to the developing dish held by myself, or to lift a plate from the manufacturer's package into the dark slide held in my own hand, this being done under my own eye, which was upon it all the time; but this did not seem to interfere with the average on-going of the experiments.

The psychic figures behaved badly. Some were in focus, others not so; some were lighted from the right, while the sitter was so from the left; some were comely, as the dame I shall show on the screen, others not so; some monopolised the major portion of the plate, quite obliterating the material sitters; others were as if an atrociously badly vignetted portrait, or one cut oval out of a photograph by a can-opener, or equally badly clipped out, were held up behind the sitter. But here is the point: not one of these figures which came out so strongly in the negative was visible in any form or shape to me during the time of exposure in the camera, and I vouch in the strongest manner for the fact that no one whatever had an opportunity of tampering with any plate anterior to its being placed in the dark slide or immediately preceding development. Pictoirally they are vile, but how came they there?

The Stereoscopic Camera in Use.

Now, all this time, I imagine you are wondering how the stereoscopic camera was behaving itself *as such*. It is due to the psychic entities to say that whatever was produced on one half of the stereoscopic plates was reproduced on the other, alike good or bad in definition. But, on a careful examination of one which was rather better than the other, and which is now about to be projected on the lantern screen for your examination, I deduce this fact, that the impressing of the spirit form was not consentaneous with that of the sitter. This I consider an important discovery. I carefully examined one in the stereoscope, and found that, while the two sitters were stereoscopic *per se*, the psychic figure was absolutely flat. I also found that the psychic figure was at least a millimetre higher up in one than the other. Now, as both had been simultaneously exposed, it follows to demonstration that, although both were correctly placed vertically in relation to the particular sitter behind whom the figure appeared, and not so horizontally, this figure had not only *not* been impressed on the plate simultaneously with the two gentlemen forming the group, but had not been formed by the lens at all, and that, therefore, the psychic image might be produced without a camera. I think this is a fair deduction. But still the question obtrudes, How came these figures there? I again assert that the plates were not tampered with by either myself or any one present. Are they crystallisations of thought? Have lens and light really nothing to do with their formation? The whole subject was mysterious enough on the hypothesis of an invisible spirit whether a thought projection or an actual spirit being really there in the vicinity of the sitter, but it is now a thousand times more so. There are plenty of Tycho Brahes capable of supplying details of observations, but who is to be the Kepler that will from such observations evolve a law by which they can be satisfactorily explained?

In the foregoing I have confined myself as closely as possible to narrating how I conducted a photographic experiment open to every one to make, avoiding stating any hypothesis or belief of my own on the subject generally, and it only now remains to exhibit the results, bad and fraudulent-looking as they are, on the screen.

J. Traill Taylor.

ON DIVERS SUBJECTS.

The Panoram.

I suppose that no less than a hundred or so inventors have exclaimed, on reading the account in the last British Journal of Photography of the "Panoram," "Why, I have had that in my head ever so long." I am one of the hundred or so, and congratulate the practical inventor for carrying out an idea which occurred to me the first time I used the Eastman roll-holder, having in my possession an old Johnson Pantascopic camera, which, in the days when I had time to use it, gave me great satisfaction. Of course, it brings up the question of perspective again, and will make discussion hot. It will be impossible to make the general public accept the perspective of the "Panoram" as correct, for the presentation of a line known to be straight as a curved one will be at once denounced as a falsehood; but the fact is that, in the case of horizontal lines, only that one which is on a level with the eye appears to it as a straight line, the lines above that level being bent down at the extremities, and those below it bent up; and in their finest temples the Greeks, who had no idea of scientific perspective, recognised this phenomenon, and, to give the buildings greater apparent dimensions, exaggerated the perspective effect by making the horizontal lines curve slightly, in the same sense that the effect of perspective made them seem to curve. The reason of it is apparent. If you stand opposite the central column of a long colonnade, the apparent height of the more distant columns diminishes in an increasing ratio, and, if the most distant were twice as far away as the central one, it would appear half the height; and this is the true perspective, as it is the true aspect of any natural object. Scientific perspective is a pure fiction, and the action of rectilinear lenses is so arranged as to confirm this fiction. It renders perfectly the facts on any given plane, but in no case gives the actual appearance to the human eye. As the Editor has shown, a sphere in extreme perspective becomes an ovoid, while the capital of a column is, in the case of a very wide-angle view, distorted most unnaturally, while to the eye, looking directly at them, they are of the same shape as the central ones.

Perspective.

In talking of the relation of perspective to photography, whether the scientific or real perspective is to be treated of, we must remember that there is a complication not easily adjusted in the equation, which is the fact that the photograph itself has to be seen in perspective, no matter how near it is held to the eye. Suppose, for instance, a photograph taken with a rectilinear lens of fifteen-inch focus of a façade of a building presenting a line of columns, the point of view being opposite the centre of the façade. By measurement the extreme columns will be of the same height as the central one; but, look at it from what distance we may, the photographed column which is most distant from the eye will be shorter than one in the centre, always on condition that we hold the photograph so that the eye is opposite the centre of the façade. If it be held at the distance of fifteen inches from the eye, the distant column in the photograph will be just as much smaller than the central one as it would be in the building itself, and the horizontal lines will have the same curvature that they have in nature. But in practice we cannot look at photographs from the distance of the focal length of the lens, and it is only comfortable to look at them from a much greater, so that in those taken with short-focus lenses we are always seeing them falsely. But the eye is educated to these compensations, and we accept what we know to be the fact even when it is not in accordance with the true optical impression. It is as in many more serious matters, we accept recognised illusions as conveying a better idea of the truth than the absolute reality would give. Everybody knows the old story of Queen Elizabeth objecting to the shadows in her portrait, as representing her with dirty patches on her face which she knew not to exist there; but, when we look at a portrait in which the light and shade are ever so strong, we do not take exception to the actual colour being different on one side of the face from that on the other, for without this difference the greater truth of the rotundity of the head could not be expressed. The simple fact is, and it can be easily proved, that any photograph can be shown in one way true and in another untrue. Taking one thing with another, I am inclined to think that the perspective which comes nearest to the truth in general is that of the panoram or pantascopic camera, for it agrees best with the method by which the eye takes in its vision.

Film Photography.

I have been seeing and hearing a good deal lately about the flexible film, as used in the roll-holder, and have seen the results of many exposures, with some results which make me doubt if it is possible to teach certain people to take a photograph even on the "pull-the-string, press-the-button" principle. I have known an amateur, in

spite of all warning, to make a snap-shot at an old picture in a church, and, on being remonstrated with, to reply, "Why, I thought' you had got the taking of photographs down to instantaneous!'. Last winter, when the light was at its very lowest, and an instantaneous picture could only be hoped for in the mid-day hours of bright day and with a powerful lens at that, a roll of film exposures was brought to the Club for development, some of which were interiors, some late afternoon and over-cast day exposures, all being snap-shops, and on opening the camera I found that the smallest aperture had been used throughout. And a literary friend, whom I had fitted out with a roll-holder camera and minute instructions, came back with a roll of exposures running over six months, all taken with a medium stop, and at the same focal distance, some interiors and some sunsets! It is not uncommon even to get a time exposure with the camera held in the hand entirely unsupported by any fixed support. I once gave instructions to and outfitted an amateur who was anxious to take photographs of a picnic party, and brought back his exposures to me for development. The first plate showed three bands of unequal density across its length; puzzled, I threw it away, and tried the second. Same result. An idea flashed on me: I said, "Did you not put your camera in a boat out on the river?" "Yes," said he; "was that not right?" And he had given a time exposure with a small stop. My experience with Kodak-users is that not half have learned, perhaps are incapable of learning, the conditions under which the Kodak must be used. I never attempt an exposure without a bright sunshine, and then, in the winter, only in the middle of the day, say, from ten to two, and in summer only when the sun is at least two to three hours above the horizon. In my experience of wandering Kodakers I am convinced that at least one-half the films are wasted through insufficient exposure and utter inattention to the conditions necessary for success. Many negatives are spoiled by carelessness in development, and generally in the following ways:—First, the negative is not thoroughly and equally wetted before applying the developer, and develops unequally. Second, the operator tries to develop half a dozen negatives at once, and they either stick together in the bath or protrude from it, and show similar inequalities. Third, they are thrown carelessly into the hypo and hold bubbles under them, or lie partly out of the solution, in both which cases they show brown patches when finished, printing more intensely. A certain amount of shrewdness is imperative even for those who only pull the string and push the button, for a judgment of the nature and intensity of the light precedes success even with the Kodak.

The Sandell Plates.

I have seen some of the results of the use of the Sandell plates on our Roman church interiors, and I must say that I have never seen such negatives of any interior by any other process; but the question which puts itself to me is, whether the absence of halation is due to the use of emulsions of various degrees of rapidity, or simply to the thickness of the aggregate of the coatings? Is it not probable, or even certain, that the chemical qualities of the under coating are immediately reacted on by the subsequent coats? and is it possible, chemically, to isolate them when in the moist state, as the prior coatings must be as soon as the later coat is applied? Is not the success of the operation due to the fact that the light has not the power to penetrate the mass of haloid presented for its action, and therefore never reaches the point at which the reflection, to which halation is due, commences? However this may be, the Sandell plate is certainly capable of producing such interior negatives as I have never seen here. My own experiments with them were not so successful, probably because I did not try them correctly. W. J. Stillman.

NOTES FROM THE CAPE.

It is some time since any notes from my pen appeared in these pages, but a cloudy night affords me an opportunity of a clearing a few items from my notebook; a few items of no startling character, but just a few of those little experiences which occasionally come handy to others.

Keeping Sensitised Paper.

Some two years ago I had occasion to order a few quires of a well-known make of ready-sensitised albumen paper. I was very well satisfied with it at first, and noted, with satisfaction, that each quire was in a tin tube, well soldered down. Six months later a second tube was opened, and the paper found to be considerably discoloured, but was fit for use, the discolouration disappearing in the toning bath. I placed it in a larger tin case, using small quantities of it at intervals, until a short time ago I found I had got to the last sheet, which showed spots and streaks that did not trouble me unless I used negatives with a large space of sky. I then opened the third tube. The paper smelt considerably, but I was astonished to find that it was very brown—two or three times as dark as the paper that had access to air at intervals. Very little of this discolouration disappeared in the toning bath, the whites coming out very brown. I have little doubt as to what was the cause; the albumen had decomposed, compounds of sulphur had been emitted, and these, having no outlet, had acted on the free silver, converting it into sulphide of silver. I can only advise shippers, therefore, not to pack sensitized paper in sealed tubes, but to roll it up in blotting and brown paper only. To those photographers who, like myself, only use small quantities of paper at a time, I say, cut it up in suitable sizes, and pack it between blotting-paper, treated with carbonate of soda, as has been so often recommended.

Packing Plates.

Whilst on the subject of packing, let me request plate makers not to pack their plates with sheets of "papier Joseph" or other paper between them. I have tried several brands of plates packed in that manner and before I have had them many months paper marks have appeared and rendered them useless. On the other hand, plates packed with a slip of thin card at the edges deteriorate very slowly, and any packing marks appear at the edges only. When I purchase plates here I like to see the word "slipped" written on the label.

A word too on the subject of packing plates in tin foil. A carefully prepared plate when new should give no trace of "light fog," and any chemical fog produced by energetic forcing should be even over the plate. But plates on keeping show fog first at the edges, and then this gradually creeps over the plate according to the time it has been stocked. A great part of it may be removed by gentle friction, but prevention is better than cure, and for some time past I have had all plates for astronomical use packed in tinfoil with most beneficial results. I have met no plate that does not sensibly degenerate with time, but now my complaints on that score are reduced to a minimum. By the way, it is hardly fair for a plate manufacturer to advertise that they supply plates to the Cape Observatory, on the strength of the occasional purchase of a few boxes at a local dealer's. Our stellar plates have for some time past been specially prepared for us by Mawson & Swan, and are a model of even coating and clean working, with rapidity and fine grain.

Landscape Photography at the Cape in 1892.

Two novelties during the past year are worthy of special notice under this heading. We had a severe winter, which extended far into the summer months. Ice was found on Table Mountain, although we had but little frost below, and on the mountain a little sleet fell; but on the distant mountains to the north and east of the peninsula snow fell in abundance, and at Worcester, a town fifty miles from Cape Town in a straight line, a party of climbers ascended to a height of 6000 feet, where one of their number—Mr. Isaac Meirig—took some photographs, which are perfectly Alpine in character, and that, too, at a time of the year when we are usually experiencing the commencement of the summer heat. The other novelty consists in the views of the Zambezi Falls, brought down by Mr. Ellerton Fry, who exposed a large number of plates there under considerable difficulty, the chief trouble being the showers of spray that obscured his lens, nearly spoilt his camera, and fogged his plates. Only one in every twenty plates he exposed does he consider a perfect success, but these are pretty numerous and unique in their way.

Indecent Photographs.

A much-needed law was passed last session stringently prohibiting the sale of indecent photographs, not that we are fastidious. The photographs prohibited are seldom the work of Cape photographers, for the ordinary run of photographs of natives cannot be classed under the above heading. They may be made indecent, and in that case their sale would be rightly stopped; but the photographs aimed at are those displays of nastiness frequently sold at foreign seaports. Port Said has an unenviable notoriety for such works, and so have some Western ports of North and Central America, and most of the Southern American ports as well. When going on shore at Guayaquil in South America in 1883, we strolled into a photographer's and asked to be shown some photographs. He opened two large drawers of—well, we blushed, and it takes something to make men do that, whilst the photographer was surprised to find that we wanted landscapes, and had very few to show us. Now that a law has been passed here on the subject, it is to be hoped that on my next visit to England I shall have less annoyance with the Custom authorities. My experience at Plymouth has been that, on the arrival of the steamer from South Africa, the appearance of anything photographic in one's

baggage has furnished occasion for rigid cross-examination and a strict search for anything nasty.

PERMANENCY OF PRINTS—GELATINE *versus* ALBUMEN.

An instructive sight here is to watch the show-cases put up by photographers in the principal streets. You see a group of sparkling landscape specimens, which you stop to examine. A week or two later you notice that the blazing sun is effecting a change in them. Soon the should-be whites have turned to an intense gamboge, then the shades appear mealy, and at last out comes a batch of new specimens. Printing-out paper is having a run here, and it was soon noticeable that photographers were taking advantage of it in hopes of obtaining greater permanency. And yet the other day I noticed that the gelatine prints were going like the rest. I remarked to a member of the profession that the gelatine prints were as little permanent as albumen, but he differed from me. "Look on this group of prints and on that," he remarked. "Printed at the same time, exposed outside together, got damp together, as witness the water stain on the cardboard. Yet, you see, the albumen are fast going, and the others are almost unchanged." Under the circumstances, it is difficult to come to any conclusions. Time alone and the collated experiences of many will tell. C. RAY WOODS,

Photographic Assistant at the Cape University.

LIGHT, SHADE, AND PICTURE COMPOSITION.

BEFORE the Aston Society, on March 9, Mr. C. T. Cox, head master at the Birmingham School of Landscape Art, delivered a lecture on *Light, Shade, and Picture Composition* to the members and friends of the above Society.

In his opening remarks he said he knew that much unkindness existed between devotees of the camera and lovers of the brush, and that many of the latter always tried to depreciate work of the former; and before commencing his lecture he should like to say that he was no party to such feelings—in fact, he considered the photographer equal to the artist, however high, and that in many cases the camera could produce effects that would be otherwise beyond the skill of an artist to obtain; in short, he thought the two should work together. He then dealt with laws relating to chiaroscuro, and showed in many ways how the laws relating with art were equally applicable to photography, and how the violation of such laws led to failure.

The members present were here asked to take down the nine rules governing the proper representation of a picture, and were as follows:—(1) Principality, (2) Repetition, (3) Continuity, (4) Curvature, (5) Interchange, (6) Contrast, (7) Radiation, (8) Consistency, (9) Harmony. After explaining the first principle, he showed, by means of specimens, how far the law of repetition was carried out in the works of Rembrandt, Turner, Edward Watson, and others; how the chief image was again represented by a similar but minor study, not competing with the chief object of interest, but only repeating it. Then, again, *continuity*, as in the case of the outlines of mountains, pillars, trees, &c., would also be seen not competing with repetition, but only repeating it. The speaker here asked who had not noticed the graceful curves of motion of the human figure, the exquisite curvature of the movements of body, the dainty toss of the head, and from these he went to those of Cader and Snowdon, and pointed out that the whole of nature presented these curves to the users of those valuable twin lenses, the eyes. He had seen and painted old Welsh cottages whose chronic curvature of the backbone of the roof and tumbledown gables lent a charm to the whole scene. Contrast and interchange were then fully dealt with, effects in the former being chiefly obtainable in April, when days of tender light and soft, flickering shade were always present; and here the lecturer showed how the general rule of contrast was laid down in the works of Ruskin, viz., "the shadow thrown was always deeper than the shaded side of the object throwing the shadow." Again, most of the famous works of Claude Lorraine were all based upon the division of his canvas diagonally into light and shade, with an interchange of both from one to the other, and the larger the picture the greater was the half-tone of each introduced.

Ruskin asserted that the shadows in photography always appeared three times as dark as they were in nature, but the lecturer said he had adjudicated in photographic exhibitions in which he had seen shadows depicted far truer to nature than could have been portrayed by the brush, owing to their transient character. Relating to consistency, Mr. Cox asked who would think that "a lovely sylvan scene—a poem without words, one that draws out the soul and appeals for response to everything that is beautiful in the mind," would be consistently represented in a thunderstorm? he said that "rocky crags and frowning dark ravines" would be more consistent with the battle of the elements. Radiation and harmony were next dealt with, and herein he advised that photographers should follow the lines of the old masters and obtain an oval character for their views, although this was often exaggerated, as in the works of Bonnington, one of which was shown in which the clouds appeared as if placed in order to fulfil the ovality, as it were. He said, if the camera screen were divided medially through the sides, and an ellipse sketched round the points of contact, we should have a guide to good picture, making if we avoided placing objects of interest in the corners or on the margin of the diagram. He (the speaker) concluded with some splendid remarks on clouds, those things which bothered photographers, and more especially artists, but things which were invaluable to the production of a good view. Finally, he was pleased that Aston had formed a photographic society. He wished them every success, and offered to give advice gratis to any member at any time that they may feel they would like to have his opinion or criticism.

MANCHESTER PHOTOGRAPHIC SOCIETY'S EXHIBITION.

THIS Society, whilst not following the practice which has now become common amongst kindred associations of inviting exhibits from the general body of photographers, was able to display a very pleasing and interesting collection of photographic work, fairly representative both of the progress made by individual practice and the development of new processes.

The Exhibition was open on March 9 and 10, and was well attended both days. An improvement made in the hanging of exhibits over previous years perhaps in a manner added to the satisfactory character of the show; still, as a rule, the contributions were of excellent quality. Prizes were offered for the best exhibits in various classes; but for the instantaneous *genre* pictures and home portraiture the result was disappointing, especially as regards the first-named, it being either an indication of the waste of energy displayed on "snap-shots," or the unfavourable conditions during the past two years for this class of work, for only one member sent specimens. In portraiture, too, a good set by Mr. J. Wood was alone, so that in these two classes prizes could not be given. The *genre* pictures were only two in number, and neither very striking as compositions. Mr. J. Wood's *Taking Milk to Market* gained the prize; the title, as far as "taking milk," was well expressed, but the destination of the said milk not very obvious. Mr. Higson's picture, *Father Adam*, was a good photograph, but not very expressive. Two classes for Landscape (over half-plate and smaller sizes) were, as a matter of course, well represented, two bits of local scenery, *Morton Bottoms*, by Mr. J. Wood, and *In the Bollin Valley*, by Mr. W. G. Coote, taking the prizes. Interiors were all good, *Lyme Hall Entrance*, by Mr. M. W. Thompstone, being adjudged first. Stereoscopic and lantern slides were not as numerous as the number of workers in this class could warrant, Mr. J. Higson, with stereoscopic transparencies, and Mr. H. M. Whitefield, with lantern slides, taking first places.

The enlargement class was very prominent both by number and quality. The Judges highly commended two pictures exhibiting very opposite treatment, one a bromide, by Mr. J. Brier, *At Tivoli*, being a well-defined, perfect enlarged reproduction of the negative; the other, also bromide, a Norwegian harbour scene by Mr. F. Edwards, a very clever and artistic enlargement of a hand-camera exposure. Mention might also be made of Mr. E. G. Wrigley's seascape enlargements for brilliancy.

The scientific or experimental photography class was responded to by Mr. B. Robinson and Mr. H. Smith, the former with a frame of photo-micrographs of great technical excellence, and the latter by perhaps the most interesting exhibit in the room, namely, the treatment of gelatino-chloride printing-out paper by short exposure and development. The results of evident patient experiment were shown by a number of prints, different tints (from red to blue-black), being obtained by varying the exposure and development, no gold or other toning being employed.

The Judges were Mr. Geo. Perkins (artist), Mr. J. W. Wade, and Mr. J. W. Leigh.

The platinum, gelatino-chloride, and bromide were the processes used by nearly all the exhibitors.

THE CENTRAL PHOTOGRAPHIC CLUB.

THE Executive Committee appointed by the public meeting on March 6 has already got to work, with the result that suitable premises and Club rules are under active consideration. Another meeting will be called in a few days to consider the propositions of the Committee. The Hon. Secretary *pro tem.* has received a large number of applications for membership, particulars of which will be sent in due course to the applicants.

Our Editorial Table.

ROUCH'S IMPROVED "EXCELSIOR" HAND CAMERA.

INGENIOUS in every way as Messrs. Rouch's now well-known "Excelsior" hand camera is known to be, the march of improvement has still further added to its usefulness and excellence. It has now a sliding as well as a rising front, and a rack and pinion adjustment allows of lenses of varying foci being used, an index scale being, as heretofore, placed on the top of the instrument. In addition to two

finders, there are spirit levels on two sides—a great convenience. The camera may be used on the stand with slides and a focussing screen, and the firm's well-known changing back can be employed instead of slides. To the changing back is now added an indicator, so that by simply touching a small lever at the side, the number of plates exposed may be seen at a glance. The camera we saw (made expressly for Mr. E. Hawkins, a successful hand-camera worker) was fitted with the Thornton-Pickard focal plane shutter, and this in such a neat way as not perceptibly to increase the bulk of the instrument. Altogether, the Excelsior remains the perfection of a practicable, workmanlike instrument, that must be a pleasure for the photographer to handle.

Marion's Cartridges for Developing and Fixing.

Messrs. Marion & Co., Soho-square, have submitted to our notice pyro and soda developing cartridges, together with similar cartridges for fixing which they have recently introduced. The various contents of these form an impalpable powder which dissolves almost immediately after being thrown into water. The pyro-soda cartridges are in form of plain glass tubes closed at one end and well corked at the other, two of these forming a complete dose for ten ounces of water. As might be surmised, the contents of one is pyrogallic acid, that of its companion being sulphite of soda and carbonate of soda. The proportions of these are so accurately adjusted as, with the above quantity of water, to form a perfect developer. The fixing cartridges, like the others, contain the active agent in form of a fine powder; and, according to whether they are to be used for negatives or prints, so is the quantity of water determinable. For negatives, the contents are dissolved in five ounces of water, while for prints ten ounces form the correct quantity.

This is a most excellent form in which to keep these necessary agents, not alone convenient for those who go to the country or seaside during the summer, but also for those who stay at home and like to have things ready to hand.

Andresen's "Diamidophenol" and "Combined Toning and Fixing Bath."

Messrs. Arthur Schwarz & Co., the agents, have sent us samples of diamidophenol which, used with alkali in the proportions of the formula given, develops rapidly and cleanly, and renders the density well. The toning and fixing cartridges should prove extremely useful—they impart a deep but pleasing rich black tone to prints.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 20	Camera Club	Charing Cross-road, W.C.
,, 20	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 20	Fillebrook Athenæum	Fillebrook Lecture Hall.
,, 20	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 20	Hastings and St. Leonards	
,, 20	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 20	Richmond	Greyhound Hotel, Richmond.
,, 20	South London	Hanover Hall, Hanover-park, S.E.
,, 21	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 21	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 21	Exeter	City Chambers, Gandy-st., Exeter.
,, 21	Hackney	206, Mare-street, Hackney.
,, 21	Keighley and District	Mechanics' Institute, North-street.
,, 21	North London	Canonbury Tower, Islington, N.
,, 21	Paisley	9, Gauze-street, Paisley.
,, 22	Leytonstone	The Assembly Rooms, High-road.
,, 22	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 22	Southport	The Studio, 15, Cambridge-arcade.
,, 23	Camera Club	Charing Cross-road, W.C.
,, 23	Glossop Dale	
,, 23	Hull	71, Prospect-street, Hull.
,, 23	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 23	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 23	Oldham	The Lyceum, Union-street, Oldham.
,, 24	Cardiff	
,, 24	Croydon Microscopical	Public Hall, Georgo-street, Croydon.
,, 24	Holborn	
,, 24	Maidstone	"The Palace," Maidstone.
,, 24	West London	Chiswick School of Art. Chiswick.
,, 25	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

March 14,—The President (Captain W. de W. Abney, F.R.S., D.C.L.) in the chair.

Messrs. E. Collins, E. J. Garwood, H. W. Hughes, W. E. Pond, T. P. Watson, and the Duchess of Sermoneta were elected members.

The North Surrey, Hastings, Derby and Manchester Photographic Societies, the Croydon Camera Club and the Photographic Section of the Chester Society, were admitted to affiliation of the Society.

The Hon. Secretary announced receipt of a supplementary communication from Colonel Waterhouse on Gaiacol, of which he had tried a fresh sample. It had distinctly weak developing powers, and it was quite possible that it was not a developer, although practically it was one apparently inversely to its purity. He had also tried other derivatives of creosol, and thought their developing power might be due to oxidation products. A minute quantity of impurity might impart developing powers.

Naturalistic Photography.

Owing to Dr. Emerson having sustained a bereavement, his paper on *Naturalistic Photography* was read by Mr. T. R. Dallmeyer. In the paper (which we shall give *in extenso* on a future occasion), Dr. Emerson said that two years ago his researches into the subject of vision and perspective drawing were responsible for the withdrawal of his book. When he took up photography he was told by all that if the photographic observer closed one eye and placed the other eye at the focal distance of the lens he would see the picture true to nature. He felt that this was not the case, and he maintained that the sharp photograph was not true to nature; hence years of long and inky warfare. Opticians were right from the mathematical standpoint and he from the physiological. He had laid it down that truth to nature was obtained by throwing the background out of focus. There was no connexion here between want of sharpness or pinhole pictures; it was a deliberate and conscious act to be modified according to circumstances, and not a hap-hazard dodge. He had found his method of focussing justified by psychology. As to what was true in nature from the visual standpoint, he thought the tele-photo lens a most useful tool to put into the hands of the decorative photographer. The position he and Mr. Goodall had taken up in their pamphlet on drawing and vision was still unshaken. There was no absolute truth to nature from the visual standpoint, for as each man's sight was different, the only absolute truth to nature was in his own view of it. From the mathematical standpoint there was an absolute standard, which was the sharp photograph. Having said that the shapes of things, such as table-tops and wall-paper patterns, are perspective distortions, the transition from one to another being infinite and continual, he said that it was evident that no photograph gives things as we see them with two eyes; some photographs gave results nearer to what we saw than others, but were not naturalistic photographs. How true must the photograph be that it may be considered naturalistic? It must be true in fundamentals to the point of illusion, that is, a man's boots must not be twice as big as his head. He did not consider photography was an art, it was a mechanical power. Its results were sometimes more beautiful than art, but were never art; just as nature is sometimes more beautiful than art. Photography was a mechanically recording representation of nature. Having defined nature as the fountain-head of sensuous impressions but not necessarily of ideas, he traced the relation of realism, idealism, and naturalism to nature. He said that, under the same physical conditions, the same results would always be obtained in photography. Art was personal, however; photography was a cross between nature and a machine, art a cross between man and nature. There was a link binding art, photography, and nature together. Photography was decorative, and photographs must be decorative to appeal to artists. The decorative photograph was a mechanical reflection of nature when she sings in tune, and a good photographer is required to know when she does sing in tune. It mattered not for merely decorative photographs what lens was used, what exposure given, what developer employed, what developer applied, provided the result be decorative, as no photograph could be said to have any art qualities without being, first of all, decorative. That was the quality which differentiated the few photographers from the thousand. It had been said, photography would do works of art when they got soul into their photographs; this and all sorts of similar rubbish had been said by second-rate artists and third-rate photographers. The paper concluded with a series of nineteen propositions, which attempted a definition of art and its relation to photography.

Mr. T. Bolas thought the paper involved a great deal of thought, although it was given in difficult phraseology. It enabled those who had studied Dr. Emerson's previous remarks to understand the full bearing of his recantation. He appeared to have changed his fundamental views as regards photography, but not as to his method of working. The paper corresponded with the tendency of thought at the present time in regarding the beautiful as subjective rather than objective. Mr. Emerson's figure of an artist's ideal changing during the progress of a picture had considerable interest as bearing on the subjective idea of the beautiful rather than the objective. There were undoubtedly a great many ideas in the paper which were quite new.

Mr. Andrew Pringle did not understand the paper, but he was perfectly willing to believe that it was extremely able. The subject was a great deal discussed—perhaps too much to be profitable, and it contained many truisms which were as old as the hills.

Mr. W. E. Debenham defended mathematical perspective as the only true perspective, and also thought that an artist's idea of sharpness, in contradistinction to the photographer's, meant harshness of outline. Mr. Emerson had said that a great deal of pretentious rubbish had been written about art; they might retort and call this paper Emersonian rubbish. Dr. Emerson had said that a representation of nature on a plane surface was impossible. Were they then to condemn paintings, and were stereoscopic views to be accepted?

The Rev. F. C. Lambert said the paper wanted three months' careful reading, it contained so much that was old and true, and so much that was debatable. He was not at all sure that he understood the greater part of it. Dr. Emerson had, it seemed to him, taken up the same position as Mr. Pennell—that because a photographer places between his brain and what he sees a machine, the product had no stamp of individuality. The mere question of tools did not affect individuality.

Mr. Birt Acres disputed the view that half a dozen photographers taking the same view would produce identical results, as each would have his own idea as to how the view struck them as a picture, and their ideas would differ as to brilliancy or softness of results. Again, he did not think the best workers in photography called themselves "artists," though they produced artistic

results. He did not think photographers should be ashamed to call themselves photographers.

Mr. T. R. DALLMEYER said the subject involved very deep study. Differential focussing had come forward a great deal since Dr. Emerson first laid it down. It appeared to him (Mr. Dallmeyer) that Mr. Debenham had gone away from the real intent of the paper, as Dr. Emerson was not discussing mathematical perspective. Psychology was not a science yet, but we did not see things in mathematical perspective for psychological reasons. He thought the term decorative a good one in regard to photography.

Rev. F. C. LAMBERT agreed with Mr. Dallmeyer as to the importance of linking physiology and psychology together to appreciate works of art. As to the use of the term decorative, it seemed to him all pictures were decorative.

Mr. PRINGLE, in the course of further observations, said that, in spite of all Dr. Emerson's changes of position, no person had a right to deny that photography owed a great deal to him. He had done a great deal towards turning the attention of photographers into an improved artistic line. The results of his work were before them now, and though many of his pupils and disciples had thrown him overboard, the fact remained that he had inaugurated great improvement not only in specific but in general artistic work.

Colonel GALE said that it was pleasant to find Dr. Emerson coming out of his seclusion, but he was disappointed to find that he was still drawing comparisons between the artist and the painter. They were always getting into trouble with painters, and he did not see the necessity for it, as photography could be carried on without reference to painting.

The PRESIDENT, in closing the discussion, said that he himself was only a plain maker of "photographic maps," but it seemed to him that, whatever might be the outcome of the paper, Dr. Emerson himself was the outcome. Whether the fuzzy school would last was a matter for the public to say. He (the President) would continue to take sharp photographs, as he thought the fashion for them would come back again.

Votes of thanks were passed to Dr. Emerson for his paper, to Mr. Dallmeyer for reading and deciphering it, and an expression of sympathy with Dr. Emerson in his bereavement.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 9,—Mr. J. Weir Brown in the chair.—There was a very large attendance.

"SPIRIT PHOTOGRAPHY," WITH REMARKS ON FLUORESCENCE.

Mr. J. TRAILL TAYLOR read a paper on this subject [see p. 167], after which several slides from the negatives he had obtained were exhibited by the aid of the lantern. A series of "Spirit Photographs," the work of Mr. Hudson, of Holloway-road, and some French photographers, were also shown by Mr. Maltby, a visitor.

In the discussion that ensued, Mr. DOWNEY asked Mr. Taylor if he thought there were such things as "spirit photographs?"

Mr. TAYLOR replied that the question was outside the subject.

Mr. P. EVERITT asked if Mr. Taylor had any choice of a room—was it of his own selection?

Mr. TAYLOR replied that the room was the only one, so far as he could see, in which he could conduct the experiment.

Mr. EVERITT said that undoubtedly vitiated the experiment. Had Mr. Taylor control over the arrangements in the room?

Mr. TAYLOR said he placed the sitters and his camera, and arranged the light himself.

Mr. A. GLENDINNING explained that it had originally been intended to have had the photographs taken in a photographer's studio, but the photographer had withdrawn from the experiments on the ground that the latter were dangerous. The photographs, therefore, were taken in the drawing-room of a house in Dalston.

Mr. EVERITT asked whether that house was inhabited by a spiritualist, or any medium, or any one of spiritualistic tendencies? Did Mr. Taylor go as a sceptic?

Mr. TAYLOR said that he went with a perfectly open mind.

Mr. EVERITT pointed out that in the paper Mr. Taylor said that he considered himself as acting as a detective upon those who were present when the photographs were taken.

Mr. TAYLOR explained that on the morning of the day on which the experiments were made he received a letter asking him to bring a reasonable man with him—in fact, he had the option of taking any one he chose.

Mr. W. E. DEBENHAM asked if it would be possible to repeat the experiments in the presence of the same medium and two members of the London and Provincial Photographic Association?

Mr. GLENDINNING said that he had been interested in this subject for twenty-eight years, and had spent both time and money over it. He would like to ask whether the members of the Association then present believed that Mr. Taylor was competent for the investigation he had recently undertaken? He did not mean, were they prepared to endorse his statements; he did not mean, did they consider him an honest investigator? Many honest men would not be considered sufficiently qualified for such experiments; others, as honest and upright, skilled in the ordinary routine of photographic work, might possess little knowledge of chemistry and optics; others, again, might be honest men, and well acquainted with chemistry and optics, but too opinionative to undertake such experiments. He would put it to them in this way: His own belief and strong conviction was, that Mr. Taylor was well qualified in every respect for the important and solemn task which he undertook—a man with an open mind, watchful to detect the slightest attempt at trickery; of integrity of purpose, independent, and who would denounce those who would so far forget themselves as to palm off a miserable counterfeit of a grand reality. Did they uphold him in his views that Mr. Taylor was the right man? He did not wish to corner them—he desired to be perfectly frank; but, supposing for a moment that Mr. Taylor's report was an accurate statement, that he had obtained images on his plates which could not be accounted for by any known agency, it seemed to be a fair conclusion that persons were present on the occasion of the experiment who could not be seen by the normal vision, but who, by their presence, had co-operated to produce those images. They might call them by any name which might commend itself to them, but he (Mr. Glendinning) would call them spirit friends, excarnated human beings. He would call the pictures spirit photographs, because they were portraits of persons who had cast off the earthly tabernacle.

Mr. F. A. BRIDGE said they were bound to believe Mr Taylor's statements; but, as practical photographers, though the pictures shown *might* be spirit photographs, he thought they gave them the idea of cut-out prints, but as to who cut them out he did not know and did not care.

Mr. GLENDINNING remarked (ironically) that he was the gentleman who "cut them out."

Mr. DOWNEY regarded the photographs as a "clever trick."

Mr. EVERITT remarked that Mr. Glendinning had drawn attention to the capacity of Mr. Taylor as a witness, and they could not have a better representative of photographers for such experiments; but Mr. Glendinning had gone a step further, and said that Mr. Taylor, having witnessed all the persons in the room, they were entitled to infer that the appearances were due to "other persons" present. He (Mr. Everitt) would say that nobody had a right to infer the presence of "other persons." It was no doubt true that Mr. Taylor had got images he did not expect to find, but to say that they were due to "other persons" present was another matter. If they were entitled to infer that those appearances were due to persons they did not know, they were also entitled to infer that they might be due to other physical phenomena they did not know. They might be due to copies of other photographs which had got on the plates in some unaccountable way. Then as to the room—all the other conditions but this were under Mr. Taylor's control. It was a pity it did not suggest itself to him, with each successive exposure, to remove to another room. By varying the conditions for each photograph, he might have traced out the conditions under which they were produced, and have had some means of arriving at a conclusion. Mr. Taylor's experiments had been vitiated to a large extent by his not having the whole of the conditions under his own control.

Mr. A. COWAN said that about fifteen years ago—before dry plates were used—a lady of title and a member of the Stock Exchange came to him in London and asked him to go to Mr. Hudson with them, to see if they could get some spirit photographs. He took plates marked with a diamond. They went and paid half a guinea for a sitting. The plate was coated, exposed, and developed, two mediums being present in front of an ordinary background. There was nothing on the plate; another one was tried, and there was nothing on that. In all, six exposures were made, and on the sixth plate was a curious effect. A "mysterious operation" was said to have gone on between the sitters; but the explanation was that Hudson had poured the iron in the centre of the plate, so that no silver was deposited. While in the studio he (Mr. Cowan) found a good many of the draperies in the spirit photographs had the key border which was on the table-cloth in the room.

Mr. DEBENHAM added his testimony to Mr. Taylor's fitness for the experiment, but he (Mr. Debenham) really thought while he was reading his paper that he was going to tell them "how it was done;" he did not understand him to be serious. In spite of Mr. Taylor's assurance, however, they must all see that the "spirits" were copies of photographs, though they did not suggest *mala fides*. The thing had been managed in the usual way of spirit photography, and, if there was any fraud in the case, Mr. Taylor had not detected it.

In reply to a question, Mr. TAYLOR said that the room in which the photographs were taken was not absolutely dark.

Mr. A. HADDON observed that if "spirits" gave out ultra-violet rays it would be advisable to use lenses made of quartz, as they would have a far better way of rendering such subjects on the plate than with ordinary lenses, which cut off ultra-violet. Again, had different eyes different powers as regards the taking in and cutting out of different rays? Mr. Friese Greene had shown how it was possible to allow an impression to be made on the retina, and then to be transferred to a plate. Most probably only certain people possessed this power, for it was curious no one had repeated the experiment with success.

In reply to a question,

Mr. COWAN suggested that these spirit photographs could be made by scraping out positives on glass and exposing them on the negative before development.

Mr. R. CHILD BAYLEY asked whether it had been appreciated that the "ghost photographs" had only height and depth?

Mr. HADDON asked why the figures should have drapery?

Mr. DEBENHAM objected to the assumption that the things were genuine because they could not be explained. Messrs. Maskelyne & Cooke's trick could not be explained by many people.

Mr. EVERITT suggested that in future experiments a mirror should be placed behind the sitter at an angle so that a photograph of the back of the spirit as well as the front should be obtained.

Mr. J. S. TEAPE, in regard to the appearance of the photographs, said any one accustomed to the appearance of stump work would recognise some of the images as having been produced by the stump. They were not photographs from nature in the first instance.

In reply to a question as to whether, when he was out of the room developing, it would not have been possible for somebody to stamp an image in relief with fluorescent chemicals on the front of the camera, Mr. TAYLOR said it was impossible.

Mr. HADDON pointed out that the spirits seemed to be able to double themselves, as Mr. Taylor took a stereoscopic picture with some on both halves. One of the "spirits" was at the back of the sitter, yet some of the high lights were on the shadows. He did not think any one would say that the ultra-violet rays could pass through the human frame and a piece of wood.

Mr. T. Shorter and Mr. Maltby (visitors), Mr. A. Mackie, and other gentlemen, having spoken, Mr. Glendinning said he would endeavour to use his influence to allow some members of the Association to make experiments in the presence of the medium (Mr. D.) at a future date, and the proceedin closed with a vote of thanks to Mr. Taylor for his paper.

North London Photographic Society.—March 7, Mr. G. J. Clarke in the chair.—Mr. A. E. SMITH gave a demonstration of the photo-lithographic process. Explaining the necessity of a previous knowledge of carbon printing, he first developed a carbon print by single transfer. Some prints on bichromated gelatine films from wet-collodion negatives were then coated with photo transfer ink, soaked in water for a few minutes to soften the film where the light had not acted. The ink on the soluble part of the film was then cleared away, leaving the printed image ready for transfer to the stone, and the transfer thereof and method of printing were then explained. At the next meeting, at Canonbury Tower, on March 21, a Lantern Entertainment will be given in the reading-room.

Hackney Photographic Society.—March 7, Mr. S. H. Barton in the chair.—The library was augmented by about a dozen more new books. Mr. J. O. GRANT recommended that the Society exhibits at the forthcoming Crystal Palace Exhibition, and, after it was carried, he said that the Committee would draw up and send a circular to all members. Mr. BECKETT stated that the Committee had decided on purchasing two nine-inch lenses by Swift for the new lantern. Mr. Houghton presented the Society with a new form of carrier for the lantern. Members' work was then shown by Messrs. Cross, Sodeau (Arachoidus ornatus, photo-micrograph), Hudson (lantern slides), and Roder (two slides developed with amidol). Mr. GOSLING asked how many sheets of tissue paper were necessary to reduce or enlarge by (diffusion of light) in sunlight. It was stated that it would depend on light; in any case, the paper must be put out of focus. Mr. BROOKER, of Hastings, then gave a lecture on *Winchelsea and Rye*, illustrated by the lantern. Much care had been bestowed by Mr. Brooker on it, as it was very instructive and interesting to all, and that the slides were good goes without saying. Whilst the scientific side was treated upon, likewise the historic, the art side of photography was certainly to the fore, and a great treat was given to the Society. Mr. Brooker must be complimented on the fine quality of his slides.

South London Photographic Society, March 6, Ordinary Meeting, Mr. F. W. Edwards in the chair.—Mr. LEON WARNERKE demonstrated his method of printing, developing, and toning gelatino-chloride paper. He said his process was somewhat similar to that used in 1848 for the preparation of waxed paper negatives before gelatine plates were invented. While staying last winter in St. Petersburg he had to contend against an almost entire absence of light in carrying on photographic work. This led him to make certain experiments with Ilford P. O. P., Eastman's Solio, and Liesegang'a Aristotype papers, exposing them for a short time, and then developing with gallic acid. The exposure of the paper could be made at night, using magnesium ribbon. He considered "Solio" paper the best suited for the process. If daylight was used, the paper could be exposed until the image was just visible, or until it was completely printed out. Good results could be obtained either way. With a short exposure, development took a longer time. He then exposed a piece of Solio paper by burning about two feet of magnesium ribbon in front of the negative. On examination, a faint image was found on the paper. He gave the following formula for development:—Water, 1000 parts; acetic acid, 10 parts; acetate of soda, 10 parts; gallic acid, 5 parts. When dissolved, 10 parts of a ten per cent. solution of acetate of lead, after filtering, were added to the above. For development, 1 part of the solution to 5 to 10 parts of water were used. The print, on being placed in the developer, gained in detail and density, as if printed out in the ordinary manner. It was then placed in a dish of water, to which a pinch of table salt had been added to stop the action of the developer. The print was then placed in a combined toning and fixing bath, composed of—water, 1000 parts; hyposulphite of soda, 100 parts; acetate of lead, 10 parts; chloride of gold (one per cent. solution), 20 parts. Uniformity of tone was very easily obtained. Toning could be stopped at any stage thought desirable. It was impossible to distinguish prints developed by this process from those printed, toned, and completed in the usual manner. The lecturer believed that the prints would be more permanent than those prepared by the ordinary methods. In reply to questions, he said a beautiful sepia tone could be obtained by using a platinum toning bath. A weak negative required a more concentrated developer, and a hard negative a dilute one, to obtain good results. He did not advise the use of separate toning and fixing baths. Lead acetate kept the whites clear, and did not affect the permanency of the prints.

Croydon Camera Club.—Third Annual Dinner.—The above was held on the 8th at the "Greyhound Hotel," when a considerable proportion of members met together to enjoy gastronomical, oratorical, and musical entertainment. "Prosperity to the Club" was proposed by Mr. CHARLES W. HASTINGS in a neat and effective speech, to which the PRESIDENT replied with a series of remarks which induced sustained merriment, the definition of "*a human being*" and an explanation of "*why Diogenes was not a club man*" being specially punctuated with salvoes of laughter. The violin solos of Mr. Joseph Beckwith were the most keenly appreciated of the musical items, and the healths of Messrs. Oakley, Tuckham, and White the toasts which were most enthusiastically received.

Leicester and Leicestershire Photographic Society.—March 8.—The details of arrangements for the forthcoming Exhibition of the Society on March 22 and 23 were considered, the Hanging Committee elected, the Excursion Committee also arranged, and various other matters in connexion with the Exhibition received attention.

Liverpool Amateur Photographic Association, March 9.—Mr. J. SHEARD delivered his new lecture on *Our Members of Parliament and Something about some of Them*, illustrated by limelight portraits of present members of the House of Commons. The lecturer dealt in a racy manner with the personal reminiscences and peculiarities of about fifty members, and exhibited about 300 portraits, together with a reproduction of a number of lifelike *silhouettes*.

Preston Camera Club.—March 9, Annual Meeting, Colonel Oliver, J.P. (President), in the chair.—The Secretary's report and balance-sheet showed a satisfactory state of affairs for a Society not yet two years old. It was decided to affiliate with the Photographic Society of Great Britain in order to be able to procure the members technical instruction of a class superior to any that can be locally obtained, and at the same time to keep in touch with the chief centre of photographic activity. Colonel Oliver was unanimously re-elected as President and Mr. Frank Ketton took the combined position of Hon. Treasurer and Hon. Secretary, the previous holders of these offices having resigned. Altogether the Club seems in a prosperous condition, and a successful season is anticipated.

Rotherham Photographic Society.—March 7, Dr. Baldwin (President) in the chair.—The President and Hon. Secretary (Mr. Hemmingway) were appointed delegates to the Photographic Society of Great Britain, under the Affiliation of Societies scheme.

FORTHCOMING EXHIBITIONS.

March 22, 23	Leicester and Leicestershire Photographic Society, Co, operative Hall, High-street, Leicester. Hon. Secretary-H. M. Porritt, 66, London-road, Leicester.
April 5–8	*Croydon Camera Club, Braithwaite Hall, Wellesley-road, Croydon. Hon. Secretary, G. R. White, 55, Albert-road, Croydon.
,, 10–29	*Crystal Palace. The Executive, Crystal Palace, S.E.
,, 12–15	*Bolton Photographic Society. Hon. Secretary, J. E. Austwick, 10, Rushton-street, Bolton.
,, 17–29	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.
May 4–6	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 4257.—"Improvements in the Condensers of Optical Lanterns." W. I. CHADWICK.—*Dated February* 27, 1893.

No. 4348.—"Improved Copying Camera for Photo-mechanical Work." A. WYBRANT and W. GAMBLE.—*Dated February* 28, 1893.

No. 4377.—"Improvements in Photographic Objectives." Complete specification. A. B. PARVIN.—*Dated February* 28, 1893.

No. 4378.—"A Flexible Temporary Support for use in Carbon or Pigment Printing." H. J. BURTON.—*Dated February* 28, 1893.

No. 4520.—"Improvements in or relating to Photographic Processes." Communicated by W. J. H. Auton. A. J. BOULT.—*Dated March* 1, 1893.

No. 4578.—"The Pocket Portable Camera Bracket." F. W. SMETHURST.—*Dated March* 2, 1893.

No. 4644.—"Improvements in and relating to Magic Lanterns, and to the Manipulation of the same." H. SIMPSON.—*Dated March* 3, 1893.

No. 4672.—"Improvements in Apparatus for Exhibiting Photographs, Pictures, Advertisements, and the like." C. F. VEIT.—*Dated March* 3, 1893.

No. 4692.—"Improvements in Photographic Objectives." Complete specification. P. RUDOLPH.—*Dated March* 3, 1893.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

MR. PRINGLE AND THE SANDELL PLATES.

To the Editor.

SIR,—I shall be glad if you can find space for what must constitute my reply to Mr. Andrew Pringle's opinions on the "Sandell" plates, as published in the *Camera Club Journal* of December last, and which I should have dealt with earlier but for a prolonged absence from home. These opinions, emphatic as they were (I am advised from several quarters) have tended to do the interests of the plates considerable harm; but I should be first to admit that this result was altogether foreign to Mr. Pringle's intention. The experiments spoken of, although expressly described as of quasi-scientific character, have been regarded as having special interest for the practical worker, and, therefore, the necessity for my pointing out wherein I consider they are at fault.

To fully discuss all the points involved in Mr. Pringle's arguments would require a lengthy dissertation on photographic theories and practice, and a too great intrusion on your space, so I will endeavour to take the vital points only. Mr. Pringle seems certainly to fail to grasp the capabilities of the plates, and, were he an authority of lesser calibre, I should be tempted to say there was a failure in his appreciation of the potentialities of the single sensitive film.

Speaking of the photography of an interior, he says, "If the exposure be only long enough to affect the upper film, the result is in no way

different from that on an ordinary plate." This reminds me that it would be more convenient if it was made manifest from the commencement that the position I take up regarding the plates is this: I assert and challenge the contrary proof, that the plates are an absolute cure for halation from support reflection, in all practical photography, and that their latitude in exposure is practically unlimited. Reverting to the interior, I submit that an exposure should not be quoted unless accompanied by the development given to render obvious the work done in the film or films during the exposure; now, this is a most important item in considering the utility of the new plates. Can Mr. Pringle imagine an exposure on any interior with a clear glass window, admitting direct skylight, where the inside details are even poorly rendered on the single film, where the light from window has not gone through and through the film? he must have surely forgotten that halation is not unknown in snap-shot work. Mr. Pringle remarks in one place, he was surprised how little light passed through the single film; it has been a matter of surprise to myself how much passes the film. On more than one occasion have I, in trying the experiment of stripping off the top film, found a printable image of the highest lights of a snap-shot developed in the second film. It may be remembered that the finer emulsion of the latter is more amenable to development than the more sensitive one, and the image formed although apparently having a similar density, has a better printing value. To these qualities I attribute the characteristic softness of the prints from all exposures on the plate. Mr. Pringle also asserts that two or three times the exposure of an ordinary plate produces a failure with the "Sandell" plate, but if the higher lights of the snap-shot have so penetrated the plate how much more so will the exposures in question. I can quite understand his failures in this case if he relied on the preposterous operation (for practical work) of stripping or a total clearing away the upper image. But I think I can demonstrate that for this, and even a greater increase on the normal exposure, the image-forming capacity of the lower film is not a necessity; and, leaving out of consideration latitude obtainable by developer modification, Mr. Pringle seems to ignore the constitution of the ordinary film, and treats of it as if it were a single molecule of silver haloid; but I am sure on reflection he will agree with me that the latitude of the ordinary plate is really due to the superposition of many molecules, and also that only the molecules to a certain depth can be utilised effectively for the image formation, the remainder being simply serviceable as a screen. If development be pushed into this screen, the result is halation. Now, in the multiple plate, the whole of these molecules can be used up to the last line, and this I maintain will admit of a greater increase in exposure than that which caused failures in Mr. Pringle's experiments.

Then, as to Mr. Pringle's joke (for surely it was such), when he spoke of the plates making him miserable, he said, "I do not think they are of any real value unless you give them enormous over-exposure." This is very comical, and smacks much more of a desk emanation than a dark-room one; their latitude for prolonged development would seem to indicate superior advantages for the quickest exposures, as well as for the longest, and I can assure Mr. Pringle that he is mistaken in fancying that any intermediate exposure between maximum and minimum necessarily yields a failure; the amount of exposure to be given, above the minimum allowable, by an experienced worker, depends entirely upon his own tastes, as to how much of his shadows he wishes to render. There is no occasion for the merest tyro to consult an exposure machine.

Before I close, I must express my surprise that Mr. Pringle could have been informed that half-second *f*-64 under trees was the correct exposure for the plates. His informant could scarcely have consulted the prospectus sent with each box. In this he is directed to give the exposure of our table for the cyclist plate as a minimum. This, under trees, would be four minutes sixteen seconds; and for landscape, with heavy foliage, three seconds. I do remember making the first of a series of experimental exposures with Mr. Pringle, and giving half second on heavy foliage, but I assure him he is mistaken if he understood me to suggest that I considered this sufficient; I did it simply to show the amount of reduction that could be effected in the film as a result of this short exposure.—I am, yours, &c.,

J. T. SANDELL.

Thornton Heath, March 11, 1893.

CHEAP MOUNTS—A PLEA FOR QUALITY.

To the EDITOR.

SIR,—"Cheapness" is the tendency of the age. It is the natural right of every man, which no one can ever think of denying, to try to obtain what he desires for as small an equivalent as possible. It is impossible to decide with mathematical exactness the relative value of things. Usage and competition fix what may be called the real or market value of the various articles, and still this fixed value may be doubtful according to the different prevailing circumstances. What is "cheap" from one point of view may be "dear" from another, depending upon that with which it may be brought into connexion. However, opinion will hardly differ on this one point: the less of an equivalent of the medium of traffic—money—is demanded for a certain article, the less it is actually worth; and the cheapest is surely never the best, nay, often hardly sufficiently good for the purpose it is intended. And I must say it is to the credit of the public that it is not so much *the mass of buyers* which raises the cry of "Cheapness! cheapness!" it is more the dominating element, the clamour of the *selling individuals*. Is the public asking for cheap mounts—it barely asks for cheap photographs—and what is the ratio of cost of a mount, even if it be the best, to that of a photograph, even if it be of the cheapest? In general, as one to ten! In view of this, will any one dare to maintain that the price of photographs is in any way affected by the cost of the cards on which they are mounted?

I stated at the beginning of this letter that "cheapness" is the tendency of the age, but, I must also add, "progress and improvement" not less, though these two tendencies go in different directions. Nevertheless, there has been a vast progress and improvement in the quality, and especially in the finish, of photographic mounts. As regards the latter, it shows that a refined, artistic taste is an indispensable element in the manufacturing of such mounts, and still they have become cheaper in proportion. On the other hand, if we behold what is now also being offered by native and foreign mount-manufacturers in material and finish, it reminds us of the time when photography was still in its infancy—I mean the modern photography—being but little superior to what at that time the photographers, as a rule, "manufactured" themselves. These manufacturers are the "Rip Van Winkles" of the photographic trade; they have slept during the "revolution," and appear on the market with something which one should think belongs to the dead past.

Is it necessary to bring forth arguments to convince that any photograph appears more advantageously on a good, nicely finished mount? Just look at the show-cases of photographers, and compare the one with the other. Is it surprising when we see the mount crumble to pieces when the photograph itself has lost but little of its original value? I must confess it is humiliating to the trade that this degeneration is gaining ground, and apparently gains an overwhelming influence over the photographers, and, as a necessary consequence, over the photographic dealers. There is but little hope of retarding the progress of the inundation of this "cheap" element, unless the public revolts against it, and demands, at any rate, a good, durable mount, pleasing to the eye and in harmony with modern taste.

I do not plead in my own interests, but in the interests of the card-manufacturers of a higher level. We shall follow degree by degree downward if it must be, yet continually keeping the reins upwards as long as our strength does not fail; we have nothing to fear, and only little to lose, but I am pleading in the interest of *the photographic art*.—I am, yours, &c.,

A CARD-MANUFACTURER.

March 7, 1893.

THE CRYSTAL PALACE EXHIBITION.

To the EDITOR.

SIR,—Mr. F. P. Cembrano, jun., having been the first gentleman to consent to act as Judge at the forthcoming National Photographic Exhibition, we deeply regret that, owing to an oversight, his name should have been omitted from the list sent you on the 6th inst. We shall be extremely obliged if you will kindly note this in your next issue.—We are, yours, &c.,

S. G. BUCHANAN WOLLASTON,
CHARLES W. HASTINGS, } *Executive.*

Crystal Palace, March 13, 1893.

BEWARE OF GLYCERINE.

To the EDITOR.

SAR,—A word or two of caution to those using glycerine for the purpose of mixing with the oxalate solution employed in the development of platinotype. Be sure that it is quite free from citric or other acid.

Quite recently I have had the mortification of seeing the image on several prints completely disappear, due solely to acidulated glycerine. I find on inquiry that a large proportion is thus sophisticated, and on sale at various druggists. It is said to be, like many other shams, "made in Germany."—I am, yours, &c.,

HECTOR MACLEAN.

34, *Birdhurst-road, Croydon, March* 13, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange fifteen monthly parts of Cassell & Co.'s journal *Work* for finder for hand camera.—Address, J. K. EWART, Marine House, Banff, N.B.

Will exchange Adams's twelve-inch club burnisher, and 15×12 Ross's wide-angle lens, for rolling press.—Address, STONE & WILKINSON, 3, High-street, Devizes, Wilts.

Wanted half-plate landscape camera, or studio accessories, in exchange for two negative cupboards to hold 2000 quarter-plate negatives, one whole-plate, and two half-plate negative boxes.—Address, R. SMALLEY, 139, Euston-road, Morecambe.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

R. Y. T.—It is, we believe, an ordinary solution of rubber.

J. C. RUTHVEN.—We should be pleased to have the communications.

CONSTANT READER.—Apply to Messrs. Winstone & Sons, of Shoe-lane, E.C.

GREAVES.—The mottling may disappear if the solution is warmed slightly.

HUSSAR.—Swell thirty grains of gelatine in water, drain, and add one ounce of caramel.

R. S. O.—Consult the ALMANAC. The three formulæ about which you inquire are given with others of a similar character.

DEVONSHIRE.—Yes; the photograph can still be registered; but it is doubtful if it will be of any use as regards those copies already issued.

A. R. T.—You will see a reference is made to the subject in another column. Of course, the copies must be good, or they would not meet with success; also the subjects must be of a popular character.

T. STEELE.—The one is a more modern lens than the other, but will answer your purpose no better. The triplet is an excellent lens for copying, and is largely used by commercial copyists, some of whom prefer it to lenses of the "rapid" type.

B. W. C.—1. The stand attachment is identical with that patented by Messrs. Mason & Henderson. 2. It is not necessary to coat gelatine negatives with collodion prior to varnishing them; but it is better to do so, as it affords greater protection.

PYRO.—Try the effect of a strong solution of cyanide of potassium and pumice stone if the other things fail. If the nails are badly stained, they are very difficult to clean. Stains, by the way, are easily avoided, but not so easily removed when once they are formed.

T. CROWE asks how he can know when he has washed all the nitrate of silver out of the prints before they are toned?—If the last washing water is clear and does not become turbid on the addition of a pinch of salt, it may be assumed that all the free silver is removed.

W. McC.—You will see by Mr. Wellington's paper on the subject that the Company do not apprehend any injury to Solio paper by the use of the combined toning and fixing bath. If you carefully follow the instructions in making the bath, no fumes should be given off.

L. S. D.—There is no regular rule with regard to resittings in first-class establishments in London. The custom is to satisfy the sitter whenever it is possible. We quite sympathise with you, and other portraitists, in the matter of the unreasonableness of some persons. For that there is no panacea.

R. TREMERE.—For portraiture an arc light of from five to six thousand candle power is desirable; but, for copying from small-size originals, one of two or three thousand candle power will suffice. Of course, such a light could be used for portraiture, but the exposure would be proportionately longer than with the more powerful one.

C. WELTON.—If you can obtain a current from the mains, it would certainly be more advantageous to take it from that source than to go to the expense of the necessary plant for generating it yourself. The current from the mains being of so high a voltage is of no moment. That may easily be reduced to anything that may be required.

E. HAMILTON.—The trouble arises from the tissue not being in the right condition when it was squeegeed on to the plate, or maybe from the squeegeeing not being properly done. If the tissue be too moist, or not moist enough, this difficulty may be expected. Master the details of carbon printing, and the trouble will not be experienced.

A. W. ALLARD.—1. Instead of diffusing the light, it wants more concentration on the sitter. There seems to be too much top light for that form of building. Stop off all direct front light, and two feet or more of the extreme top light. What light then remains will be ample and easy to control. Any quiet, unobtrusive colour, such as a greyish blue or green, will do for the side wall.

S. A. T. asks the best way of reproducing negatives. There is no best way, because all the recognised methods are equally good in the hands of skilled workers. The simplest method is, make a transparency by contact printing on a dry plate, and from that produce the negative by the same means. Excellent negatives are made daily by making a carbon transparency, and from that the negative by the wet-collodion process in the camera.

W. A. T. writes: "Will you kindly say—1. What fuming with ammonia does to sensitised albumen paper? Does it make it keep better, or what? 2. Also are the following brands of albumen paper the best to be obtained?"—1. Fuming with ammonia does not add to the keeping qualities of the paper. It is said by those who employ the method to improve the quality of the prints. 2. It is quite against our rule to recommend any particular make of material. All the brands named however, are good.

WIDOW.—By no means pay such a sum as a premium for your son to be "articled" for three years to learn the portrait photography as a source of livelihood. The whole business is at present in a very depressed state, and there is, we fear, little prospect of any immediate improvement. Furthermore, the labour market is, and will be for some time to come, overstocked. If he must follow photography, the photo-mechanical branches just now are the most promising; but these are fast being overdone. Have nothing to do with the so-called crystoleum and similar styles of colouring.

T. M. says: "I have a quantity of old silver plate, which I have, as executor, to dispose of to the best advantage. There are over seventy ounces of it, and it occurs to me that if I were to dissolve it in nitric acid, and crystallise it, I could sell it to photographers, and so realise more than by selling the metal to a refiner. Will you please give me your idea on the subject?"—By all means sell the metal as it is. Supposing the metal were pure, it would not pay for the time and material required to convert it into nitrate; but, as silver plate is alloyed with copper, the nitrate of copper that would be formed must be separated before the nitrate of silver would be marketable.

RECEIVED.—*Dry Plates*, Shapoor N. Bhedwar, C. G. Ablett (Port Elizabeth), and others.

PHOTOGRAPHIC CLUB.—March 22, *New Cameras*; adjourned discussion on *The Combined Toning and Fixing Bath; The Sandell Plate*, by Mr. S. Herbert Fry. 29, Lantern Night.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—March 23, Technical Lecture, by Mr. Edgar Clifton, *Cameras, Tripods, and Dark Slides*. 30. *The Sandell Plate*, demonstration by Mr. S. H. Fry; *Stripping Gelatine Plates for Collotype Work*, by Mr. W. J. Rawlings. April 6, *Determination of Plate Speeds*, by Mr. G. F. Williams.

On March 23 the Woolwich Photographic Society will hold a Lantern and Musical Entertainment.

RICHMOND CAMERA CLUB.—March 20, Demonstration on *Printing, Toning, and Developing Gelatino-chloride Paper*, by Mr. Gotz.

BOLTON PHOTOGRAPHIC SOCIETY'S EXHIBITION.—We are informed that the Society will pay carriage on all exhibits in the Champion Class.

WE have been shown several examples of Messrs. Morgan & Kidd's machine-collotype process, which attest the remarkable readiness with which this firm has thus early achieved excellence of results with the process.

HACKNEY SOCIETY'S FUTURE ARRANGEMENTS.—March 21, Demonstration of *Sandell Plate*, Mr. S. H. Fry. 28, *London Street Cries*, Mr. E. Scamell. April 4, *Photogravure*, Mr. A. Dawson. 11, Members' Lantern Night. 18, *Record and Survey*, Mr. W. Jerome Harrison. 25, *After-work of Hand Cameras*, Mr. A. R. Dresser. May 2, Annual Meeting.

ON Saturday afternoon a new photographic studio, to be known as the Delmen Art Studios, Limited, was opened at 470, Holloway-road, N. Messrs. Downey and Mr. Mendelssohn, on behalf of the Directors, received the visitors. Although scarcely yet finished, the suites of rooms are elegant and nicely planned for a photographic business. All the rooms are fitted with the electric light.

MR. J. SMALL, of Dartmouth, writes: "This last week or two mention has been made of mammoth enlargements. I was not aware they were novel, as the celebrated firm of Marion & Co. made me, from a *carte* negative, an enlargement, seven feet six inches by four feet six inches, of Lord Northbrook's son, who was drowned in H.M.S. *Captain*. This was in December, 1870. The enlargement was painted by the Hon. Graves, of Bond-street, at a cost of 600 guineas. The Autotype Company have made me several enlargements 48×36, so that I rather read the announcement with a little surprise."

WE have received from Messrs. Perken, Son, & Rayment their wholesale and export illustrated Catalogue of lanterns, slides, gas bags, jets, and everything else connected with the lantern, together with an illustrated Catalogue of cameras and the numerous and varied appliances of photography. Their new lecture sets for the lantern are so comprehensive as to afford highly suggestive matter for those who contemplate making camera trips during the approaching season. As regards the numerical strength of this department alone, it is such as almost to defy counting. The quality of such of these as we have seen is of the very highest order of excellence.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—A Committee meeting was held at the registered offices of the Association, Memorial Hall, E.C., on March 13, Mr. Alexander Mackie in the chair. Three applicants for assistance appeared to state their cases, and in each instance the assistance asked for was granted. It was in small sums—one pound to set up a roadside worker with apparatus, a few shillings to help an out-of-work man to reach his next situation, and a few shillings to redeem a man and his wife from actual starvation. A couple of pounds covered the whole of the grants, but the investigation of the cases occupied over two hours. Thirteen new subscribers, who had been introduced by Mr. Birt Acres, were accepted, and a hope was expressed that other managers and employers would introduce the subject of the Benevolent to their *employés* as Mr. Birt Acres had done.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1716. Vol. XL.—MARCH 24, 1893.

ELEVATING THE POINT OF VIEW.

The view of a place which will be most familiar to the observer is that which is obtained from a height approximating to that of the human eye, or, say, a little over five feet from the ground. Numerous camera stands fall far short of fulfilling this requirement—a fact readily perceived when one watches a party of camera men in the field, and notes how they stoop when focussing or arranging their subjects on the ground glass of the camera. To obtain a view as seen by the eye, the camera stand ought to be elevated to such a degree as to permit of the focussing screen being brought directly opposite the eye. This is a truism which requires no elucidation.

While "'tis well to have a giant's power," there are numerous occasions on which it would be exceedingly unwise to take advantage of it. A lakelet, a stream, or a flat meadow in the near foreground might, from the usual point of view, assume a magnitude of expanse so pronounced as to detract from—nay, eclipse—that of the scene beyond, unless thrown into subordination by lowering the point of sight to within one or two feet of the ground, so as to foreshorten these obtruding and undesirable commonplaces. The photographer, who is also an artist, understands full well the value of selecting a point of sight that will ensure him getting all the pictorial effect necessary, and it is fortunate that the mechanical construction of most of the camera stands enables this to be done without difficulty.

But there is another view of this question of height, and that is, when it is found expedient that the point of sight be higher—in oftentimes a considerable degree—than that capable of being attained by our ordinary appliances, What is to be done when a tall fence, or other equally tall obstruction intervenes between the only *locus standi* for the camera and the subject that is to be taken? It is now about twenty years since we saw among the outdoor *impedimenta* of a photographer in the provinces (Mr. Bottomley, Leeds) a camera stand constructed expressly for meeting such contingencies as those just hinted at. Each limb of the tripod was fourteen feet in length, and formed a ladder, up which the adventurous photographer had to climb with his camera until he reached the top, which formed a small platform, from the centre of which rose a stout piece of wood, supporting the table on which the camera was planted. Think of the advantage possessed by a man perched on such an elevation over another nine or ten feet nearer the ground! Foreground obstructions have for him no existence.

There are other subjects for which a tall stand is an absolute necessity. A photograph in our possession, received from Dr. Le Plongeon, shows that intrepid traveller and explorer engaged in the act of photographing the details of carvings on the wall of one of the temples in Yucatan, Central America, this being done from the great elevation necessary to bring the camera opposite to the architectural tracery which is being depicted. On this occasion he employed a stand, the legs of which were twenty feet long. It was composed of a ladder and two other supports, formed of bamboo.

While such tall stands are only required for special purposes, and are not necessary to the amateur, portability being quite out of the question, yet would we put in a strong plea for portable stands, by which the camera could, when required, be elevated to, say, seven feet when required. We have tried the effect of extemporising an additional joint to each leg of one by which this height is attained, and find that it places a great power in one's hands. With the camera at the usual elevation, much prominence was given to trivial foreground objects; with the greater elevation these disappeared, their places on the plate being occupied by others at a greater distance. Incidentally, we experienced a slight difficulty in arranging and focussing the subject on the ground glass, and in inserting the slide and withdrawing the shutter. But by the adoption of a portable stool, about eight inches by twelve inches, the legs of which fold underneath, this difficulty is entirely overcome. A stand of this nature is so useful, and may be constructed at a cost so little in excess of one of the length now usually made, that we strongly recommend its adoption.

Apropos, many users of hand cameras err in holding their cameras so low as they do. We can readily understand that an excuse for this is to be found in the fact of the assumed necessity for having to allow a certain space to intervene between the eye and the finder, upon which the user looks down; but, as we have shown on former occasions, direct finders may now be obtained, which may be placed so as to be used opposite the level of the eye, by the use of which the point of sight is considerably elevated.

Since writing the foregoing we have learned that a tall stand, such as we desiderate, has been exhibited by Messrs. Houghton & Son at the Photographic Club, and, from subsequent examination, find it fulfils every reasonable requirement. We hope that the manufacture of such stands will become universal.

THE WELSBACH LIGHT FOR STUDIO WORK.

Exactly two years ago (p. 193, vol. xxxviii.), we described an arrangement which we were shown by Mr. Atkinson, of Liverpool, for the utilisation of common house gas as the illuminant in studio portraiture. Briefly, it consisted of placing the sitter

inside of a portable room, and directing the camera towards him through an aperture. The light was obtained from a row of gas jets, with reflectors, placed above the sitter, where the top light might be supposed to be, and another row behind a diffusing screen, as the side light. By the system and power of light used, an exposure (with a portrait lens, of course), of ten seconds, was practicable.

We suggested at the time that, by increasing the illuminating quality of the gas, the duration of the exposure might be diminished, while we regarded, and still regard the idea of utilising house gas for portrait purposes as capable of being turned to great practical account in the hands of photographers. A similar idea is evidently entertained by the Incandescent Light Company, of Palmer-street, Westminster, who are adapting their well-known Welsbach light for portrait work in the studio. An opportunity for observing the capabilities of the light was recently afforded us in the studio of Mr. Charles F. Treble, of Clapham Junction, who has had it in use for the last three months.

The arrangement adopted by the Incandescent Company may be described as follows:—As the top light, and placed behind a translucent screen, is a row of jets with the now-familiar incandescent mantles, burning gas from the main, protected by glass chimneys and having metallic reflectors. On the side from which the side light comes, two other rows of lights are placed behind the same kind of screen, one system of gas piping being employed throughout. On the shadow side, and as a background, a large rectangular portable screen of a tint reflecting as much light as possible, is placed, conditions which, we were informed, are also necessarily applicable to the floor and the ceiling.

In all, some seventeen lights are used, the estimated candle power of each being about 120. This large volume of light allows of the exposure, under favourable circumstances of lens aperture and sitter, being so short as six seconds. A considerable but not uncomfortable degree of heat is given off, and the lights, although powerful, do not emit any inconvenient glare, or dazzle the eyes as other illuminants do. The flames, besides, are perfectly steady and noiseless.

From personal observation of a sitter, we had opportunities of noticing that the light cast on the face is of a soft, agreeable nature, and such as, by its inherent properties, ensures the negative falling short of hardness. Moreover, we ourselves sat while several trial negatives were taken, so that we can attest its lack of discomfort so far as the sitter's eyes are concerned. The charmingly lighted work which Mr. Treble himself has produced by the illuminant, points to its high capabilities in the hands of the photographer. We gathered that the consumption of gas involved is, all things considered, not so formidable as might have been supposed from the number of burners.

The employment of house gas for studio portrait work, in accordance with the above-described system, should be welcome to photographers, not only in winter time but at other seasons of the year, and at evening, when natural light is unobtainable of sufficient actinic force, or magnesium and electricity are either unsuitable or too expensive.

COMBINATION PRINTING.

It may seem a little strange at the present time to have to say anything about such a simple matter as double printing; but, if we may judge from the letters we are constantly receiving, not only from amateurs, but from professionals even of some few years' standing, asking how one or more figures in a group that may be unsatisfactory in one negative, from a movement or expression, may be replaced by more satisfactory ones from another, information on the point may be of general value. To do such a thing in several different ways would give no trouble whatever to a printer of the old school, and that, too, without showing the slightest indication of a join. At one period in the history of photography, as some of our older readers will remember, almost the first question put to a printer seeking employment was, Can you mask well? For at one time it was rarely that a portrait was printed with the background that was in the negative, as a new one, nicely shaded, was generally substituted. Nowadays, there are few printers who are skilful at double printing

Combination printing may be classed under two heads vignetting and masking. By the former method the juncture is made by vignetting the edges of one picture into similarly shaded ones of the other. This was the system followed by Rejlander in producing his once well-known picture, *The Two Ways of Life*, which was printed from upwards of thirty different negatives, and so skilfully was the work done that the junctions of the various printings could not be detected. The same principle was also adopted by M. Lambert in the "Lambertype" process. This method requires considerable skill on the part of the operator for its successful working, and it is better adapted for large sizes than for small ones.

The more generally practised method of double printing is by masking, and it is the one the novice will succeed best with. Let us take, by way of explaining it, two negatives of a group of several persons—usually, in taking a group, a couple of exposures are made—and one or two figures in one are unsatisfactory, while in the other they are perfect; but it is the first picture, as a whole, that is preferred. Now it is required to substitute the approved figures for the faulty ones. Portrait negatives have been taken by way of illustration, simply because recent queries have applied more particularly to them; but it will be obvious that the same systems are applicable to all classes of subjects. Take, say, first the negative with the figures to be substituted, and stop out neatly all portions, with black varnish, except these figures, so that they will print with a perfectly white ground. In the other negative these figures only are stopped out by the same means, leaving the other portions of the negative intact. After the first negative has been printed, it is quite easy to place the print in its exact position on the second negative for the second printing, so that no junction will show when finished.

Instead of painting out with black varnish, the old method was to make a light print from one negative—sometimes from both—and then cut out neatly with a penknife the different portions, and then, after the paper had been blackened by exposure to light, cementing them as masks in proper position on the different negatives. The cement generally used was indiarubber solution, as that did not cause an expansion of the paper as an aqueous cement would do. This plan has also the advantage that the paper can be taken off, and the negatives restored to their original condition. This is not always possible with black varnish containing bitumen when it has become insoluble by exposure to light. It is a very important point in double printing, especially in the case of portraits, to have the paper in the same hygroscopic condition for the two printings. Paper, it is well known, expands with moisture, and it is manifest that, if one printing is made with it very dry and

the other after it has been allowed to absorb a certain amount of moisture, accurate registration will not be obtained. Further, if the paper is not in the same condition as regards moisture in the two printings, a uniform tone will not be obtained in the finished result.

Here is another system of double printing which is exceedingly satisfactory, and requires even less skill in its working than that just referred to, as, with it, the masking of only one negative is necessary. It is therefore better suited to the requirements of the novice. It is based upon the plan introduced many years ago by Mr. Edge. The first negative has all stopped out—either with black varnish or a paper mask—except the figures to be introduced into the other. It is then printed. Then these figures are neatly painted over with a non-actinic water colour—such as gamboge—and allowed to dry. The colour protects the printed image from any further action of light. The print is then placed in position on the second negative, which is readily done, and printed. After the second printing, the toning and fixing is, of course, done in the ordinary way. The gamboge readily dissolves off in washing the free silver out of the paper. With this method, as we have just said, only one negative need be masked. It has also this further advantage, that, as the first printed image is perfectly protected from light by the pigment in the second printing, therefore it will not be affected by any little inaccuracy in the registration.

As described, this method would only do for albumen paper, as it would be undesirable to apply water colour on gelatine paper, because it might soften the coating and be absorbed by it. However, gamboge is soluble in spirit, and gelatine is unaffected by that; therefore the gamboge should be mixed with alcohol instead of water. Then, after printing, the colour can easily be removed by a sponge charged with spirit prior to washing out the silver for toning.

Photographs of Jupiter.—The Royal Astronomical Society at its first meeting of the new Session, in enumerating the present received, referred to some exceedingly beautiful photographs of Jupiter from the Lick Observatory.

Solidified Air.—The latest and most remarkable outcome of the experiments upon the compression of gases, recently popularised by Professor Dewar, is the solidification of air, a product described by the learned professor in a communication to the Royal Society a fortnight ago. The exact condition of this solid matter is yet a matter of doubt. It may be solid air in which both constituent gases are frozen and pressed into solid air; or, it may be, a kind of jelly of nitrogen with liquid oxygen entangled like solid gelatine holding water. Hitherto, though nitrogen has been frozen, oxygen has resisted all attempts to pass it beyond the liquid stage.

Recognising Metol by its Smell.—Writing of metol in the current number of the *Journal of the Photographic Society of India*, Colonel Waterhouse says: "I have not worked further with metol since my last paper on it. I have, however, noticed one fact regarding it which may be worth recording, and that is, that old metol solutions can easily be recognised by the strong smell of phosphorus they evolve. I observed this smell in testing it with various reagents. Metol is said to be the sulphate of mono-methyl para-amido-meta-kresol, but is possibly a phosphate or phosphite of this compound. The smell of phosphorus is most decided and unmistakable."

Simple Specific-gravity Apparatus.—An exceedingly simple and, evidently, roughly correct contrivance for quickly taking specific gravities is described in a recent number of the *Wiener Berichte*. It consists of two glass tubes joined by an indiarubber tube. One of the former is thirty centimetres long, and about one wide. There are scratched upon it two marks twenty centimetres apart. This tube is immersed up to the lower mark into the liquid to be examined, and at the same time the other tube is immersed in water. Upon withdrawing the tubes the water rises in one, and the other liquid in the other tube. When this latter reaches the upper mark, the height of the water column is noted on a suitable scale, and its height measures the density of the liquid under examination.

Orthochromatising Gelatine Plates.—Colonel Waterhouse says: "For some time past I have been orthochromatising my gelatine plates by bathing them for one or two minutes with the tincture containing erythrosin silver and ammonium picrate used for the orthochromatic collodio-bromide emulsion process described in the February number of the *Journal of the Photographic Society of India* for last year. The formula is as follows:—Erythrosin, 1 part; silver nitrate, 1 part; picric acid, 1 part; ammonia (s.g. ·880) about 30 parts; spirit of wine, 500 parts; water, 500 parts; one part of the above solution being diluted with nine parts of water to make a solution containing about one part of dye in 10,000 of fluid. More ammonia may be added, in the proportion of one part to 100 parts of diluted solution. This works exceedingly well for most purposes when orthochromatic plates are required, and for landscape work with the telephoto lens no yellow screen seems to be necessary, unless there is much blue haze in the distance. The quantity of ammonium picrate may also be increased in such cases."

Photography versus the Eye in Photographs of Clusters.—Dr. Isaac Roberts recently read a paper on this subject, and brought out in a remarkable manner the contrast that was to be found in these two classes of records. Thus, while Sir John Herschel described a particular cluster as "bright, round, rich, and composed of pretty large stars down to the eleventh magnitude," the photographs of Dr. Roberts, taken with an hour's exposure, show the cluster to be composed of stars of very different magnitudes, ranging from the eighth to the fifteenth, and not round or symmetrical in shape. An interesting question arises from another photograph of Dr. Roberts's, whether some stars in another system, not hitherto catalogued, but found on the photograph, are a system in motion? A further photograph, taken some years hence, may show whether the possible motion takes place or not. During the discussion on Dr. Roberts's paper, a question was put as to whether it was possible that the nebulous appearance seen in the plates was due to photographic action rather than stellar images? But Mr. Ranyard stated that this was almost impossible, seeing that negatives taken by Dr. Gill at the Cape exhibited, down to the minutest details, the same appearances as Dr. Roberts's. It might be expected, if the appearance was not really a representation of a telescopic image, it would differ according to the instruments and processes employed.

Weinek's Enlarged Lunar Photograph.—This photograph continues to excite considerable discussion, and many experts declare its details in parts to be due to something other than simple enlargement. Many details of surface structure are visible which hitherto have escaped detection in eye observations—winding rills, valleys, and hairlike markings. These were quite sharp and distinct, and in contrast with the larger-surface pictures—a condition which has led to their being challenged. In contrast to the usual experience with enlargements, sharpness being then diminished, we have in this lunar photograph minute details after an enlargement of twenty diameters, while other larger portions are "fuzzy." In the *Observatory* of this month Mr. Elger says: "If these curious markings represent actual features on the moon's surface, ought they not to be easily seen in any good telescope that shows the formation and its principal details with far greater sharpness than the twenty-times enlarged negative, and many small craters, &c., in addition, which are scarcely traceable upon it? One does not understand why this should not be

so, unless these objects make an impression on the sensitive plate that they fail to do on the retina, which is hardly likely to be the case." Many experts, it appears, are reserving their judgment. To us the simplest method of solving the matter would be to have the original negative enlarged by a second photographer, a preliminary examination of the original for technical defects, and a comparison of a second enlargement even on a smaller scale would at once show whether Weinek's picture was a true photograph or not.

TEMPERATURE IN THE DARK ROOM.

Although it is but a few weeks since attention was called to the importance of maintaining a uniform temperature in the dark room during the winter months, it is more than probable that the sudden change of last week has brought trouble into very many photographic establishments. A spell of fine weather, more resembling summer, in the matter both of light and temperature, than late winter, or even early spring, has been suddenly succeeded by a sharp "snap" that would have done credit to mid-winter, and photographers—good, easy men, who have fondly imagined the cold season had departed, and have become careless in consequence, have no doubt suffered correspondingly.

The danger to which we wish more especially to direct attention in the present article is not connected with the mere warming of the studio and dark room, though that, of course, if neglected, will contribute materially to the seriousness of the visitation, should such occur; we have at present to deal with a more insidious foe, more dangerous, perhaps, from the fact of its, in many cases, being unsuspected—namely, the fall in temperature of the water supply. That the water is colder after a sudden fall of temperature, such as that of the past few days, becomes painfully apparent to those who have to dabble in it, in either developing or printing operations; but, so long as the studio and developing or printing rooms are kept properly warmed, the tendency is to suppose that everything has been done that is necessary. Such, however, is not the case, as we have repeatedly tried to show in years gone by, and, as the danger lurks during the summer months, though perhaps to a less extent, as well as in the winter, we make no excuse for pointing out in what way inattention to this important point may cause serious trouble.

We need scarcely repeat the truism that chemical action of every kind goes on more rapidly, as well as more energetically, at a high temperature than a low one. We employ hot water instead of cold in such simple operations as solution-making, in order to hasten the process, and every one knows that a warm developing solution acts not only more rapidly, but also far more vigorously, than a comparatively cold one. And yet, in spite of these obvious facts, many photographers are content to use their developing, fixing, sensitising, and other solutions, as well as the water they employ in washing, at nearly freezing point, and expect them to behave in the same manner as when they are thirty, forty, or perhaps fifty degrees warmer.

The chemist is careful in performing any experiment or operation in which uniformity of results is necessary for comparative or other purposes at a uniform or standard temperature, knowing well that it is only under such conditions that a proper and accurate comparison can be made; and it is equally important that a similar course should be followed by photographers, though it is scarcely needful to observe the same rigid uniformity as the chemist. The general principle should be borne in mind, though the latitude permissible in photographic operations permits of considerable variation without materially affecting the results. Let us point out one or two instances in which carelessness in this respect may work injury.

It has been remarked that the temperature of the developing solution seriously affects its energy; this applies not only in a chemical, but also in a mechanical way; or, in other words, not only does an abnormally cold solution act less powerfully as a developer, but it also penetrates into the film of gelatine with far less rapidity, so that we have a double retarding action. This was brought forcibly to our own notice a few days back, when, on attempting to develop one of a series of exposures, several of which had already been developed successfully, we could obtain no trace of an image after several minutes, although the conditions were apparently identical. The idea arose that it was a case of having forgotten to draw the shutter, until we remembered that the plates previously developed had been treated before the sudden fall of temperature.

On procuring a supply of hot water with which to raise the temperature of the developing solution itself to a normal of 58° or 60°, and reapplying, the image at once commenced to appear, and progressed regularly and precisely as the previous ones had done. A still more remarkable result accrued, and one which shows more forcibly where danger may arise when an assistant neglected to raise the water used to the proper temperature—an omission we failed to discover for some time. Two plates had been exposed, one after the other, on the same subject, the light having practically not changed in the slightest, the second exposure, however, being about four times as long as the other, which had been cut short owing to the movement of a portion of the subject. The shorter exposure was developed first, and proved, with suitable development, a fairly satisfactory negative.

It was on the finish of this that a fresh can of water was brought in, the temperature of which was some ten or twelve degrees lower than what we had been using. Unconscious of this, we proceeded to develop the duplicate exposure, treating it in accordance with its increase of time and the result obtained from the other. The progress of development was much slower, and the contrast obtained much greater, owing to the shadow details hanging back while the lights were gaining density. On discovering the mistake, it was too late to remedy the matter, for, though unnecessary detail was obtained in the shadows, the high lights under the modified treatment became too dense, and the second image appeared to have had much the shorter exposure. This, of course, is a result that could only ensue from carelessness, but it shows in a marked manner the absolute need for uniformity of temperature from day to day if equality of result is desired.

It also shows, what it was attempted to demonstrate in a leading article in these pages some years back, that the temperature of the developer alone may have an effect on the character of the image that no variation of the proportions of the ingredients will alter. It is not necessary to recapitulate all that was said in that article, but it may be stated in brief that the results of experiments showed that cold developing solutions conduced to brilliancy and clearness, while a higher temperature produced greater softness. This general result could not be altered by variations of the ingredients within the bounds permissible for successful development. It appears, in fact, as if the cold developer is incapable, with a given, or even with an increased, exposure to search out details that are readily brought out by a solution a few degrees warmer.

GLYCIN.

[Journal of the Photographic Society of India.]

Glycin appears to be identical with *p.* oxy-phenyl-glycocoll, or para-oxy-phenyl-amido-acetic acid, with the formula—

$$C_6H_4\begin{cases}OH\\NH,\ CH_2,\ COOH.\end{cases}$$

and is prepared, according to Vater, by the action of chloro-acetic acid upon para-amidophenol. It is therefore a chloro-acetate of para-amidophenol.

The sample I have is a light cream-coloured granular powder, not altering readily in the air. It is not very soluble in water or in alcohol, but dissolves easily by the addition of caustic alkalies or their carbonates. The watery solution has a strongly acid reaction, but it is quite colourless. Alkaline solutions take a yellow tint, which disappears on the addition of sodium sulphite.

It is easily soluble in dilute nitric, sulphuric, and hydrochloric acids, the solutions being quite clear and colourless. It is not so readily soluble in weak bromine water, but the solution becomes colourless. Nitrate of silver first turns the glycin solution a turbid, dirty greenish-black, but it afterwards takes a violet tint, like slightly darkened chloride, and silver is precipitated, but not in the bright metallic form distinctive of metol. The same change takes place if the glycin solution be acidified with nitric acid before the addition of the silver salt; the silver precipitates, and leaves a clear solution of a beautiful purple colour. With a solution of glycin made alkaline with potash, nitrate of silver gave at once a thick brownish precipitate.

The manufacturer recommends two solutions for developing, ac-

cording as the negatives are required to be soft and detailed, or hard and dense, and glycin is said to be especially suitable for reproductions of all kinds, photomicrography, &c. The formula for the first developer is:—

1.

A. Glycin	4	parts.
Potash	1·5	„
Sodium sulphite (crystals)	12	„
Water	100	„
B. Potash	10	„
Water	100	„

For use, one part of A is mixed with two parts B.

Heat is required to dissolve solution A; but I find that, on standing, the salts have crystallised out in very pretty, thin, long hexagonal plates.

The second developer, for dense negatives, is as follows:—

2.

Glycin	5	parts.
Potash	25	„
Sodium sulphite (crystals)	25	„
Water	100	„

diluted for use with three parts of water.

In preparing this, it is well to first dissolve the potash in the water, then the glycin, and add the sulphite. The solution is nearly colourless, or a dirty white, and does not readily change by keeping, either in colour or in its developing power. I have not yet ascertained its full keeping powers.

Both of these formulæ give powerful and effective developers, yielding images of great density and brilliance, with clear shadows and perfect freedom from stain. Like other para-amidophenol developers, they require good exposure, and the density depends a good deal upon the length of time the plate is left in the solution, as is also the case with ferrous oxalate and and the sulpho-pyrogallol developers. The action of glycin is slow compared with amidol and metol, but not inconveniently so, and there is not the same tendency to a general veiling over the image.

I find both developers quite suitable for ordinary landscape work, the first formula being, perhaps, the better, while, for copying, the second is more suitable. They also work very well with orthochromatic plates. I have not yet tried them for instantaneous work, but with a suitable very rapid plate, and a large aperture of a quick-acting lens, they would probably answer. Several plates can be developed in a batch of developer without any marked change in it. The stability of the glycin, both dry and in solution, the density and clearness with which it works, and the latitude that appears to be permissible in exposure, seem likely to give it a very great advantage over para-amidophenol hydrochlorate and other new developers lately introduced. Largely diluted, it would probably be an excellent developer for lantern slides or for bromide paper.

A voltametric examination of the developer, made up according to formula 2, shows that it evolves hydrogen more vigorously than any other developer I have yet tried, and this would appear to favour the hypothesis that developing power is dependent, other conditions being suitable, on capacity for evolving hydrogen.

The dilute solution, made up in the above proportions, contained:—

Glycin	1·25	parts.
Potash (anhydrous carbonate)	6·25	„
Sodium sulphite (crystals)	6·25	„
Water	100·00	„

This solution was first electrolysed in the tube voltameter, described in a previous paper, with platinum electrodes, using, as before, a battery of four gravity cells, the current being 280 milliampères, with a pressure of 4·2 volts, the resistance of the galvanometer being one ohm. The current through the voltameter at starting was eighty milliampères, with a pressure of 3·2 volts, and in twenty minutes it had decreased to about seventy-five milliampères, and 3·15 volts. At starting, the solution in the tubes and the outer vessel was quite clear and colourless, the temperature about 72·5° Fahr. When the current was turned on, the evolution of hydrogen was very brisk, and the yield was, in five minutes, 2·5 c.c.; in ten minutes, 5·4 c.c.; and, in fifteen minutes, 7·6 c.c.

This corresponds very closely with the results obtained from an ordinary ferrous-oxalate developer containing four drops of a ten per cent. solution of potassium bromide to 120 c.c., or about one drop to the ounce. In this case 5 c.c. of hydrogen were evolved in ten minutes, the current, with the same four-cell battery and voltameter, being about seventy-five milliampères, with a pressure of 3·25 volts.

The solution in the oxygen tube turned a bright yellow, and the anode was surrounded by a dense layer of yellow solution. The general body of the solution in the outer vessel did not change colour, nor did that in the hydrogen tube. At the end, when the oxygen tube was removed and the solution in it mixed with the remainder, the whole was a bright yellow with a slight blue fluorescence.

With silver electrodes, the evolution of hydrogen was not so brisk, possibly owing to the immediate formation of a film of oxide on the anode.

With the same battery the current through the voltameter at starting was about eighty milliampères with a pressure of 2·7 volts, and in twenty minutes it decreased to seventy-five milliampères with 2·5 volts. The yield of hydrogen was, in five minutes, 2·2 c.c.; in ten minutes, 4·5 c.c.; and in twenty minutes, 9·3 c.c. The anode was covered with a flaky deposit of silver oxide (?), and ribbon-like streams of a turbid yellowish solution were given off above and below the anode plate. As in the case of the platinum electrodes, the colour of the solution in the outer vessel was not much changed; and, when the solutions were mixed at the end, the mixture was slightly turbid and not such a bright yellow, but it was also fluorescent.

Dr. Eder, who reports on glycin in the *Photographische Correspondenz* for October, 1892, speaks highly of it, and gives a formula for a glycin-soda developer as follows:—

Glycin	3	parts.
Sodium sulphite	15	„
Crystallised soda	22	„
Water	200	„

The solution can be used at once, and keeps unchanged for a long time in closed bottles. It gives clear and soft negatives, and, by lessening the quantity of soda or diluting the solution, the negatives will be more transparent. By adding bromide of potassium, even decided over-exposure can be remedied.

Baron von Hübl has found glycin a very valuable developer for collodion-emulsion plates when made up according to formula 1, diminishing the water to 80 if greater intensity is required, or mixing one part of solution A with three to five parts of B, or diluting the normal developer if less density is required. He says that this developer gives, with collodion-emulsion plates, perfectly clear shadows, a good and very compact deposit, rich half-tones, and a surprisingly beautiful gradation. This agrees with my own experience of para-amidophenol hydrochlorate as a developer for collodio-bromide emulsion plates.

COLONEL J. WATERHOUSE, I.S.C.,
Assistant Surveyor-General of India.

AMERICAN NOTES AND NEWS.

The Medal Question in California.—Our sprightly young contemporary, *The Pacific Coast Photographer*, says: "We wonder why the English photographic journals are so constantly quarrelling over the disposition of medals—whether an already medalled picture should be allowed to compete again in the form of a lantern slide, or else in some other exhibition, or whether a contributor with a string of medals as long as his arm has or has not the right to enter his pictures and hunt for more 'honours;' and, wondering, we are rather led to think that this is about all for which English clubs are organized—holding exhibitions and distributing medals. However, a liberal ray of truant light seems to have started our foreign friends in a—to them—new direction, for there is now a movement to establish a central photographic club with meeting rooms, dark rooms, and work rooms. Out here, on the frontier, we have had such an organization for a number of years. It is called the California Camera Club. They have had only one public print exhibition, and that was simply a quiet little time, and there were no medals. The photographic press ought to use its space to better advantage than squibbling about the awards of medals. As a pointer, however, the way the matter would be settled over here—when a man showed the disposition of greed to such an extent that, after receiving three or four medals, he still wanted more—his desire would probably be settled with the explanation, 'Do you want the earth?' But then, of course, we are merely an isolated and unpolished community."

Medals and Medals.—The *Journal of the Photographic Society of Philadelphia* has the following very sensible remarks on the medal question:—"The photographic journals of recent issue seem to be unanimous in deploring what has been termed the 'medal nuisance.

A small deluge of 'metallic honours' has apparently been poured on the heads of English photographers, and it does look as though the matter had been overdone. Is this a reason, however, why medals should be abolished? To us it seems that, if our leading societies treat the evil in the right manner, it will cure itself. If little exhibitions continue to award big prizes in large numbers to 'toy photographers,' will not the public quickly appreciate the fact that these awards are of no value, and, instead of asking an exhibitor, 'How many medals have you won lately?' the question will be, '*What* medals have you won?' The medals at our most important exhibitions here and abroad are still as hard to win as ever—or probably harder—as the amount of fine work produced increases each year. In this country, three of the leading societies have made an agreement which limits, so far as they are concerned, the number of 'open' competitions to one each year. All photographers of the world are invited to take part, and each year the invitation is more generally accepted. At these exhibitions the very highest standard of excellence is maintained, and the awards have a value which will never grow less so long as this aim is kept in view. The question may be asked, however, 'Are not the conscientious and diligent workers, who are not quite up to the 'highest notch,' entitled to awards of some kind?' This point has been met, where it should be, within the 'domestic circle' of the societies. Local annual exhibitions are now held in our principal societies, the competition being confined to their own members, and awards of diplomas, or, in some cases, medals, are made. These awards should not be numerous enough to become cheap or easily won, and should always be awarded for decided merit of some kind."

Viewing Photographs by Transmitted Light.—A recent American invention embodies "a simple and improved method of treating photographs, drawings, crayons, prints, &c., whereby the picture is protected, and is adapted for exhibition, either as a surface picture or as a transparency. A photograph, drawing, or print, is imposed upon a sheet of translucent material, such as paper or thin cardboard. Over the surface of the picture is secured, by means of a suitable translucent adhesive substance, a protective sheet of mica or other suitable material, which will not destroy the flexibility of the mount, and which is sufficiently transparent to render the picture at all times clearly visible. Upon the rear side of the translucent sheet upon which the picture is imposed is placed another sheet, preferably also of translucent material, upon which is printed or painted the natural or desired colours of the picture subject. The colouring is visible unless the picture is viewed, by transmitted light, as a transparency."

Fluorescence.—Professor L. H. Laudy, before the Society of Amateur Photographers of New York, recently entered into a discussion of fluorescence, and described the experiments of Sir John Herschel with an acid solution of sulphate of quinine. It was found that such a solution, colourless by ordinary light, was opaque when viewed by violet light. Professor Stokes made many experiments on this subject, and found that in fluorescence the length of the light wave is increased, and its velocity of undulation is diminished. The vibrations of the ether in the incident ray appear to excite disturbances within the complex molecules of the fluorescent medium, whereby new vibrations are excited in the ether, different in period from those of the incident ray. The portion of the light which has produced this molecular disturbance is used up or absorbed, and thereby lost to visible perception. By this means we are enabled to make the invisible visible, to bring out that portion of the spectrum that, to our eyes, produces no visible image. A design, traced on a card by means of such an acid solution of sulphate of quinine, when dry, is scarcely visible, but a photograph of the same reveals the design in sharp contrast.

What a Retoucher Should Know.—In the course of a paper in *The Art Amateur* on "An Occupation for Women," Mr. George G. Rockwood says: "A retoucher should have some knowledge of light and shade in pictures. He should know something of the value of a high light or a mass of dark, and should note carefully how the light has fallen on the sitter, also whether it is a direct light or a reflected one. This knowledge is especially necessary where he is to supply lights that are entirely lacking in the negative. Suppose he finds that his print is flat and tame: clearly, the way to improve it is to put in some lights here and there. Perhaps the hair may need a few sharp lines, being careful to follow the curves of the locks, or the modelling of the face may be strengthened by a delicate lightening of the prominent portions. Accessories, such as drapery or furniture, often need little skilful lights, to give them character or to add to the general effect of the composition."

The American Customs and American Dry Plates.—We read that, when Miss Barnes took back her American plates from her recent trip to England, the Surveyor of the Port decided that she must pay a duty of 60 per cent., as they came under the head of "American Glass Manufactures Improved Abroad." The duty was paid under protest, and a letter written to the Secretary of the Treasury at Washington brought about a reversal of the ruling, on the ground that the exposure of a plate did not constitute sufficient evidence of its improvement, many of them being ruined by this treatment.

RULED *VERSUS* GRANULAR GRATINGS.

I see, in your last week's issue, "Cosmos" alludes to the method I recently described of making gratings by photographing a grained surface under suitable conditions of lighting. I feel inclined, with another of his admirers a few weeks back, to say, "Oh, that I could write like 'Cosmos!'" but, as I cannot hope to do that, I must try and explain in plainer language why I described that method, and why I use it instead of—I will not say "prefer" it to—the ruled screen. If my cosmopolitan friend does not agree with me, I trust he will not write me down an "unalterable" one, to use his latest term of endearment.

I am prepared to admit that a properly prepared mechanically ruled screen is better for the purpose I had in view, and to which "Cosmos" also refers; but I cannot agree with him that "more evenness and regularity of grain would be likely to be obtained by mechanical ruling" than by the method I described, in the hands of an amateur, at any rate. Mechanical ruling requires machinery or appliances of the most delicate and perfect character, and these are not found in the possession of photographers, either amateur or professional; and, if they were, something more is required than the mere ruling to produce a usable screen.

Some years ago an acquaintance of mine, who was connected with the photo-mechanical printing business, showed me a ruled copper plate, not larger than a quarter-plate, which he had had specially prepared, and which had cost him, he said, 10*l*. The difficulty was that, perfect as was the plate itself—and it was the finest piece of ruling I think I ever saw—he was utterly unable to use it, mainly on account of its extreme fineness, and he came to me to help him to do it by photographic means. But I too failed, for ink impressions upon the most highly surfaced paper were too fine to copy, the contrast between the lines and paper being so faint. We tried printing direct on to thin sheets of gelatine, and even on to stripped collodion films; but here the difficulty was to get the ink to "take" evenly to the support.

I have seen samples of very fine ruled screens on thin, transparent, flexible films, but do not know how they are produced, and their price is prohibitive, running to about two shillings per square inch, or, say, about twenty-five shillings for a quarter-plate size. I should think they must be photographed direct from rulings on a much larger scale, which means a tremendous amount of labour and the extremest skill.

I need not say that for this purpose absolute regularity—using the adjective it its strictest sense—is necessary; the slightest error in spacing even a single line, or the least variation in pressure, spoiling the whole screen. The difficulty of producing even a quarter-plate grating with 100 or 120 lines to the inch by hand ruling, even with the aid of a machine, may be imagined even by those who have never tried it, which I have not. Possibly "Cosmos" has.

I have tried a method described in the Journal two or three years back, consisting in making a line of minute perforations in a strip of tinfoil, using a finely cut file upon which to lay the foil while a sharp point is passed over it with slight pressure in the same manner that the printing *cliché* is made in Zuccato's papyrograph, and using this

perforated strip to form a series of fine lines by drawing it across the surface of a sensitive plate. The principle is perfect, but in practice it is extremely difficult to avoid missing one or more perforations in a line of any length, and, as I have said, the least irregularity spoils the whole thing.

Now, in my makeshift method, there is no attempt at regularity, in the sense of mechanical or mathematical regularity, but a grain of a fairly uniform character, in which, from the absence of any attempt at mathematical precision, the faults, if any, are not so noticeable. The grain, too, when photographed, is represented by a vast number of minute points *with softened edges*, which act as minute "vignetters," and so help to add perfection to the gradation, even when the grain is comparatively coarse. In other words, one of these minute "holes," when printed under a *high light*, would be represented by the merest pin point, but, if submitted to the far longer exposure it would receive under a transparent *shadow*, would perhaps increase to the dimension of a decided dot. In printing on albumenised paper, with an evenly ruled screen, a similar, though not so marked, effect is produced.

Such is my reason for using the plan I described, not because I consider it superior to a ruled grating, for I do not, for the purpose, at least, to which I apply it. In conclusion, I agree with "Cosmos," that, if photographers only appreciated the effects that can be obtained in this manner, they would be inclined to introduce them as a stimulant to business.

W. LINDSAY.

AERIAL PERSPECTIVE.

(American Journal of Photography.)

THE matter of focussing the image upon the ground-glass or focussing screen of the camera, with regard to a determination of the amount of definition in the photograph, is so important a one in its relation to artistic effect, that we feel we may, without apology, be permitted to supplement the excellent article by Professor W. K. Burton, "The Stop to Use," published in the November number of this JOURNAL, by a few remarks which may make more intelligible what Professor Burton evidently feels to be the case, but it is not clear enough upon to assert as definitely as he perhaps should.

Objects, as we see them in reality, in addition to extending on a plane parallel to our eyes, also extend towards us and from us, and as one object after another is added to those constituting the scene before us, there is an actual recession which, as in the case of landscape scenes, if we would travel from our point of sight to the extreme boundary of our scene, would often take us very many miles away from our starting-point. This continual receding of parts, which is often spoken of as the natural perspective of a view, is so common to us that it does not form a matter of thought, or arrest the attention in any way, until we come to see a representation of such scene or view upon a flat surface, as in a drawing, or painting, or photograph. Then it is that we feel the shortcoming of art, which cannot in any way advance or recede beyond the surface plane of the canvas or paper, except as in the case of scenery in theatres; and yet this very shortcoming contributes one of the greatest beauties and features of attractiveness in a well-executed work of art, because by the art of the painter is overcome the appearance of want of relief, and the very deceptiveness of that which he presents to our vision adds to its charm. It is the knowledge of this fact, and the effort of the higher class photographer to vie with the painter, which has given rise to the discussion which we see continually in progress of the effect of certain alterations of focus in portraying scenes with the camera to bring about, if possible, this perspective effect.

There are two things upon which the painter mainly relies to bring about the appearance of recession. The one, perspective, which is really the diminishing in size of objects, under certain absolute laws, as they recede from the eye, which is called linear perspective. The other, the intervention of atmosphere between the receding passages, which is known as aerial perspective. The former is unvarying, the rules being the same under all conditions, whilst the latter is simply accidental, varying with the conditions of the weather and other uncontrollable circumstances. In addition to these two means within the power of the painter to produce his perspective deception are others, of minor importance, though often made use of, such as the choice of bold features in his foreground, brilliant lights, deep shadow touches, and coarser or more vigorous handling with his brush or pencil. Some of these may be made available by the photographer, others not.

The chief reliance of the landscape photographer for the attainment of the effect of retirement in the receding passages of his picture must be the intervention of atmosphere; and here, again, is a nice point, for there must be just enough of such haze to bring about the desired effect. He cannot, as the painter does, at his will, change and vary, perhaps bringing in more here and clearing away there, thus sharpening and heightening his effects—he must choose a time when there is such a prevalence of haziness as precisely suits his aim. Not too much, because then it will be impossible to attain a sufficient amount of detail in his foreground before his distance will have been irrevocably over-exposed, and not too little, or he will find his distant features failing to retire, and his perspective effect will be lost.

There is a continual complication in this matter of effect of recession, between studio or group photography and that of open landscape views. In the former much more may often be conveyed by alteration of focus than in the latter, because the effect of blurring is much greater in looking at an object a few feet from the eyes, of other objects in the rear of it, than is the case in taking a comprehensive out door view. Therefore the act of vision is better accommodated by the nature of circumstances.

In the case of groups, and what are known as picturesque foreground bits, wherein the whole subject pertains comparatively to the foreground, atmosphere can have little or no influence in the matter, and a blurring of the background may do much in the way of accentuation of the principal feature of the work. Let us especially note here, however, that such blurring by unaccentuated focus can have little benefit when the background features, are very marked in light and dark, or vie in size and form with the principal feature, or are ill-shapen. When a really fine picture is desired, such must be avoided.

Some painters, more especially modern, have done much in giving relief to their figures by finishing the latter highly and painting whatever may have formed the background, even though it were near objects, in a blurred manner. We recall some work by De Koninck as especially happy in the effect of relief produced in this way, but the background features were so chosen as not to vie too much with the subject figure.

Backgrounds so treated—that is to say, blurred by being put out of focus—must be of such a character as to be considered background solely. Whenever any of the background objects assume sufficient importance to be in any way a prominent part of the picture, it becomes necessary to accentuate the focus sufficiently upon them to make them distinct.

To return to landscape work: In order to attain the best perspective effect, we must necessarily choose a time for taking our views when there is just that nice amount of haziness which will give a due softening of each retiring passage of the work. Only the most careful observation and continual practice will train the photographer in this matter; not only, as we said before, because the precise amount of obscurity must be determined, but also because its character will make much difference, there being a certain bluish-white, smoky atmosphere prevailing sometimes, which will much more potently affect the sensitive film than will be the case under other conditions of murkiness.

There can be no attainment of this desired artistic effect so perfect as that of taking a view under the most favourable atmospheric conditions. No simple blurring of distance by imperfect focus will attain the desired aim when atmosphere is entirely absent.

Our remarks must be taken in the true artistic sense. We are well aware that this quality of atmospheric perspective is understood by but few in this country, and even in an admirable little work recently published in Paris, upon orthochromatic photography, the author gives two examples of an extended view with distant mountains and middle-distance town, under what an artist would consider a favourable atmospheric condition, to show how much superior the view is taken upon the orthochromatic plate, because the appearance of haziness is entirely overcome by it, and the town and distant mountains show up in all the distinctness of detail which would pertain to a clear atmosphere.

The best English photographers are working in the true artistic way, and those who are relying upon good composition and light and shadow, with the proper amount of atmosphere, are having the best success, some of those who have relied solely upon alterations of focus to attain their aim, notably Mr. Emerson, having given up in despair.

XANTHUS SMITH.

THE INFLUENCE OF DEVELOPMENT ON GRADATION.

MANY of those photographers who carefully study the journals have been, during the last few years, in a state of considerable doubt and uncertainty as to whether they have any power of controlling and improving the gradation of their negatives by means of suitable treatment in development. That such a power existed *had* been

regarded as a well-established fact, the truth of which was sufficiently confirmed by the opinions expressed on the subject by the best authorities on photographic matters, as well as by the ordinary experience in the dark room; but, in 1890, the publication of Messrs. Hurter & Driffield's paper, with the striking and interesting experiments therein described, showed a strong case against this generally accepted belief, and gave rise to much doubt in the minds of many readers. Dr. P. H. Emerson was so convinced of the truth of the conclusions arrived at by those experimenters that he entirely altered his views in consequence, in regard to the art side of photography; and others, while less hasty in fully accepting the supposed proof that no modification in gradation could result from variation in development, have still felt that the experiments of Messrs. Hurter & Driffield could not be ignored, and that confidence in the older theory was a good deal shaken. As I was one of those who thought so, and having written a short article on the subject in the autumn as a contribution to The British Journal Photographic Almanac while in that rather unsatisfactory state of mind, I decided to undertake a few experiments in order, if possible, to throw some light on the matter; and as the result as regards myself has been to clear away all doubt, an account of my experiments may, perhaps, be interesting to others.

Some of Messrs. Hurter & Driffield's critics have argued that their experiments were unsatisfactory because of the shortness of the range of exposures tested (viz., only those between 10 and 80 C.M.S.), and can scarcely be considered exhaustive. It has also been pointed out that the developers used did not vary sufficiently in constitution, and that considerably greater departure from normal proportions would be made by a practical photographer who wished to greatly change the character of the gradation of a negative in consequence of a known error in exposure. I therefore endeavoured in my experiments to cover the whole range of sensitiveness of the plate, giving exposures varying from those which were only sufficient to produce the smallest appreciable density up to those which approached (or entered) the "period of reversal," and, in developing, I went equally to extremes. Pyro and ammonia was used (except in one experiment), that being the developer which is generally understood to give the greatest amount of control, and, in settling the proportions in which the ingredients were to be mixed, I was guided by the valuable and instructive series of experiments (quite inconsistent with Messrs. Hurter & Driffield's conclusions) which Mr. W. K. Burton described in 1885, choosing those proportions which had given the most and least detail respectively among the mixtures which he used; but I found, in the latter case, that it was necessary to slightly increase the amount of ammonia to suit the plates I was using. These plates were the Ilford ordinary, which I believe are pretty regular in quality and easily obtained. A few preliminary sensitometer experiments gave pretty clear evidence of different action on the part of two developers, and I then proceeded on the lines laid down by Messrs. Hurter & Driffield. My first experiment in that way left no doubt whatever that complete alteration in the character of a negative might be produced by different treatment in development, but, as the two next were more satisfactory in some respects (especially in being much cleaner in the unexposed parts owing to my having backed all plates after the first experiment) I will omit details of the first experiment, and give particulars of the two next. Five exposures in separate patches were made on "plate B," each being ten times the length of the previous one, and varying altogether from 1 C.M.S. to 10,000 C.M.S. The plate was then cut (of course, lengthways) into two pieces, which were soaked a short time in water, and developed separately in solutions mixed in the following proportions:—

No. 1.

Pyrogallol	½ grain.
Sulphite of soda	2 grains.
Bromide of potassium	½ grain.
Ammonia	2 minims.
Water	1 ounce.

No. 2.

Pyrogallol	2 grains.
Sulphite of soda	8 „
Bromide of potassium	2 „
Ammonia	1 minim.
Water	1 ounce.

One strip was developed in No. 1 for two and a half minutes, and the other in No. 2 for ten minutes, but the action being rather slow, the ammonia was then increased to one and a half minims per ounce, and development continued five minutes longer. "Plate C" was exposed in the same manner, divided into halves, and the strips treated as before, except that, in using the No. 2 developer, no addition was made to the ammonia, but the strip was developed for thirty minutes in solution containing one minim per ounce. The results produced were similar in both cases, the strips which had been through similarly constituted developers being very much alike; but the two halves of each plate showed *great* contrast towards each other. The No. 1 developer was clearly superior in the 1 C.M.S. patches, having brought out good, substantial density, and such as would show up well in the print if it formed part of the detail of a negative. When developed with No. 2, these patches were certainly just visible, but so very thin that the amount of deposit there would evidently have *no* printing value, and would be quite useless in a negative. In the 10 C.M.S. patches the densities were much alike in all strips; but, in the results of longer exposures, great differences again became apparent. As developed by No. 1, the densities of the 100, 1000, and 10,000 C.M.S. parts were weak and thin, and hardly appeared to differ when judged by mere inspection, although the photometer showed that density *had* increased with exposure. On the other hand, when developed with No. 2, these patches showed good contrast at each stage, and those representing the longer exposures had great opacity —strikingly different in appearance from corresponding parts of the companion strips. The experiments showed, therefore, that where a negative had received only an instantaneous or very short exposure, in which the light acting on the various parts of the plate had ranged from about 100 C.M.S. in the brightest parts down to some fraction of a C.M.S. in the shadows, that then the No. 1 developer would be much preferable to No. 2, as the more weakly lighted parts would have a reasonable amount of deposit, and the high lights would not be over-dense; so that, if sufficient density were not obtained in developing the plate, a good negative might, at any rate, be made by intensifying. But if the exposure were full, so that *no* part of the plate had received less than, say, 10 C.M.S. of exposure, then it is clear from the above that No. 1 would give an entirely worthless negative, and No. 2 a satisfactory one. It is evident that these results are quite inconsistent with the principles advanced by Messrs. Hurter & Driffield. If the densities resulting from one method of development had been greater *at each step* than the corresponding ones produced by the other, it might have been somewhat difficult to prove that more prolonged development of the weaker strip might not, at a certain stage, have brought all its densities equal to those of the other half; but, where we have some parts denser on one half and some denser on the other, it is clear that no prolongation of development or after treatment by intensification could ever have produced the same range of gradation on both sides. A simple comparison of the strips seems sufficient to prove the case, but photometrical examination still further strengthens it, and is interesting as showing, in figures, how great the difference is. I have examined the strips in a photometer, constructed according to the directions given by Messrs. Hurter & Driffield in their original paper, very slightly modified, and although I have, so far, had but little practice in photometry, I have worked carefully, and believe my figures are fairly accurate. The following table gives the densities found, and the ratios between the densities, in each plate of the parts treated with No. 1, and those treated with No. 2:—

Exposure, C.M.S.	Plate B.			Exposure, C.M.S.	Plate C.		
	Developer No. 1.	Developer No. 2.	Ratio.		Developer No. 1.	Developer No. 2.	Ratio.
1	·29	·09	·31	1	·30	·12	·40
10	·70	·70	1·00	10	·78	·75	·96
100	·95	1·58	1·66	100	1·01	1·41	1·39
1,000	1·05	2·00	1·90	1,000	1·09	1·83	1·68
10,000	1·14	2·19	1·92	10,000	1·19	2·21	1·86

The greater density given by the No. 1 developer, in the case of the 1 C.M.S. exposure is well shown by the table, and 10 C.M.S., in each case, appears as having about equal densities on both halves of the plate; but the great superiority in density brought out by No. 2 for the longer exposures then becomes apparent, and increases at each step till, in the 10,000 C.M.S. patches, differences are shown amounting to a density of 1—that is to say, the strips developed with No. 1 allow *ten times* as much light to pass through, at that part, as do the corresponding strips. I need make no remark as to the "ratio" columns, except to point out that, if

Messrs. Hurter & Driffield's principles applied, the figures in those columns should be *practically identical* for all exposures on the same plate. H. J. CHANNON.

(To be continued.)

ON THE PRODUCTION OF BLACK AND WHITE NEGATIVES BY MEANS OF ARTIFICIAL LIGHT.

IV.

IN a previous article I referred to the influence varying degrees of temperature of the developing solution had upon the plate. A perfect black and white negative previous to intensification should show no reductions on the blacks, but at the same time have a good degree of opacity in the whites. With such a negative, the process of after-intensification offers no trouble, and, provided the plate receive a sufficiency of washing before and after the application of the mercuric chloride solution, the transparent portions will in no way deteriorate.

The knowledge whether or not there has been any reduction in the blacks during development will soon be acquired when the bleaching operation takes place after the application of the chloride of mercury solution. Provided there be no appearance of any bleaching on the clear glass portions of the image, all will go well, but, if after the application of the mercury it is seen that bleaching takes place, then the negative has been over-developed, and a beginner would do well to expose another plate on the same subject, giving less time, and by a judicious use of pyro and bromide force up contrasts without carrying on developments so far. By this means, a knowledge of how far a plate may be developed without causing a reduction in the blacks is arrived at; and once a worker is able regularly to expose and develop in such a manner he becomes master of the entire situation; it takes some practice, and in development a somewhat different method of treatment from the ordinary practice when high lights, middle tints, and on through shadows for details have to be looked for.

It very frequently happens that, no matter how careful a worker may have been to guard against the reduction of those portions of the negative representing the blacks in the picture, that, after completion of the fixing and the plate is taken out into daylight, a very slight reduction will be noticed which was not apparent in the dark room. When such occurs, the plate should be most thoroughly washed, after which an application of a weak solution of iodine and a further thorough wash followed by a very dilute bath of cyanide of potassium will effectually remove the slight reduction; these solutions, however, must be freshly made up, and the greatest precautions taken to avoid staining the plate. When it is seen that there is no deposit on the portions of the negative that ought to be clear glass, the plate receives a very thorough washing, and is then ready for being intensified.

In cases where ordinary negatives embodying high lights, middle tints, and shadows are concerned, the application of a mercuric chloride solution, followed by copious washing and an after-application of a saturated solution of sulphite of soda, or, as some workers advocate, a weak solution of ammonia, will be found as effectual and perhaps as convenient a method to employ as any; but in the class of work we are considering we have no middle tints to look after, but, on the other hand, the great aim is merely to increase to the utmost the opaque portions of the negative; and perhaps there is no better plan to follow or formula to employ than that of cyanide of silver. With such the utmost degree of intensity is usually got. Any one using such for the first time will be struck with the extra amount of density noticeable after the plate has been dried. This will not be so apparent whilst the plate is wet, but is very evident when dried and finished.

As a rule, amateur workers are not conversant with cyanide of silver as an intensifying agent, for the simple reason, doubtless, that the highly poisonous nature of this chemical intimidates many from using such. It is very useful, however, in the class of work we are considering, and with proper care a worker need have little or no scruples in making up a supply and using it.

To make a useful quantity of this intensifier, the following will be found about the right quantities of chemicals to employ:—Dissolve 220 grains nitrate of silver in three ounces of water. In a large jar place twenty-four ounces of water, and with a glass rod dissolve in same by stirring one ounce of cyanide of potassium, when the cyanide is dissolved from the silver solution gradually into the the cyanide solution. Stirring with the glass rod, a white precipitate will be formed, but, with constant stirring, after a time this will be redissolved up, and eventually the solution will become quite clear. It will work best after being a few days old.

The chloride of mercury, or bleaching solution, is made as follows:—In twenty ounces of water dissolve 200 grains bichloride of mercury and 200 grains chloride of ammonium.

The plate, after being most thoroughly washed, is placed in a small quantity of mercury solution, until the bleaching has gone right through the entire film; it is then thoroughly well washed again, and the face of the negative well sponged with a large plug of clean cotton wool, after which the cyanide of silver solution is applied just like applying an ordinary developing solution. The plate will at once assume a jet-black appearance, and in a short time the silver solution will permeate right through to the back of the film. When it is seen that the film is blackened right through to the glass, the negative should, without any further delay, be well washed under the tap for some minutes, and eventually washed in a water bath changed at intervals for, say, an hour or so. If all these manipulations have been carefully performed, and the chemicals properly prepared, the result will be a black and white negative of a class seldom seen by amateurs. The blacks will be represented by what is termed clear glass, and the opaque portions of the negative so dense that no gas flame will be visible when the negative is held at, say, twelve inches from it.

Some workers advocate economy by using these intensifying solutions over and over again; this means, they pour them back into the stock bottles when they have been applied to the plate. I find, however, I invariably get cleaner results by using entirely fresh solutions: so it is just as well to pour the used mercuric and silver solutions down the sink when used, and always employ a clean, fresh supply from the stock bottles.

With a negative having such a wide contrast, a worker will be able to turn out results in the way of printing—either on sensitive plates, such as is useful for lantern slides, either by contact or through the camera—that will astonish those who have never been able to get clean high lights; whilst in platinotype or bromide printing, work will be rendered in a manner hitherto unapproached for pluck and vigour. T. N. ARMSTRONG.

NORMAL AND SOLARISING DENSITIES.

THE intervals of time expressed by the figures 5, 90, 1620, 29,160, &c., given by myself as typical of the relative connexion existing between the exposures necessary to produce, successively, the three most characteristic combinations of two fixed densities under conditions invariable as regards the nature of the subject, the intensity of the light, the sensitiveness of the film, the strength of the developer, and the period of immersion, form a geometrical series, having a common ratio, and exhibit from first to last a uniformly retarded fluxion.

The terms "normal," "neutral," and "reversal," which I carefully selected to designate the three phases of two simultaneously presented extremes of greatest and least contrast, or of transparency and maximum opacity, and two equal opacities, amply convey—to any mathematician at all acquainted with the subject—the fact that the equal opacities are, and must be, mean densities, the three terms alternately implying the idea of combinations of $0+1$, $0{\cdot}5+0{\cdot}5$, and $1+0$ densities, as otherwise the flux and increment could not correspond, as I showed that they did.

Taking two extreme degrees of light and shade in a subject, we observe as one of the leading features of solarisation that, whilst each degree of luminosity in a shorter or longer interval of time affects the film in apparently the same way, and imparts to the two corresponding portions the power successively to acquire mean, greatest mean, and least densities, it is to be specially noted that, although both, so to speak, ascend and descend the same hill, yet is the one ever going up as the other is coming down, and *vice versâ*, each moving simultaneously from base to summit and from summit to base with a constantly retarded velocity, and meeting invariably between these turning points or termini.

Let us regard the gain and loss of density by the two portions of

the plate respectively exposed directly and indirectly—or to the greatest and least light—as the distance swung by a pair of pendulums suspended close together—either side by side, or one in front of the other. Let one oscillation to and fro be taken as equal to a complete cycle of phases. If the angle included between the extremes of position of the shaft were subdivided into any number of equal fractions, representing density, each scalar step, grade, or degree of density would, expressed to the required base, form a series of logarithms corresponding to the periods in which they were described. It would, of course, be essential that arcs of forty-five and ninety degrees should be described in periods with a common ratio, such, for instances, as 5, 90, 1620, 29,160, &c., or as 128, 16,384, 2,097,152, 268,435,456, &c., although x, xn, xn^2, xn^3, or r, r^2, r^3, r^4, &c., are preferable, as of more general application, in which formulæ x is simply the exposure for the phase first found, and n or r the number or ratio by which it must be multiplied or divided in order to produces the succeeding or preceding phase.

In order that the conditions first pointed out by myself—from which much in the way of detail may be elaborated—may be realised, we must be able to see that the swing from 0·0 to 0·5, and from 0·5 to 1·0, of the one pendulum is performed in the period in which the other describes 1·0 to 0·5, and from 0·5 to 1·0. Whether the "swing" is a "whole swing," a "half swing," or a "quarter swing," it will be performed by the one pendulum in precisely the same time as that taken by the other to move the same distance; but, be it noted, one quarter falling density corresponds to one quarter rising density, one half increasing to one half decreasing, and so on. It may not pass the wit of man to devise an irregularly accelerated and retarded velocity by which these points may be enabled to coincide; but at the same time it is evident that, without proof to the contrary, the uniformly retarded velocity proved by myself to determine the extremes and means of density must be accepted as influencing fractions smaller than one-half.

To summarise, then:—The *swing* in density from 0 to 1 of the *indirectly* illuminated portion of the film being strictly isochronous with the *swing* from 1 to 0 of the *directly* exposed part, and the *half swing* from 0 to 0·5 or from 0·6 to 1 being likewise isochronous with the *half swing* from 1 to 0·5 and from 0·5 to 0, it would naturally seem to follow that the quarter swing and other swings describing smaller fractions than I dealt with should obey the same law and be described in proportionate periods, that is, in times whose common ratio corresponds to the common difference of the densities. Without any further data, then, we are in a position to conclude that the time taken by the "solarising" or brightening portion of the film to lose any fraction of mist density will be the exact period required by the darkening part to gain the same amount. Hence, as the one quantity depends upon the other in such a manner that that expressing the time is equally multiplied for equal added or subtracted increments in density, we know that the rate of growth is logarithmic and cannot be otherwise. Knowing this, it is easy to calculate and interpolate the exposures necessary, under similar conditions, to give 0·25 or 0·75, or any fractional part of the unit of opacity, either for the least protected or the most protected part of the film.

My terms, "neutral," "normal," "neutral," and "reversal," taken together with the figures I put forward typically, or, if preferred, with the symbolic expression of the exposures necessary to produce the densities the terms imply, bring out three important facts:—

1. The leading conception that what is true of the "image" of the brightest light is equally true of the "image" of the deepest shadow, and that both alternately decrease, increase, and decrease again in their power to attract the deposit furnished by the developer.

2. That, unless the period required by the one form of image to gain a given increment in density be the time taken by the other to lose the same amount, the phases could not occur in the sequence given by Professor Janssen, nor assume the forms described.

3. Since these selected phases are compounded of two densities, each of which grows at the same rate, and that rate is stated both by figure and formula, it follows that the law is thereby expressed which numerically defines the condition of interdependence of the densities upon the exposures, and of the exposures upon the densities. This law, first given by myself in THE BRITISH JOURNAL OF PHOTOGRAPHY for January 13, 1888, antedates by over two years the publication of any verification or amplification of it.

HUGH BREBNER.

ROUGH PAPER.

[Fillebrook Athenæum Photographic Society.]

CONSIDERING the extent to which rough paper is now being advocated and used for photographic printing, and the undue preference shown to coarse-textured prints by Exhibition Judges, we may, perhaps, profitably devote an evening to a consideration of the principles that should govern its use.

Unfortunately, in every art, and especially in photography, there are many who, seeing a success achieved by a picture in which some new departure is made, cannot appreciate the art qualities that ensure its success, but attribute it to the novel treatment. The inevitable result is that these peculiarities or mannerisms become a craze, and are adopted under all conditions and circumstances without any consideration of suitability.

Some of our prominent workers having printed on rough-surface paper with more or less good effect in special instances, the present craze is "Rough paper," and, preferably, the roughest of the rough, which is frequently used with so little discrimination that, instead of enhancing any artistic merit that the picture may possess, completely obliterates it.

The Judges at some Exhibitions are largely responsible for this state of affairs; for, when it is seen that the principal claim to recognition is the adopting of certain "fads" or eccentricities in general treatment of subject, or coarseness of printing surface, or a combination of both, it must be admitted that, to the ordinary mortal, the temptation is very great to produce a result for the sake of winning a medal that his better taste might condemn. "Cosmos," in his "Jottings" in THE BRITISH JOURNAL OF PHOTOGRAPHY of March 17, in alluding to Judges at Exhibitions, writes: "The worst of it is that people of this kind get so imbued with the idea that their way of making pictures by photography is the right one, that any one who thinks otherwise, and proves the faith that is in him by exhibiting, stands very little chance of an award."

As a striking example of this I may instance an award at our recent Exhibition. An old architectural subject, about 10 × 8, printed on the roughest paper, so that the truth of all straight lines was destroyed, and any detail, which in masses of old stonework would be sufficiently varied and broken, not only lost, but replaced by a regular mechanical series of lights and shades, due to the undulations in the paper, and out of all proportion to the scale of the subject—larger, in fact, than the blocks of stone themselves. While this was medalled, far better photographs of similar subjects, treated more as any artist in monochrome would have rendered them, were passed over, because they were open to the objection of being legitimate photography, sharply focussed, and carefully printed in platinotype. Such awards as this tend to give a fictitious value to rough paper, instead of good technique coupled with artistic merit.

It is frequently contended that rough paper and one or two other kindred crazes are more artistic and *painter-like*, and that photographs other than those that accord with these methods have no claim on the attention of persons of refined and artistic tastes; they are merely photographs, or even "topographical photographs," while the work of the faddists are *pictures*.

The pictorial qualities of a photograph—composition, balance of light and shade, due prominence of foreground, and correct rendering of distance, the whole treatment of subject—are quite independent of any special fad, and are not the sole property of any one school in either photography or painting. On the other hand, *the indiscriminate use of a method of treatment or printing surface, suitable only under special conditions, is certainly not artistic—it is either studied eccentricity or utter want of judgment.*

A rough surface is said to give breadth of effect, which is simply the massing of the lights and shades, and must be obtained by suitable lighting. If this quality is not present in the negative, rough paper cannot confer it.

Every art has its own peculiar character which gives it a special charm, and, if the worker be a master of his craft, he will retain and emphasise that character in expressing his ideas, however much individuality may stamp his works. It would not be considered the highest ideal for an artist in water colours to aim at producing a result that should be mistaken for an oil painting; why, then, should the standard of quality in photography be that our works should look as unlike photographs as possible?

It is quite a new doctrine, that unfortunately seems to be gaining ground, that the legitimate methods of photography are inartistic and incapable of expressing sentiment; that only as we depart from accepted methods are our works to be considered artistic; in brief, that careless technique is essential to art. In painting, a man is judged by the technical quality equally as by the sentiment of his pictures; if either is defective, his work is condemned.

I do not wish to convey the impression of totally condemning rough paper, but only its indiscriminate use. The roughest should only be used for very large work, and then only in special cases. The texture should depend not only on the actual size, but equally on the character of the picture. A bold, simple, or broad effect could be printed with good taste on a far rougher surface than a delicately treated subject, or one in which fineness of detail was more or less essential. The grain should not be obtrusive at the ordinary distance of viewing the picture, otherwise it attracts to itself that attention that should centre on the subject of the picture.

It is very much to be regretted that many whose works show an appreciation of the beautiful in nature should so finish them that, instead of giving pleasure, they only irritate by their coarseness.

Etchings and engravings are invariably on smooth surface paper, and water-colour drawings, excepting those of very large size, on that of fine

grain or moderate texture; but they are not considered inartistic on that account. Those photographers who affect extremes in either roughness of surface, or out-of-focus methods, or misty and gloomy effects, might study with advantage the works of leading etchers, which show that smoothness of surface, fineness of definition, delicacy of treatment, bright and sunny scenes, are not inconsistent with the highest artistic quality.

HENRY W. BENNETT.

AN ATTRACTIVE "OPTIMUS" EXHIBITION.

THERE is at present on exhibition in the premises of Messrs. Perken, Son, & Rayment, 99, Hatton-garden, a large collection of pictures, both direct and enlarged, of a very attractive nature. It is a selection of prints the offspring of the 1892 Optimus One Hundred Guinea Photographic Competition. One of the main conditions of this highly creditable contest was that each negative must be taken by an "Optimus lens."

The resulting prints, several hundred in number, including portraits, landscapes, seascapes, architecture, animal studies, &c., are of very high order of merit from a technical as well as from an artistic standpoint. The sizes varied from 15 × 12 down to quarter-plate. Many display a minuteness of definition that is simply marvellous. Even the 24 × 18 enlargements (also made by "Optimus lenses") from 4¼ × 3¼ negatives are so crisp that they may readily be mistaken for well-defined direct work. We would strongly recommend the "Optimus" firm to enlarge these quarter-plate negatives considerably further, feeling sure the most critical would be amply satisfied with the results. Messrs. Perken, Son, & Rayment must be much gratified at the class of work their prizes have brought together. Among the contributors of prints we notice the names of many of our recognised past masters at the art science.

We understand this firm has already announced its intention to offer another one hundred guinea series of prizes for the best photographs taken with "Optimus lenses" during the present year, the conditions and entry forms of which will be published at the end of April.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 4814.—"Improvements in Photographic Cameras." B. F. S. BADEN-POWELL.—*Dated March* 6, 1893.

No. 4884.—"A Cabinet or Case for the Holding and Carrying of Lantern and other Slides." J. POTTS.—*Dated March* 7, 1893.

No. 4951.—"Improvements in Photography by the use of New Developers." Communicated by the Chemische Fabrik auf actien vorm. E. Schering. S. PITT.—*Dated March* 7, 1893.

No. 5035.—"An Improved Case or Chamber for Enclosing and Protecting Photographic Printing Frames and Similar Apparatus with their Contents during the Process of Photographic Printing and the like." G. C. J. JELPKE.—*Dated March* 8, 1893.

No. 5170.—"An Improvement in the Manufacture of Lenses for certain purposes." H. VAN DER WEYDE.—*Dated March* 9, 1893.

No. 5219.—"An Improvement in Photographic Cameras." J. THEOBALD.—*Dated March* 10, 1893.

No. 5232.—"Improvements in or relating to Photographic Cameras." T. E. C. WILSON.—*Dated March* 10, 1893.

No. 5350.—"A Field-glass Camera." A. F. SCHOERLE.—*Dated March* 13, 1893.

No. 5396.—"Improvements in Hand or Detective Cameras and Shutter which can be used with other Cameras to advantage." N. CROUCH.—*Dated March* 13, 1893.

No. 5504.—"Improvements in or relating to the Manufacture of Films for Photographic Purposes." Communicated by T. H. Blair. A. J. BOULT.—*Dated March* 14, 1893.

No. 5517.—"Improved Silver Haloid Emulsions for Photographic Purposes." W. H. PRESTWICH.—*Dated March* 14, 1893.

No. 5554.—"An Improved Form of Jet for Optical Lanterns." J. H. BARTON.—*Dated March* 15, 1893.

No. 5624.—"Improvements in and connected with Clips for Holding Photographic Films, Glass, Paper, or any Sheets of Thin Material." J. W. BARLOW. *Dated March* 15, 1893.

No. 5828.—"Improvements in Photographic Cameras and their Accessories." W. J. LANCASTER.—*Dated March* 18, 1893.

No. 5846.—"An Improved Photographic Apparatus." J. DAMOIZEAU.—*Dated March* 18, 1893.

SPECIFICATIONS PUBLISHED.

1893.

No. 3014.—"Photographing Apparatus." THIROUX.

No. 5541.—"Limelight Jets." NOAKES.

No. 6542.—"Pyroxyline Solutions and Compounds." FAIRFAX.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 27	Camera Club	Charing Cross-road, W.C.
,, 27	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 27	Lantern Society	20, Hanover-square.
,, 27	North Middlesex	Jubilee House, Hornsey-road, N.
,, 27	Putney	Boys' Gymnasium, Charlwood-road.
,, 27	Richmond	Greyhound Hotel.
,, 28	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 28	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 28	Hackney	206, Mare-street, Hackney.
,, 28	Halifax Camera Club	
,, 28	Lancaster (Annual)	Springfield Barracks, Lancaster.
,, 28	Leith	165, Constitution-street, Leith.
,, 28	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 28	Paisley	9, Gauze-street, Paisley.
,, 28	Rochester	Mathematical School, Rochester.
,, 28	Warrington	Museum, Bold-street, Warrington.
,, 29	Bath	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 29	Burnley	Bank Chambers, Hargreaves-street.
,, 29	Leytonstone	The Assembly Rooms, High-road.
,, 29	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 29	Southport	The Studio, 15, Cambridge-arcade.
,, 30	Camera Club	Charing Cross-road, W.C.
,, 30	Glossop Dale	
,, 30	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 30	Hull	71, Prospect-street, Hull.
,, 30	Liverpool Amateur	Percy-buildings, Eberle-street.
,, 30	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 30	Oldham	The Lyceum, Union-st., Oldham.
April 1	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 16,—Mr. C. E. Atkins in the chair.

This being a Lantern Night, slides by Messrs. H. E. Davis, Wilkes, Beckett, and a collection, illustrative of South Africa, contributed by the South African Photographic Societies, were shown.

Mr. H. E. Davis showed a very light tripod stand, made by Messrs. Newman & Guardia, and the firm's representative exhibited one of their new-pattern hand cameras.

North Middlesex Photographic Society.—The second of the series of Elementary Technical Classes being given by the above Society was held on Wednesday, the 15th inst., the subject being "Development." Mr. C. BEADLE briefly explained the subject in hand before proceeding to the more practical part, in which he was assisted by Messrs. J. MacIntosh and A. J. Golding. The plates were exposed at a special outing held on Saturday, the 11th inst., each beginner developing his own plates, while the instructor stood by to show and explain as development proceeded. These classes are given, free of charge, to help beginners, and appear to be greatly appreciated, which is very encouraging. The next Technical Class will be held on Wednesday, April 12, the subject being "Toning Gelatino-chloride Paper." The Secretary, Mr. G. Gosling, 13, Lausanne-road, Hornsey, will be pleased to hear from any gentleman wishing to attend.

Harringay Photographic Society.—March 16, Mr. Coghill occupied the chair.—Mr. T. W. A. BALL gave a demonstration of *Retouching*. The demonstrator showed how to reduce a negative with spirit, how to prepare and apply the medium, and he then proceeded to retouch a negative. One new member was elected.

Hackney Photographic Society.—March 14, Mr. E. Puttock presiding.—Members' work was shown from Messrs. Beckett and Dean. Question: "Is it advisable to back all plates taken out?" Reply: "Yes; it is a great advantage, especially when light is strong; in no case could it do harm." Question: "What is the most reliable backing?" Reply: "Caramel and burnt sienna, as per formula given last June." Mr. NUNN mentioned red blotting-paper, and Mr. GOSLINO carbonised manifold paper, as not bad substitutes. Mr. R. BECKETT said that films were better than unbacked plates; but Mr. F. HOUGHTON found no halation on films exposed last week one-sixth of a second. The CHAIRMAN then read a paper by Dr. Paul Jeserich entitled *Detection of Crime by Photography*. Whilst the lecture was being read a series of slides was shown through the Club lantern as alluded to. These were taken from subjects forming criminal cases in Germany. Dr. P. Jeserich treated his subject under the heads of Hairs, Blood, and Forgeries. Hairs, he said, from the same individual were easily recognisable. Human hairs and blood were different from those of other mammals. He instanced cases where his evidence resulted in acquitting some people accused of murder and pointed suspicion at others, to which they ultimately confessed. Forgeries executed in different coloured inks, though the unassisted eye could not detect it, were photographed by *his* process (presumably coloured screens and colour-sensitive plates). They clearly showed the original handwriting faintly, with the additions strongly contrasted. Spectra of blood were shown, which were apparently identical, urging, as a strong point, that no two substances give exactly the same spectra. In a short discussion which followed, Mr. DEAN objected to the too dogmatic way in which the paper was written, claiming that some of Dr. Jeserich's assertions were stronger than the stated facts justified, and that he ought not to assume that human hairs from the same individual have the same size and the same-shaped roots; that a cut hair grows from the middle of the *cut* end; that blood corpuscles from the various orders of the mammalia are *so very* dissimilar from one another in size; that no two spectra are the same. Mr. Dean quoted a reliable authority that the differences between the spectrum of red ink and that of blood, even under very high powers, are undiscernible. Slides from Messrs. Beckett, Hull, Smith, and Salmon were then put on the screen.

Fillebrook Athenæum Photographic Society.—March 20, Mr. H. T. Maltby in the chair.—A discussion on *Rough Paper* was opened by Mr. H. W. BENNETT [see page 186]. Mr. J. W. SPURGEON said that one of the chief characteristics of photography, its ability to render detail, was destroyed if the paper were too coarse for the subject. A style of photograph coming into prominence was the "fuzzy;" but, in his opinion, a sharp picture artistically good was far superior. Mr. CAIRD, speaking as a water-colour worker, said that rough paper was inadmissible for fine work, and most photographs were fine work on account of their small size. In water-colour drawing generally, the whole method of working was broader than in photography; even then very rough paper was only suitable for large and broad effects. Mr. MALTBY considered that taste was shown in choosing a grain to agree with the scale of subject represented. The texture had quite a different object in water-colour drawing from photography, the irregularities of surface allow a play of light and shade, and give transparency to masses of colour, and, by permitting simple washes rather than laboured effects, greater purity of tone results. Next meeting, Monday, April 17. Subject, *What to Photograph*, to be opened by Mr. J. W. Spurgeon.

Putney Photographic Society.—Dr. W. J. Sheppard in the chair.—Mr. Henry Kimber, M.P., was elected a Vice-President, Mr. W. R. Few a member of the Council, and Mr. F. W. Thompson an ordinary member of the Society. Mr. W. E. DEBENHAM gave his lecture and demonstration on *Transparencies by the Carbon Process*, this being one of the papers placed at the disposal of affiliated societies by the Central Committee. Mr. Debenham commenced by fully explaining the theory of the process, illustrating his remarks by diagrams drawn on the blackboard. He claimed that for lantern slides carbon transparencies were unbeaten, as the process gave great range of gradation, clearness in the high lights, and transparency in the shadows, and, further, that any colour could be obtained with absolute certainty; the process was also greatly used in the trade for reproducing negatives for enlargement, photogravure, &c., for which it had been found to be very suitable. The tissue might be prepared by the user without much difficulty, but amateurs would find it more convenient to buy it ready for sensitising, in which state it would keep for a long time. They could readily sensitise it themselves by immersion in a solution of bichromate of potash. This should be done shortly before use, as the tissue will not keep many days when sensitised, even when precautions are taken to store it under the most favourable conditions. Mr. Debenham then proceeded to explain and demonstrate the method in detail, from the preparation of the tissue to the final transparency, giving many valuable hints of a practical nature, which were greatly appreciated by those present, who throughout followed Mr. Debenham's remarks with much interest, and, at his invitation, asked questions as the demonstration proceeded. It is almost needless to say that the whole of the process was brought very fully and clearly before the members, both theoretically and practically, specimen transparencies and reproduced negatives illustrating the lecture were handed round, and the results fully bore out Mr. Debenham's claims for the beauty and utility of the process.

West London Photographic Society.—March 14.—Messrs. HODGES & HORTON read a paper on *The Processes Applicable to Lantern Slides, and Hints on the Management of the Lantern*. Omitting the first part of the subject, as likely to occupy too much time, the authors proceeded to enumerate the optical and other *desiderata* of a good lantern, and, after reviewing the history of lantern illuminants, and dwelling briefly upon the various forms of oil lamps, including the improved lamp of Stock, they proceeded to describe in detail the various types of limelight appliances, including the oxy-spirit, blow-through, mixed jet, and oxy-ether, and to show samples of all but the last in operation. The practical part of the paper was notable for the interesting series of comparisons instituted between discs thrown on the screen from two lanterns placed side by side, employing in succession a four-wick oil lamp of ordinary make, a Stock lamp, an oxy-spirit jet, a blow-through jet, and, lastly, a mixed gas jet. Each illuminant, taken in the order enumerated above, gave a distinct advance in light-giving power as well as in whiteness of the light. At the conclusion an interesting series of slides, belonging to Mr. Le Marchand, made by the albumen process, were shown.

Ashton Photographic Society.—March 16, Annual Meeting, the President (Dr. Hamilton) occupied the chair.—Mr. G. H. DEAN, Honorary Secretary, read the report, which stated that twenty-nine new members had joined the Society during the past year, making the present total 120, or eleven more than last year. The library had been considerably augmented, through the gift of the late Mr. Basil Hall's collection, by his brother, Mr. T. B. Hall. The Council hoped, in the course of a few weeks, to have the books arranged and ready for circulation amongst the members. During the season seven outings were arranged, but, owing to the inclemency of the weather, one was abandoned. Mr. R. T. Marsland, the Treasurer, presented the balance-sheet, showing the income to be 66*l.* 7*s.* 6*d.*, of which 42*l.* 11*s.* 6*d.* had been received in subscriptions, 13*l.* 3*s.* 6*d.* from the sale of tickets, &c., and 9*l.* 7*s.* 6*d.*, the balance brought forward from last year. The expenditure was 50*l.* 15*s.* 4*d.*, leaving a balance to be carried forward of 15*l.* 12*s.* 2*d.* The CHAIRMAN, in moving the adoption of the Secretary and Treasurer's reports, congratulated the Society upon its increased and increasing efficiency. As far as he had been able to judge, the work of the members, photographically, had advanced distinctly, not only in practical detail but in true artistic feeling, without which no photographic society could ever make any real or distinct progress. It was gratifying to him to know that, in their Society, there had been a distinct effort to realise this particular condition. One of their members, to whom they were indebted in many ways, had endeavoured from the beginning to produce real pictures. He referred to Mr. Glazebrook, whose work had received the commendation of Mr. Arthur Severn, a well-known artist, and Mr. John Ruskin, one of the greatest art critics of this century. He (the Chairman) did not mention this with a view only of showing what a good worker Mr. Glazebrook was—although that was an important part of it—but to show that they had realised what artists said photographers were not able to do. He had never heard of any photographic society being honoured by the favourable opinion of two such eminent men. Major Bradley moved a vote of thanks to Dr. Hamilton for the service he had rendered and the great interest he had taken in the work of the Society. Dr. Hamilton was re-elected President, Messrs. J. W. Kenworthy, C. Lord, Thos. Glazebrook, and Major Bradley were elected Vice-Presidents. Dr. HAMILTON moved a vote of thanks to Mr. Dean for his services as Secretary. Unfortunately for the Society, Mr. Dean felt himself compelled through stress of work and through change of residence, which took him further away from the rooms, to resign the office he had held during the last two years. He was sure they all regretted to part with him. Mr. Josiah Matley seconded the motion, which was carried. Mr. Marsland was elected Secretary, and Mr. Walter Leigh Treasurer. Mr. Walter Chadwick was elected Librarian. The following were elected on the Committee:—Messrs. W. C. Brown, T. Chayne, W. Chadwick, W. Greenwood, J. Hutchinson, J. T. Lees, C. E. Redfern, and S. Woolley.

Birmingham Photographic Society.—March 14.—Three sets of slides, lent us by the Liverpool Amateur Photographic Association—entitled (1) *Illustrated Boston*, (2) *In and Around Columbus*, (3) *The White Mountains of New Hampshire*—were shown on the screen and described by Mr. MIDDLETON, with the help of notes which accompanied them. Very interesting they were, showing old and new buildings, landmarks, and busy streets, while the third set were perhaps the more delightful pictorially. Fine mountains, streams, and wooded scenery evidently abound in this charming district. The CHAIRMAN expressed thanks to the Liverpool Amateur Photographic Association.

Liverpool Amateur Photographic Association.—March 16.—Mr. F. HOPE-JONES delivered a lecture on *Eural*, the deserted mansion of the Puleston family on the river Dee, some fifteen miles south of Chester. Photographers are always on the look-out for fresh subjects at which to level their cameras, and this interesting ruin provides picturesque material for them. In addition to this, its historical associations are important, and form an excellent subject for a lantern lecture.

FORTHCOMING EXHIBITIONS.

April 5–8	.....	*Croydon Camera Club, Braithwaite Hall, Wellesley-road, Croydon. Hon. Secretary, G. R. White, 55, Albert-road, Croydon.
,, 10–29	.....	*Crystal Palace. The Executive, Crystal Palace, S.E.
,, 12–15	.....	*Bolton Photographic Society. Hon. Secretary, J. E. Austwick, 10, Rushton-street, Bolton.
,, 17–29	.....	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.
May 4–6	.....	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

RAPID SOLUTION MAKING.

To the EDITOR.

SIR,—I think it matter for unfeigned regret that Mr. G. W. Webster should have introduced personal feeling into the discussion of a trifling detail of laboratory practice.

I recall with pardonable pride the fact that I have enjoyed the privilege of contributing to the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY for thirty-seven years, from seven pages in a month to a brief paragraph in a week, and I think, Sir, you will bear me out when I say that never until now have I been accused of making use of "covert sneers," or "accusations of making false claims," and I beg to assure you that nothing was further from my mind when writing the letter you did me the honour to publish in your JOURNAL for February 24.

I hope to have the pleasure of meeting Mr. G. W. Webster at the Plymouth meeting of the Photographic Convention, and am therefore specially desirous to avoid saying anything now which might lead to the formation then of a "four-and-twenty feet ring, clear stage, and no favour" in front of the Sir Francis Drake statue on Plymouth Hoe. I beg to assure him that I was perfectly sincere in expressing the opinion that photographers uninstructed in chemical manipulations should feel indebted to the gentlemen named—not specially to Mr. Webster, but to Messrs. Baird and Ayres, who, by the way, do *not* accuse me of sneering.

In his article in the JOURNAL for February 17, Mr. G. W. Webster uses the expression, "In my own case the *invention* was spontaneous." What is this but a claim to having invented an article on sale at Doulton's? Again I say I was equally sincere in feeling "amused" at this claim.

My acquaintance with hyposulphites and their comparative instability dates from 1843, and that knowledge leads me to prefer freshly prepared solutions rather than stale ones laid on in pipes, and after five years' systematic study in a public laboratory, should have found Mr. G. W. Webster's instructions *re* solution-making more acceptable if the accompanying sneer, so far from being "covert," had been less palpable.

I will not trespass on your space to defend "Atticus" (whom I have never had the pleasure of meeting); but as I feel grateful for his suggestion of a calico-covered basket, which I consider preferable to the

lacquerer's "dipping" basket or my own strainer, I cannot refrain from expressing regret that he should have been the subject of such unguarded personality as is contained in the JOURNAL for March 17.—I am, yours, &c., J. MARTIN.

Photographic Works, New Southgate, N.

"ATTICUS'" DEFENCE—RAPID SOLUTION-MAKING.

To the EDITOR.

SIR,—"Atticus is of no account" (so Mr. G. Watmough Webster says in last week's JOURNAL), "but appears to be readily amused." True, "Atticus" is amused at times at the resurrection of old processes and methods, and, though they be reclothed in thick material, the disguise is often not thick enough.

Mr. Webster, however, is very thin-skinned, for even gentlemanly and just criticism produces literary convulsions of a rather inconvenient nature to him; nevertheless, he must not forget that the JOURNAL is the mouthpiece of the profession, and not that of the individual. He charges "Atticus" with untruthfulness; therefore, and not without reason, "Atticus" sharpens his quill to repel and repudiate the charge. "Atticus" is accused of not knowing the difference between a dark room and a laboratory, and that he never uses sulphite in making stock solution of pyro. This is the red herring across the trail, and it must be left to its own natural decomposition; but it is advisable not to go too near during the last stages of decay.

Mr. Webster, at page 100 of the JOURNAL, says, "We all know that great minds think alike. Doubtless, in our case" (*i.e.*, Webster and Ayres) *the invention was original*, whichever claims priority of publication." However, at page 164, Mr. Webster changes front, and says, "This principle of rapid solution" (*i.e.*, the Doulton dipping basket) "is of historical age, and that he used it thirty-five years ago."

Mr. Webster insinuates that "Atticus" must "have a specially original copy of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1893, for it contains statements not to be found in any other copy." The article quoted is "Rapid Solution Making," page 668. The writer says, "His duties consisted in making sundry solutions for stock and otherwise, *i.e.*, pyro, hypo, sulphite, chrome alum," &c. He "sought out the easiest method, and found the Doulton dipping basket a complete success, dissolving the substances named (pyro, hypo, &c.) in a remarkably short time." These are the statements Mr. Webster says that cannot be found in any other copy of this year's ALMANAC. The dissolving of pyrogallic acid in a Doulton dipping basket would certainly prove most expeditious!

Finally, Mr. Webster says (page 164), "It goes without saying that the particular application of the dipping basket is only one of a hundred plans that may be adopted for the same end." This may, or may not, be *tall talk*, but if Mr. Webster will name six practical methods, out of the hundreds he knows of, by which rapid solution can be effected—to meet easily and practically the wants of an every-day photographer—and will supply the information (within a reasonable time) through the pages of the JOURNAL, using cold water in all cases, and not adopting any methods already published in his or his son's articles, "Atticus" will give half a guinea to the funds of the Photographers' Benevolent Association.—I am, yours, &c., ATTICUS.

March 20, 1893.

"CHEAP MOUNTS: A PLEA FOR QUALITY"—THE CAP FITS.

To the EDITOR.

SIR,—In your JOURNAL of the 17th inst. we notice a criticism upon the quality of some mounts just recently circulated. It emanates from a card manufacturer.

There is no doubt in our minds as to the criticisms being intended for our goods, consequently it will be only fair if you will kindly place our reply before your readers, most of whom will have received our samples, and have read the short article referred to.

The mass of buyers with ordinary foresight and sense can only be expected to buy in the market which gives them best value for their money. The selling individuals who have only used proper discretion in pricing their goods, and have had the good fortune after twenty years' sleep (*vide* Rip Van Winkle) to awake to the fact that there is room for other players on the Tom Tiddler's ground of photo-mount makers, cannot be blamed for entering into competition with your irate correspondent, "A Card Manufacturer."

As regards *cheapness*, so often referred to in the article in question, we submit there is no doubt the prices are not extortionate.

There is one serious allegation made, and that is in regard to the durability of, presumably, our mounts, which, if allowed to go uncontradicted, is calculated to do us a great deal of mischief; and as a full answer to this, we are prepared to prove that our "Special Bristol Mount" (the cheapest of those submitted) contains more pure paper than many of the mounts now being offered by other manufacturers.

As regards "A Card Manufacturer's" interests, they are, or should be, mutual with that of the consumer; and assuming your correspondent to be an Englishman, it is time he learned that, by his *gradual* descent in prices, he is helping the foreigner to the whole of a trade that could, and should, be kept in Great Britain, and that there is only one way to regain the photographers' and dealers' confidence, viz., by giving them prices as low as our foreign *confrères* for an article equally as good. This is a Rip Van Winkle's idea of the matter.—We are, yours, &c.,

Pro WILLIS & CO. (LIMITED),
The Long Acre Card Works, London, W.C. F. W. ALLEN.

THE SANDELL PLATES.

To the EDITOR.

SIR,—Needless to say I have read with interest Mr. W. J. Stillman's note on the "Sandell" plates in your last issue, and, with your permission, will endeavour to furnish answers to the pertinent queries contained therein.

The first question, as to whether the absence of halation is due to the thickness of the aggregate coatings, or to the use of emulsions of varying degrees of rapidity? In the case of interiors, it is undoubtedly due to the latter cause, for the triple film, although obstructing a great deal of light, transmits amply sufficient to powerfully react on the most sensitive films if its reflections could pass the lower strata, which is practically impossible.

I may say that before adopting the multiple-film plan, I tried a much thicker film of the rapid emulsion than the combined films furnish, but the results were in no way comparable for the rendering of contrasts. Not only was halation obtainable, but solarisation proved an insperable difficulty, and then the thickness of the film used required an impossible period for fixation.

Secondly, it is not possible that there is any interchange or intermingling of chemical qualities during coating, as will, I think, be understood after the following explanation. The after-coating is only applied when the previous one is perfectly dry, and the bringing into contact of, say, one part of emulsion at 130° Fahr., whose setting point is somewhere between 70° and 80°, with twelve parts of dry emulsion and glass at 60°, will furnish the reason; the setting takes place too rapidly, the absorption of moisture by the dry film or films promoting this. Of course I am assuming that the insoluble nature of the sensitive haloids is understood.

I should mention the fact, well known to emulsion-makers, that the dried emulsion would require a prolonged digestion at 130° to cause a remelting, and I strongly hold the opinion that there can be no migration of silver haloid in a set film.

This, then, will constitute my reply to the third query also.

Proof that the light has effectively penetrated the films in my interiors is furnished by the fact that in almost every case the maximum negative effect is always in the lowest film. Of this result I am assured when I find my window already apparent before development on the surface of the plate as a negative. This, however, disappears soon after development is commenced, a perfect positive taking its place. Then I am sure that solarisation is complete in the upper film (*i.e.*, for the window), partially so in the second film, and at this juncture the third is a *sine-quâ-non*.

Under-exposure of upper film, and under or over-development of lower films, are the only probable causes of failures with these plates. A short or the normal exposure of a single highly sensitive film may be developed by a normal developer; but where strong contrasts are photographed, a weak well-restrained developer should be used until almost sufficient density is obtained in the highest lights, then the shadows which are rendered on the film surface should be brought up by a strong developer. The seeming diffidence of our experts, Sir, in discussing the plates must be my excuse for troubling you to this length.—I am, yours, &c.,

Thornton Heath, March 20, 1893. J. T. SANDELL.

CONTINENTAL POSTAL REGULATIONS AND PHOTOGRAPHIC MATTER.

To the EDITOR.

SIR,—It is to be desired that representations should be made to the Post Office authorities in England with regard to the illiberality of their treatment of photographic matter in transmission to the Continent, as in this respect they are behind most of the European powers. The Italian Post Office permits the transmission of packets of photographic material by sample post, under limits of weight, and with the declaration that the value does not exceed four shillings (five francs), and allows them to pass unopened if inscribed "*tema la luce*" (must not be exposed to the light). If, on the contrary, I order a packet of Solio paper from England, I am told that the end of the packet must be left open, and if it be an order, though ever so small, that it cannot go as a sample but must be sent by parcels post or as a letter. The consequence is that the cost is such as to make the order out of question, and all this little commerce, so convenient here, is forbidden us from England, with the effect of making us dependent on Continental supplies. This is neith

for the good of trade nor the convenience of amateurs, a numerous class nowadays on the Continent, hailing mostly from England and America, and naturally using English material by preference on account of the sizes. A dozen celluloid films, 8 × 10, sent by sample post, would cost about sixpence, but by parcels post about two shillings more. Then the Custom House here always respects the caution not to open in the light, if made intelligible to the officers, and in the Club we have a special label—"entered"—at the Custom House, and which secures any package or sample from being opened. In fact, the Italian Government, poor as it is, consults the convenience of the photographer, both as to security and expense, while the rich English Government does neither. Is there no member of the House of Commons who is an amateur, and would make himself the mouthpiece of the class of travelling photographers, and help to get this abuse corrected? As it now stands, I am often obliged to pay, in order to get some trifling object that I may have immediate need for, several times the value of the article.

What would be the injury to the income of the Post Office if the rules of the Italian Office were adopted, viz., that any article under a kilogramme in weight, and declared of no value, should go by sample post, and, when inscribed by the sending house as sensitive to light, to be allowed to go unopened?—I am, yours, &c., W. J. Stillman.

Rome, March 13.

GLYCERINE.

To the Editor.

Sir,—On starting to read "Beware of Glycerine!" by Mr. Hector Maclean, I expected to find some reference to its nitro compounds. "Citric or other acid" is delightfully vague, and I would remark that it says very little for the permanence of the platinum image if these *supposed* acids were the cause of fading. Was it not due to a mechanical, and not a chemical, action by the image being formed *above* the paper surface?

I have tested my stock of glycerine, but find no trace of acid reaction in a colourless commercial sample. Your correspondent can get a well-known British brand of glycerine for the asking, and it might have saved him from an all-too-contemptuous observation, for I can assure him more than shams are made in Germany, with brains too.—I am, yours, &c.,

March 17, 1893. Arthur Spat.

TESTING THE SPEED OF SENSITIVE FILMS.

To the Editor.

Sir,—Here is a point on which I should be glad to receive instruction. Given two sources of light, the respective actinic powers of which are as 100 to 1, will the effect on a sensitive film be the same from an exposure either of one tenth of a second to the stronger, or of ten seconds to the weaker light, all other surroundings being equal? My notion is that the blow of the one will do more than the push of the other. The behaviour of an exposed film, when acted upon by strong and weak disturbing forces, is perhaps of no scientific value in determing this question; still, it may be worth while to remember that a very fully exposed film will be ruined as a negative by the rapid action of a quick developer, but can be turned to good account by the use of a less vigorous reducing agent.—I am, yours, &c., Angler.

March 18, 1893.

MIXED DEVELOPERS.

To the Editor.

Sir,—I read with much interest your leader on mixed developers. I have lately been using a mixed developer—eikonogen and hydroquinone—with very good results. Having received some metol for trial from Messrs. Fuerst, I found that, with the formula that accompanied it, it was impossible to get sufficient density, though the detail was excellent. I thought I would try it mixed with hydroquinone, and made up some in the following proportions:—

No. 1.

Metol	3½	grammes.
Hydroquinone	1	,,
Sulphate of soda	25	,,
Water	200	,,

No. 2.

Water	50	grammes.
Potassium carbonate	12½	,,

For every sixty grammes of No. 1, I add ten to twelve of No. 2. After mixing No. 1, and letting it stand for a few hours, there is a dense flocculent precipitate, which must be filtered out. The solution then remains quite colourless for several days, and, as a developer, gives abundant detail, and very good density. Perhaps some of your readers who are chemists may be able to explain the nature of the precipitate. All my experiments were made on snap-shot exposures. I may mention that the mount of metol in the developer is more than the amount recommended in the printed directions; but this is not the reason of the improved density, as I tried the stronger solution without hydroquinone, and found it did not give me sufficient density.—I am, yours, &c.,

Morristown Lattin, Naas, March 19, 1893. George Mansfield.

MADDOX FUND.

To the Editor.

Sir,—I have the pleasure to acknowledge the receipt from Dr. A. C. Mercer, of Syracuse, New York, U.S.A., of the sum of 16*l.* 8*s.* 6*d.* for the above Fund, which was closed some time ago. I have placed the money in the hands of Dr. Maddox. The sum is contributed as follows:—

Mr. Ed. Bausch (Bausch and Lomb)	$25
Syracuse Camera Club	$55

I am yours. &c., Andrew Pringle,

Cromwell House, Bexley Heath, S.E. *Hon. Secretary.*

"HONOUR AMONGST PHOTOGRAPHERS."

To the Editor.

Sir,—A paragraph in your issue of the 17th inst., entitled "Trusting to Honour," contains the following sentence: "We should like to see the element of 'honour' entering more largely into competition among professional photographers than this and other recent advertisements would indicate as prevalent." You might, Sir, without doing any one a crying injustice, have applied your remarks to photographic assistants also, for in no case would it have fitted more neatly than between master and man, and in no case does the "element of honour" stand more in need of some revivifying influence. The following is an instance within the writer's experience, and has its bearing upon both parties:—

An assistant accepts the offer of a permanent situation in a provincial town, settles to work, and does his level best through a busy season. A week before Christmas, when work has slackened, and bids fair to remain slack for a period, he receives a week's notice without any previous warning whatever. Upon reminding his employer of the terms upon which he came, he is informed that it is a question of ability, and that complaints have been made of his work—that, in fact, he is generally incapable. Should he proceed against his employer for wrongful dismissal? He knows by this time he has a slippery customer to deal with, and that the chief point in his favour—viz., that no previous complaint has been made—he has but his own bare word to support. He accepts the inevitable, therefore, treating his employer's mean action with the contempt it deserves. The vacancy created by his departure is not again filled until fully *fully three months afterwards.* This latter should be sufficiently significant.

The consequences resultant upon the wrongful dismissal are not at first realised by the assistant. Truly, he is out of work at a slack time, but then he takes the optimistic view that, to a man of ability, all periods are alike. He finds that not only is he out of work in a slack period, but also a period representing the beginning of two or three years' photographic stagnation. He finds his optimistic impression confirmed, in a sense, for many will employ him, but at a wage that every right principle rises against. He can advertise—yes, of course, he can advertise—and in doing so, finds that his modesty is shadowed by the wants of half-a-dozen columns of high-class assistants. He finds that he must increase the size of the adjectives applied to his own abilities, to compensate for the customary *cum-grano-salis* application of the employer—that, in fact, he must lie with the crowd or be ignored as a duffer. Now, strange to say, he considers himself above the crowd in the points of ability and honesty, and is therefore shy of scrambling for his daily bread in competition amongst it. He stands on one side to allow the crowd to pass, but, before doing so, has the last straw of obnoxious conviction forced upon him. Upon stating his requirements to a certain great man, he is met with the calm reply, "My dear sir, you cannot surely expect to obtain such a salary now. *Look at the number of good assistants out of work!*" which is merely the equivalent of saying, "Though not slack ourselves, we must certainly take advantage of the general slackness, and obtain assistance at a cheaper rate than we could do at a busier time." Pure speculation! Miserable money-grabbing! that brings after it a necessary train of evils. So the assistant gasps a little at this new conviction, and then stands aside, mentally putting his foot down in firm resolve to take a position to which his abilities entitle him, or to accept none; to wait for a better time and tide over the present by giving occasional help, though identifying himself with no man's interest. A foolish attitude possibly, but an honest one certainly, not actuated by self-interest only, but with a small amount of thought for his brother-assistant in a like case. Need it be said that this assistant still leads his Bohemian existence?

This case, you will doubtless say, Sir, is ordinary enough to admit of its authenticity being taken for granted. It is not a case towards which the writer desires to call public attention; neither is it one upon which he wishes to base a literary endeavour of the descriptive type; but rather one that he wishes to state as an evil, and suggest a partial remedy thereto. The cause, according to the writer's belief, is the lack of orderly division

amongst photographers, the path from the lowest to the highest being one smooth, gradual ascent, instead of clearly marked steps and landing-places. Employer and assistant lack the distinctive stamp that shall assign to them a definite position upon the photographic scale. It has become a question, not of what a man is, but of what he calls himself, and owing to the absence of honour to which, Sir, you have called attention, each—man to master, master to man—apply a rigid forefinger to their olfactory organs, playfully but sceptically. Each views with suspicion, and is viewed with suspicion again, owing to the "leaven of unrighteousness" that exists among them. The cure can only be in reinstating the worth of man's word, or, failing that, by "separating the sheep from the goats," the latter being the only practicable course. I ask you, Sir, and any of your many readers, what assistant, conscious of the fairness of his intentions, and of the reliance that may be placed upon his abilities, would refuse any test sufficient to ensure him a definite and decided position upon the photographic scale? In former times a man's testimonials seemed all-sufficient, but now, what with bogus testimonials, testimonials written by employers out of pity and knowingly false, added to those firms who refuse testimonials at all times, the written character is looked upon as so much waste paper. Numbers of assistants would raise themselves above the crowd, free from the taint of suspicion with which they are viewed, be they never so clever, were the means but open to them.

Let me suggest a scheme for ameliorating the condition of retouchers. Supposing a negative presenting average difficulties were carefully chosen by, say, the Editor of THE BRITISH JOURNAL OF PHOTOGRAPHY, and a number of negatives reproduced from it. Supposing the same authority were then to invite any retouchers so minded to acquire one of these reproductions by payment of a certain fee, and guarantee to assign him a distinct position on the list of retouchers according to the work he produces from it—intensification, reduction, and all printing processes being optional. Supposing that this list of retouchers were made containing a certain number of grades, and that each competitor were assigned a position in one or the other by careful comparison with the original print. Supposing such an idea were put into practice, would it meet with approval? To the man who fears a comparative test it would not; but to the genuine assistant it must, because of the secure footing it offers him. Some one asks, "By what means?" When a retoucher is out of work, instead of advertising, he sends up a fee and has his name placed upon the "open list." Any employer wishing for a man of ability sends in a fee and has his name placed upon the "Open List." Every employer wishing for a man of ability sends in a fee and obtains a copy of the "Open List." Selecting what grade or position he pleases, he corresponds with one or another, and is shown the piece of work that secured the position; being satisfied as to ability, the rest is easy.

Such, then, is the rough outline of a plan, the strong point of which is, if once started, it must act and react upon employers and employed—employers taking to it as the best means of obtaining genuine ability; assistants taking to it as a means of proving their genuineness. The greatest fault will be found with it as a species of monopoly, though surely the legitimate worker has a right to a monopoly that will exclude none but fools and rogues.

I fear Sir, that, should you consider this worthy of publication, I shall have already occupied too much space, although I have written but a rough outline of all I would say. The details, however, would present little difficulty should the rough sketch meet with approval, and my apology must lie in the importance of the defence of the honourable portion of a not now too honourable profession.—I am, yours, &c.,

March 21, 1893. N'IMPORTE.

"A HARD CASE."

To the EDITOR.

SIR,—Would you oblige me by giving your opinion on the following. I went apprentice to a photographer on September 10, 1887, and was bound January 9, 1888, and came out of my time January 9, 1892—serving four years' apprenticeship. For three years I took no photographs, then he told me if anybody came while he was out I could try my hand. I did so, and during the last year I took about thirty-five sitters, mostly *cartes*, and one cabinet group of three sitters. Some of the thirty-five I took when he was in; he did the arranging of positions, and I the focussing. I never did a bromide enlargement, and only a few cabinet-size outdoor views. He does not do his own retouching, so I tried it at home on the quiet, and got on fairly well after reading Mr. Redmond Barrett's writings on the subject; toning and printing I had pretty well practiced; very little, indeed, practice at mounting. My principal work was dusting, looking after fires, and filling up picture-frames, and suchlike work. Taking the year all round, he does a good trade and a good deal of picture work.

My wages were 2*s.* 6*d.* for the first year, 3*s.*, 4*s.*, 5*s.* When I came out of my time, he asked me to stay on with him for a year or so, so that he could push me on. I consented to do so, for if I felt so minded to take another place, I could not have done so, owing to my knowing so little. He said he would take another apprentice, and keep me to the business. He said he would give me 10*s.* a week for the first six months, and 12*s.* for the next. I then told him that I could do a little retouching. He said I should try my hand, and, if successful, he would give me a little extra. The first week I got 12*s.*, next 11*s.*, next 10*s.* 6*d.*, next 13*s.*, then 15*s.*; now it has got to 17*s.* a week. He only took an apprentice last week. I only took five sitters during the fifteen months, very little outdoor work—only a few traps and a church. I have never taken a whole-plate or a 12 × 10. I never tried to do a bromide enlargement till last week; in fact, instead of improving myself, I lost what little bit I did learn during the last year of my apprenticeship. Once a couple came to be taken together, and my employer was at the back, and I went into the studio with them and started taking, and he came in and stopped me, and said before them that I had no business starting taking them when he was at home; it was all very well when he was out. Whether right or wrong on my part, he ought not to have spoken to me like that before them, for them to tell it about to people. A few weeks ago I asked him to push me on, as time was getting on, and there was a deal of opposition in our trade, which made it more reason why I should try and learn more. He said he could not see how he could do any different, as nobody came when he was out, and people liked him to take them when he was in. Since asking him I have not taken anybody. He does all the operating himself. This is a large county town, and we have plenty of the working class of people in, but not even them does he let me take.

In fact I am in such a state that if anybody came now and he was out I could not take them, I should feel so strange, as if I never had taken anybody before. Of course I feel thoroughly disheartened, and my time is no pleasant one, as I have no prospect before me. Should you advise me to give it up altogether and turn to some other trade, as I cannot take another situation, as I know so little, not one-quarter as much as I did when I came out of my time, because what little I did learn I have forgotten? His daughter has been away to learn retouching, finishing, &c., and she is coming home in September. Of course he will not want me then. If I took every sitter from now till then, I should only just about feel competent of doing anything like at another place. Sorry I have made my case so long, but it will greatly oblige me by your opinion.—I am, yours, &c. A. E. T.

March 20, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Wanted, first-class enlarging camera, large size, in exchange for Marion's five-guinea embossing press, with four dies, as new.—Address, W. WALKER, Scotholme, Nottingham.

Electric engraving machine, in perfect order, with battery, offered in exchange for 12×10 field camera in good condition.—Address, E. WAITE, 10, Grundy-street, Radcliffe, near Manchester.

Exchange enlarging lantern, nine-inch condensers, with front lens, blow-through jet for limelight, gas bag, pressure boards, &c., for good safety cycle, cushion or pneumatic tyres.—Address, A. COUPE, Photographer, Withington, Manchester.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

PHOTOGRAPHS REGISTERED:

Robert Jennings, Blackburn.—*Photograph of Edward John Williams.*

William Emmett, Stalybridge.—*Photograph of Lieut.-Colonel Sidebottom, V.D.J.P.*

Underwood & Underwood, Liverpool.—*Fifty-one stereoscopic photographs of various subjects.*

Abraham Flatters, Openshaw.—*Photograph of tranverse sections of the cotton fibre on micrometer scale.*

John Clapperton, Galashiels.—*Photograph of John Dunlop, champion bicycle rider of Scotland, and long distance rider of the world.*

Marshall George Strapps, Wisbech.—*Photograph of carved oak frame representing incidents in the life of the Right Hon. W. E. Gladstone.*

William Wort, Sutton Coldfield.—*One photograph of Frank Howson, professional boxer; Joseph Knowles, trainer; and Arthur Hibberson, assistant trainer.*

H. MACE, A. McCANN, and others.—In our next.

POWDER.—The powder process is fully described at pages 417, 433, and 449 of our volume for 1888.

C. N. FRITH.—Pressure of other engagements prevents us from availing ourselves of the honour. Thanks, nevertheless.

G. H. DUNMORE.—Remit one and sevenpence and three copies of the photograph to our publishers, who will effect the registration for you.

A. Z. (Leeds).—If it is simply a monogram you have on the cards, no licence is needed; but if it is a crest, then a licence will be necessary.

SURGEON-GENERAL COOK.—1. At the office for the sale of Patent Specifications, price 8*d*. 2. Mr. Andrew Pringle's address is Cromwell House, Bexley Heath, S.E.

P. P.—If the prints are made quite dry they will not stick to the burnisher. But it is a good plan to lubricate them with a solution of Castile soap, one or two grains to the ounce of alcohol.

A. R. T.—It is quite true that a patent was applied for for a "Willesden Paper" for photographic pictures. But, so far as we know, it has not been put upon the market. Why we cannot say.

DON.—As the marking can be seen on the plates before they are exposed, it is clear they are not due to carelessness on the part of the user. If the marks are in the film, there is no way of avoiding them when developing.

C. G. ADLETT (Port Elizabeth).—We think the set of three photographs marked "Pluto" entitled to first place; but the superiority over "Coningsby's" is only very slight. We have forwarded the photographs as requested.

CHEMIST.—If you wish to know what the action of light is on silver salts, consult Dr. Eder's *Chemical Effect of the Spectrum*. Your question as to the "action of light on certain substances" is, however, rather ambiguous.

HENRY SUTTON, Geo. Colley, B. B. (Antwerp), F. Johnson, W. H. P., T. H. Faulks, S. H. R. Salmon, H. C. Jennings, W. Guttenberg.—On the abstract subject underlying your various communications, we think it well not to permit any correspondence to be opened in the JOURNAL. But this does not apply to records of actual experiments.

SAMUEL WRIGHT.—In enlarging by daylight no condenser is necessary. Simply direct the negative itself to the sky, or place a piece of white cardboard at an angle of forty-five degrees, so as to reflect light from the sky upon it.

ASSAY.—It is, we believe, illegal to use the current coin of the realm for making chloride of gold. But, for all that, it is often used for the purpose. Those who do so, do not always publish what they have done, we suspect. In employing gold coin, full value in metal is ensured.

E. ARTIS.—1. If you can get the lens to give a sharp image in the centre of the picture while the margins are out of focus, it indicates roundness of field, and that it has been corrected for sitting figures. 2. Either the limelight or oil, it being merely a matter of exposure.

R. D.—Unless the pyro solutions were made up with a preservative, we fear they would be useless for developing purposes. You might, however, try the effect of adding solution of soda sulphite in the proportion of four ounces to the ounce of pyro. Recrystallisation would not, we think, be of much avail.

W. T. SHEPPARD.—Unless an unsuitable pyroxyline was used we cannot say what is wrong. You do not say in what way the collodion is unsatisfactory. We should advise you to get some commercial collodion to compare that of your own make with. Bromo-iodised collodion is quicker than that simply iodised, when iron developer is employed.

W. EMERY.—1. In commencing photo-micrography, you will do well to confine yourself, for a time, to the use of low powers, say, an inch and a half or an inch. When some degree of proficiency is attained with these, the higher powers may be tried. 2. We shall be pleased to give our opinion on the work from time to time. 3. Slow plates to begin with.

J. BLOWER.—The experience is not exceptional. Prints made on rose-tinted paper invariably change when exposed for long to a strong light. The colour is simply discharged by its action. Had the prints been kept in an album or portfolio, they would not have changed in that way. The loss of the pink tint is not necessarily an indication that the photograph is fading.

R. B. J. says that some of his negatives have grown some curious excrescences something like the scales of fishes, and although they can be washed off, they leave a mark. He asks what they are. From the description, there is very little doubt that it is hyposulphite of soda crystallising out of the film. This could only arise from the negatives having received only the most perfunctory of washings.

C. R.—This correspondent says that he sent a negative to a firm for an enlargement, and explained that, although he was an amateur, he was going to supply this picture as a matter of business. He complains that they will not allow him any "trade discount." Why should they? Trade discount, when given, is only allowed to *bonâ-fide* professional photographers, and not to those sailing under false colours.

FRANK OSBORNE writes: "Can you give me any information how I can make a solution of bichromatised bitumen capable of being developed in cold water, or where can I find any instructions on the bichromatised bitumen process?"—We certainly cannot say. We do not know how to make bitumen soluble in water, hot or cold. Has not our correspondent made some mistake in the matter?

B. HERSCHE writes: "I have made up thirty ounces of silver bath—fifty grains to the ounce—and added a few drops of nitric acid. I have only used it three or four times, and it has turned quite brown—nearly black—and it now discolours the paper. Is the bath spoilt, and how?"—The bath is not hurt. If it be shaken up with a little kaolin, and then allowed to stand for a day or so, it will be as bright and colourless as it was at first. The kaolin may be allowed to remain in the bottle.

H. PIQUET.—1. The price you have charged is not only "reasonable" but very low, much less indeed than would have been charged by the majority of photographers. 2. As for the time, it was very short to execute such an order at that season of the year. We should say you will have no difficulty in recovering the amount in the County Court. At the hearing of the case you had better be provided with photographic witnesses of good standing to testify as to the reasonableness of the charges. You will recover their expenses as witnesses.

WILLIAM CONNOR says: "I am trying my hand at enamelling prints. The way I proceed is this. I first French chalk the plates. Then coat them with collodion and allow it to dry. Next place the plates on a levelling stand and pour on a solution of gelatine, and, after this has set and stood a few hours, I take the prints from the washing water and squeegee them down upon it, and I have got excellent results. But now I have got a fresh lot of gelatine, of a whiter kind than I have hitherto used, and this, when poured on the plate, as soon as it begins to set, becomes studded all over with little holes or specks. They don't seem to show much in the prints, but still they are there. Can you tell me the cause and how they may be prevented?"—The cause is an unsuitable gelatine—one that "pits," as many foreign gelatines do. The defect is generally attributed to grease in the gelatine. If a very colourless gelatine must be employed, try one of those specially adapted for dry-plate purposes.

AFFILIATION OF SOCIETIES.—Meeting of delegates at seven p.m., Friday March 24, at 50, Great Russell-street, W.C.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical Meeting, Tuesday, March 28. A demonstration of *Platinotype Printing*, by Mr. F. Hollyer.

AMONG the papers to be read at the Society of Arts after Easter will be one on *The Optical Correction of Photographic Perspective*, by Mr. H. Van der Weyde.

PHOTOGRAPHIC CLUB.—March 29, Last Lantern Meeting of the season. April 5, Adjourned discussion on *The Sandell Plate* and *Toning Chloride Prints*.

A FREE LANTERN LECTURE.—The Harringay Photographic Society will give a lantern lecture to-night (Friday, March 24) at Emmanuel Church, Ducket-road, Harringay, entitled *The Thames from Source to Sea*, at eight o'clock. Admission free; ladies invited.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—March 30, *The Sandell Plate*, demonstration by S. H. Fry; also *Stripping Gelatine Plates for Collotype Work* demonstration by W. J. Rawlings. April 6. A paper by Mr. G. F. Williams on the *Determination of Plate Speeds*. 13, *The Influence of the Hand Camera*, paper by W. D. Welford. Visitors are welcomed.

CROYDON PHOTOGRAPHIC EXHIBITION.—This Exhibition, which opens on April 5, promises to be most successful. Messrs. B. Gay Wilkinson, T. M. Brownrigg, J. Gale, and John A. Hodges give special lantern displays on the four evenings during which it is open. The demand for the prospectuses has been so great that a reprint has been necessary. Our readers should note that Saturday is the last day to receive notices of entry, which should be sent (no forms necessary) to G. R. White, 55, Albert-road, Croydon.

VANDERWEYDE'S CHICAGO EXHIBITS.—Mr. Vanderweyde is evidently determined not to occupy a secondary position at the "World's Fair." He is sending nearly forty of his choicest works; many of these demonstrate the advantages of his photo-corrector, which he has now brought to a state of perfection or almost so. The *salon* in which they are to be exhibited is richly furnished and complete, including carpet, and, being made portable, is to be packed up here ready to be set up. The most imposing of his pictorial collection is a truly fine work of art, the subject being *Hypatia invoking Apollo*. It is eight feet in height, and, so far as the figure itself is concerned, is quite untouched. In this noble work the artist has, to our thinking, exceeded himself.

A SOCIETY FOR BEVERLEY.—A meeting of amateurs was held last week at the Church Institute for the purpose of considering the desirability of forming an Association for the town and neighbourhood. The Rev. F. J. Hall was voted to the chair. After some discussion, in which it was stated that the number of amateurs locally was about fifty, and that a good organization could be inaugurated, it was unanimously decided to form a Society under the designation of the "Beverley Photographic Society," and it was further agreed that the first field day be on Easter Monday to Bishop Burton. Any pamphlets, samples, society-working rules, &c., will be gladly received by the Hon. Secretaries *pro tem.*, J. J. Morley and A. Pickering.

*** GOOD FRIDAY.—*As Good Friday falls next week, we shall be obliged if our correspondents will note that it will be necessary for us to go to press a day earlier than usual. All communications intended for the next number of the* JOURNAL *should therefore reach us by Tuesday Morning.*

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1717. Vol. XL.—MARCH 31, 1893.

MULTIPLE-COATED FILMS.

It seems more than likely that the subject of multiple-coated films will form matter for interesting discussion for some time to come, since, underlying the fact that such films prove the most effective cure for, or preventive of, halation that has yet been devised, there is the question as to how the effect is produced. Is it the mere extra opacity of the double or triple film that prevents the rays of light penetrating to the glass, and to be thrown back again upon the sensitive layer of gelatine, or do the separate films of varying sensitiveness react in some peculiar way, one upon another, in such a manner as to contribute to, if not altogether to bring about, the result? Such is the question already raised, which will have to be satisfactorily answered.

Double films are by no means a novelty in photography, for if we go back to the very earliest of practical dry-plate processes—the collodio-albumen—we find that that was a double-film process, a preliminary layer of silver iodide in collodion being subsequently coated with iodised albumen, sensitised in a bath of silver nitrate, washed and dried. There is, however, little analogy between the double-coated film of to-day and that of forty years ago. The former consists of two separate layers of sensitive gelatine, each possessing a different degree of sensitiveness, while in the older process the sensitiveness was most probably uniform throughout the whole thickness of the compound film, or as nearly so as is possible with any bath film.

The lower, or collodion film, it is true, was, *per se*, quite insensitive, being prepared in such a manner, with excess of alkaline iodide, that exposure to light before the application of the second or albumen film was said rather to improve the qualities of the plate than otherwise; but, after recoating with iodised albumen, and immersion a second time in the silver bath, the sensitiveness of the iodide of silver in the under layer of collodion was restored, and little difference, we imagine, was to be found in the character of the film at different depths. Even when, later on, bromide was introduced into the second film, it is questionable whether any alteration took place in this respect, for the albumen would more or less sink into the pores of the collodion, and form a practically homogeneous layer instead of being altogether isolated, as in the modern compound films. There is, however, one very noteworthy fact that may be mentioned in connexion with the old collodio-albumenised plates, namely, that, although they were by no means remarkable for opacity, they were wonderfully free from the defect now known as halation.

Some seventeen or eighteen years ago double films cropped up again, this time in a purely scientific rather than a practical form. Captain Abney published the result of a series of experiments of his own, showing that if a sensitive film after exposure were recoated with a second layer of washed collodion emulsion, and then developed, an image would be formed upon both films, that which had not been exposed being affected in some peculiar manner by the chemical action proceeding in the other. The two films in this experiment were even more completely isolated than is the case in the modern multiple film, as, in order to prevent the second layer of emulsion dissolving the film upon which it was poured, as well as to enable the two films to be afterwards separated for examination, an intermediate layer of gum arabic, albumen, or similar substance, was applied in such manner that the two films were actually not even in contact.

It is, perhaps, only right to say that there are those who doubt the accuracy of the observations in connexion with the production of the image on the unexposed film, but from our own trials we think there is little doubt that, under favourable circumstances, it does occur, though there is considerable uncertainty as to what the precise conditions are. We have on many occasions obtained unmistakable evidence of development on the unexposed film, and at other times, under apparently precisely the same circumstances, have altogether failed. So that it may be said there is some doubt as to the possibility of any action taking place between films that are completely isolated—at any rate, in the way of setting up a developing action when there has been no exposure. The reverse effect might possibly occur under precisely similar conditions from easily explainable causes, as we shall point out later; in other words, development might be arrested in one film by that going on in another.

As an outcome of Captain Abney's experiments, it was attempted to utilise the principle of double coating for the purpose of producing composite films combining qualities that could not be obtained in the same emulsion. Thus, it will be remembered, by those of our readers whose acquaintanceship with photography dates back to the period mentioned, that the great difficulty with collodion emulsion workers was to combine extreme sensitiveness with the necessary vigour required in a printing negative. Very sensitive emulsions could be made—not approaching, it is true, the films of to-day—but they were of no practical value, owing to the impossibility of intensifying the images they produced by any known means. On the other hand, it was quite easy to get any desired amount of vigour in an emulsion, but unfortunately only in conjunction with comparative insensitiveness.

Acting on Captain Abney's suggestion, it seemed but natural that, if a plate were coated, first with a slow and vigorous

emulsion and afterwards with one of the rapid and delicate type, the difficulty would be solved, and such in a partial manner proved to be the case; but, owing to the troublesome character of the double-coating process, the matter was never at that time seriously carried out. In more recent years, since the introduction of gelatine emulsions, numerous suggestions have been made, and, we believe, at least one actual commercial attempt to introduce collodio-gelatine plates—that is to say, double films of gelatine and collodion; but, for one reason or another, most probably the extra trouble, the matter has never been followed up.

While the scientific aspect, if we may so term it, of double films has been altogether neglected, the various attempts to utilise the principle practically have hitherto failed, and it is only at the present juncture, when success has been secured in a direction not hitherto looked for, that interest is again aroused. The special claims made for the modern composite films are great latitude of exposure and capability of resisting halation, and both of these seem to be well fulfilled. The former partly covers the ground attempted some fifteen or sixteen years ago, when it was endeavoured to combine rapidity with density, for the result is arrived at by the same means, namely, combining two emulsions of widely different sensitiveness, and so far the *rationale* of the behaviour of the compound film is intelligible.

But it is on the question of halation that discussion will arise. This formed no part of the argument in past years, if for no other reason than that a very large number of collodion films would have to be superimposed before the opacity of even a single gelatine film would be reached, and, indeed, mere opacity was not then looked upon as a cure for the defect. Even now, as shown by Mr. Stillman's article of a fortnight ago, there are those who doubt it, while Mr. Sandell's letter of last week expressly states that mere thickness of film does not prevent halation.

In order to thoroughly ventilate the question, it would be interesting to experiment with films that could be easily separated after development, in order that the action of one upon the other might be carefully studied. For this purpose we would suggest a gelatine film on the top of a collodion film; and, if a triple film be required, let the first, or lowest, be of albumen, sensitised in the silver bath, and thus rendered quite insoluble. Over this might come a collodion emulsion film, as sensitive as can be made, and over that, again, a layer of gelatine emulsion. With such a combination we should have certainly a wide enough variation in sensitiveness, and, for purposes of examination, any of the layers could be easily dissolved off without affecting the others, which is scarcely the case when gelatine lies on gelatine.

The effect of a double film, as now used, must not be confounded with that referred to in connexion with Captain Abney's experiments. There, an exposed film was supposed to transmit some action to an entirely unexposed one during development; in fact, an electro-chemical action was supposed to be set up. In the modern double or triple film each layer receives a certain exposure, which may be sufficient for the more rapid, but not for the others, and amongst them they make a sort of compromise. Whether the rapid film is able to impart extra energy to the slower film in contact with it or not is one of the points to be decided; but we think there can be little doubt as to its power—where reversal occurs—of arresting development in the other film, and it is, possibly, in great measure to this action that the prevention of halation is at least partly due.

LENS FOG.

In a preceding article on this subject we descanted upon some of the most familiar causes of this little-discussed defect, causes that might be described as mechanical. But even that category was not exhausted by us. Let us next refer to a very evil condition of the lens that is sometimes seen in instruments made by opticians in the foremost rank. It is, perhaps, seen most commonly in portrait lenses, but there are some other particular constructions of lenses in which it is often manifest. We refer to the condition of the external margin of the lens. Too frequently this portion of the glass is simply smoothed in the lathe, and the lens is then burnished or screwed into its cell without further treatment. But we aver that there are very few instruments worked with full aperture where this may not on occasion produce fog. When a lens so defective is used in the open air, or even in a well-built studio, if the camera be placed in such a position as to receive a fair share of light from the sky, a portion of that light will strike this part of the lens, and a portion be reflected into the camera and on the plate, and no other result but a veiled image could be expected. Every objective worked with full aperture should have each of its constituent elements carefully blackened at this part to prevent injurious reflection. An asphalt varnish will, perhaps, be as good a medium as anything to use for the purpose, as, when in proper contact with the glass surface, it practically destroys any reflection likely to occur. That a suggestion as to a desirable varnish is not unnecessary is proved by a lens which is before us while writing. It is made by an eminent foreign manufacturer, the posterior combination being of very considerable thickness, and, possibly to lighten the instrument, coned as regards its external figure. If it is placed in the camera without a diaphragm, there is seen such an amount of light dispersed from the inner surface of this cone that it would be utterly impossible to take a good negative with it if a particle of sky light fell upon the instrument. A judiciously applied coating of asphalt varnish would destroy all this danger. But we would further add, that the protection would be more complete if the surface were more roughly polished instead of smoothed, and rendered like the ground glass of the camera.

Another little-observed form of lens fog, which is almost incapable of cure, is that caused by internal reflection from the various faces of the lenses on the plate itself, when a very brightly lighted object is before the camera. Who is there who has not attempted, say, a group of sitters against an only available background, a whitewashed wall, and been disappointed beyond measure at the result? It is true that some of the fogginess produced under the conditions described is due also to the illumination of the bellows of the camera from the brightly lighted plate, but the main portion is to be credited to the lens. For photographing under these conditions there has been suggested as a remedy a preliminary staining of the surface of the plate sufficient to allow the penetration of the image, but insufficient to light up camera and lens with actinic light. Turmeric or logwood solution has, we have been told, been successfully tried. The sensitiveness is diminished, it is true, but the light sent back upon the plate is diminished in greater proportion; and so the evil is abated, if not, as sometimes may prove to be the case, entirely cured. We do not remember ever to have seen this kind of lens fog to have been alluded to, but it very often is produced under ignorance of its true causes. We have often seen another example of lens fog, where the sun strikes the glass surface of the lens itself.

When stopped down and the surfaces quite free from dust, it is possible that no evil may result; but it is not impossible, for the internal surfaces of the lens, their marginal surfaces, and the blacking of the lens tube and shade require to be in a condition perfectly adapted to avoid the kind of reflections we have treated upon.

From all these descriptions of the various kinds of lens fog, there is one obvious moral to be drawn, a large proportion of them are entirely avoidable by properly screening the lens. In drawing attention to this point we are well aware that it is no news at all to many skilled workers, but our readers will bear us out that, whenever a body of photographers meet for outdoor negative-taking, the majority of lenses are not so screened, except perhaps by holding the black cloth, or perhaps a black hat, to shade the objective. And in studio work how many cameras may there not be seen, in the very first class of establishments, with neither screen nor shade beyond the comparatively narrow brass rim provided by the maker. If every lens—studio and field—were shaded off till nothing could be seen from the lens but the particular object or view to be photographed, there would be such an improvement in the vast majority of the negatives taken as to amount almost to a revolution in results.

The "Royal" Photographic Society.—In a long advertisement in a suburban paper, of a local firm of photographers, amongst the list of imperial and royal Exhibitions at which medals have been awarded to them, the Royal Photographic Society of Great Britain is mentioned no less than four times. The parent Society is advancing rapidly now, it is true; but we were unaware that it had obtained a Royal Charter, although we believe it is desirous of possessing one. As the town in which this firm is located possesses an energetic photographic club, which is affiliated with the Photographic Society of Great Britain, and whose President is one of its Council, the advertisement will, no doubt, cause its members some little surprise or amusement.

Simplicity.—In a recent issue of an evening contemporary, which devotes a column to notes and queries, appeared the following:—"Could any reader kindly give me a receipt for the wet-plate or positive process." *Simple?* In due course formulæ are given, over a signature that appears in replies to questions on every conceivable subject. The silver bath is two ounces of nitrate of silver and one drachm of collodion to sixteen ounces of water. Fifty-five grains to the ounce is a little strong for a positive bath, most people would think. The developer contains "galacial" acetic acid. From the wording of the query one is almost led to inquire if the wet-collodion process will in the near future only be associated with glass positives.

Fine Art Exhibition.—An excellent and highly representative Exhibition of paintings, by most of the leading artists, is now open at St. Jude's Schoolroom, Whitechapel. It will well repay a visit to the "far East," as it contains selections from some of the best collections in England. This is the thirteenth show of its kind, and, like all its predecessors, it is highly appreciated by the East-enders, as testified by the number of visitors, the larger majority of whom, it is worthy of remark, are of the working classes, the Exhibition being opened on Sundays. During the few days it was open last year, it was visited by about 80,000 persons. It closes on the 9th prox. Judging from the specimens exhibited in the show-cases of some of the photographers of the neighbourhood, they would do well to visit the Exhibition, and profit from what they will see. The art aspect of photography at the East-end, like that of many other parts, is open to improvement.

The Manchester "Spy" and Photographers.—A few months back we were the first to commend the *Spy* for its action in denouncing the malpractices of "Mons. Sauvy," of Manchester, towards his lady sitters. The *Spy's* success on that occasion, however, seems to have been instrumental in leading to the loss of its editor's head, if we may place any reliance on the following facts, with which we have been furnished. In December last several cases under the Criminal Law Amendment Act were tried against some Bolton tradesmen, and among them was a photographer, in regard to whom the charge was dismissed. Thereupon the *Spy* launched out into a wholesale attack upon the photographer (and photographers in general), with the result that an innocent man has been brought to the verge of ruin by our contemporary's unmerited onslaught. We hear with pleasure that action is to be taken against the *Spy* on account of Mr. Alfred Cowley, of Bolton (the photographer in question), and trust that success will attend any efforts to make good the loss of name and position he appears to have sustained from the *Spy's* cruel and poisonous comments.

The Apprentice System.—In our issue of last week appeared a letter headed "A Hard Case." The case as detailed is but typical of scores of others. We are told, though we hope it is not true, that some photographers, like electrical engineers, make more profit out of their apprentices, "articled pupils," and learners, male and female, than they do out of their legitimate business. With them they usually get a premium for three or four years, and have the whole of the work of the establishment done for nothing, or, as in the case mentioned, at merely nominal wages. Too often the unfortunate apprentice finds, at the end of his time, as the one who writes does, that the whole of his time has been wasted, so far as his knowledge of studio work is concerned—and, indeed, many other branches of the business. A master taking an apprentice is, by law, bound to teach him his trade, and if he does not he is liable to legal proceedings. But, we may ask, what is there now in an ordinary portrait business to demand a heavy premium and several years' services except studio practice, and that, as a rule, is what the pupil gets least of? Plates are now bought ready for the camera. The paper ready-prepared, sometimes even ready-sensitised. The enlarging is often put out to be done, and so, frequently, is the retouching. With these facts before us, and considering the present depressed state of the business, one is naturally led to consider that the masters who take "articled pupils" or apprentices with a premium, and secure their services for a term of years for nothing or for a merely nominal wage, certainly make a better bargain than do the friends of the apprentices.

Studio Portraits with Natural Backgrounds.—Just now professional portraitists seem to be exercising their minds for some novelty to introduce in portraiture to give a fillip to business during the coming season. That something is necessary to stimulate trade there is no question. Now, seeing that there is but little immediate prospect of anything actually new being forthcoming, it may be well to consider whether or not some of the older ideas, that may almost have become forgotten, could not be reintroduced as novelties which, in some cases, they certainly would be at the present time. Here is a suggestion that may be useful to some photographers at seaside places and other pleasure resorts, though less so perhaps to others in the metropolis or other large cities. Many of our older readers will remember a style of portraiture that was, many years ago, introduced by Mr. Edge, whose method of vignetting was incidentally alluded to last week. It was a portrait taken in the studio, but with a background from nature. Not a painted background placed behind the sitter, but a veritable photograph of the scene depicted. As these pictures were first shown there was for a time much conjecture as to how they were produced. This was the way. The portrait was taken in the studio in the ordinary way with a very light, though not white, background. This, if we remember rightly, was shaded off somewhat darker towards the bottom. When the negative was printed an impression was obtained on a lightly tinted ground. Next, the figure was painted over neatly with gamboge. Then this print was exposed behind a negative of some suitable local

landscape view till that was sufficiently printed. In washing out the free silver previous to toning, the pigment was removed. As the paper at the first printing becomes tinted, or toned down, the backgrounds are always subdued and not obtrusive. Further, the landscape negatives, to be suitable, should be kept thin in the development and be taken without strong contrasts of light and shade. It is needless to remind our readers that the lighting of the sitter in the studio should be in accordance with that of the landscape picture which has to form the background. Many visitors to the seaside during their holidays could, no doubt, be induced to sit for their portraits if they could be taken with natural scenery of interest in the locality.

Camera Club Conference.—The 1893 Conference will be held in the Theatre of the Society of Arts on Wednesday and Thursday, April 12 and 13, under the presidency of Captain W. de W. Abney, C.B., D.C.L., R.E., F.R.S. The following is the programme:—Wednesday, April 12, Conference at the Society of Arts, 18, John-street, Adelphi, to be opened by the President at 3 p.m. Papers to be read from 3 p.m. to 6 p.m. in the Theatre. 1. 3 p.m., opening by the President. 2. Mr. William Taylor, *The Establishing of Standards.* 3. About 3.45 p.m., Mr. T. R. Dallmeyer, *Lens Systems.* 4. About 4.45 p.m., Mr. Chapman Jones, *On Certainty in Photography.* 5. About 5.30 p.m., Mr. Leon Vidal, *On the Influence of Photography upon Vision and upon Works of Art, both in respect of form and colour.* 7.30 p.m., Annual Club Dinner for members and friends. Thursday, April 13, 3 p.m., renewal of Conference in the Theatre, Society of Arts. Papers to be read from 3 p.m. to 6 p.m. 1. 3 p.m., Professor E. Mach, *Scientific Applications of Photography.* 2. About 3.30 p.m., Mr. A. W. Clayden, M.A., *The Organization of Meteorological Photography.* 3. About 4 p.m., Mr. Hume Nesbit, *Relations of Art and Photography.* 4. About 4.45 p.m., Mr. Rowland Briant, *Astigmatism and Pictorial Effect in Photography.* 5. About 5.30 p.m., Dr. J. M. Eder, *On the Determination of Focal Points in the Use of Photogrammatrical Apparatus.* Renewal of Conference at 8 p.m. 1. 8 p.m., Mr. H. Van der Weyde, *The Pictorial Modification of Photographic Perspective* (illustrations by the "Photo Corrector," the working of which will be demonstrated). 2. 8.45 p.m., Captain W. de W. Abney, C.B., D.C.L., R.E., F.R.S., *On the Speed of Plates and other Matters.* 3. 9.15 p.m., Mr. H. M. Elder, M.A., *Some Notes on the Effect of Light on Plates.* Friday, April 14, 8 p.m., Exhibition of Lantern Slides in the Theatre. Special tickets are required for this Exhibition. The annual Exhibition of photographs by members will be on view at the Club, Charing Cross-road, after conference week. Admission, on Tuesdays only, from 10 to 12 and 2 to 4, by tickets from members of Club. The Exhibition will continue for about six week. All photographers are cordially invited to take part in the Conference. The meetings at the Society of Arts are open to ladies.

STUDIO-BUILDING.

II.

Before continuing my remarks upon this subject, I should like to ask that any one with whom I am personally unacquainted would not write to me privately for instructions and plans. I do not object to reply when asked for a maker's name and so forth; but it is impossible to write to everybody who may start to correspond with me on this subject. If their wants are sufficiently interesting for the general body of readers of this Journal, I could reply in its pages; but to send one or two plans and particulars of various kinds to a single correspondent, for example, as I was recently asked to do, is not reasonable or right.

Enough, perhaps, having been said upon the shape of the building, a few words may be devoted to its size and proportion. As to the former, the two considerations of *l. s. d.* and surrounding conditions are the chief factors in arriving at a decision, for, within ordinary bounds, the larger a studio is the greater its convenience, and the more complete the control of the lighting. Especially is this so in large groups, as the nearer the group is to the light aperture, if such an expression may be permitted, the more uneven will be the lighting of the individual members composing it. Length of studio is most important for group-taking also, as it is likewise for full-length portraits.

It is always advisable to have a full twenty or twenty-two feet at least between sitter and camera, but this must not by any means be understood as the length the studio should be. At the very lowest estimate, two feet should be allowed for the camera, and another two feet for comfortable working behind it. Double these allowances would not be too much. Then, at the sitter's end, allowance must be made for head-rest (still of occasional use in every studio) and for movable backgrounds. For these purposes four feet is the minimum distance to be reckoned with. We thus arrive at thirty feet as practically the shortest length a studio should possess, if it is to be well adapted for the various purposes a professional portraitist would require it for. A still longer room will naturally offer greater facilities, but when a greater distance than here named is allowed between lens and sitter it will be found that atmospheric fog—unless the air be exceptionally pure, as in some seaside places—will too often be sufficiently manifest to cause a foggy picture. Under all ordinary circumstances, provided the camera is not too near to cause disproportion or distortion, crisper pictures of single subjects are taken when the sitter is near to, rather than far off, the camera. It need not be said, however, that increased distance gives more harmony of proportion as regards hands and limbs.

Breadth of studio, again, is very advisable; when there is room to spare on each side of the sitter, there is so much greater freedom in arranging accessories, and increased command over the light, that it is easy to avoid that tendency to conventional positions, lighting, and management, so fatal to originality and artistic effect of the work produced. Granted the maximum dimensions in length already quoted, I would, if it were in my power, much prefer to increase the breadth than the length.

The next point I have been asked about is the length and thickness of the window bars, the size of the glass, how to glaze, and other similar subjects. Taking the size of the bars first, I should say this is entirely a question for the architect or builder; but, above all, they should be stout enough. A little loss of light from these bars or sashes is of no account whatever in comparison with the danger of leaking and the glass breaking, through the strain on the binding material, be it putty or otherwise, which is certain to be incurred when the bars are too light. It is no unfair estimate to say that nearly one half of the leaky skylights in the country are caused by the frames being too light. Under any circumstances, it will be necessary, for example, to have workmen occasionally on the roof, and, if the bars cannot sustain their weight without a slight bending, it will be found that the next shower, after the glass roof has been so invaded, will discover several leaky spots. The bars can be chamfered off at the inner angles without seriously reducing their stability. I have adopted that plan with advantage, but otherwise have always made a point of having them strong and substantial. One very valuable recommendation as to the shape of bars has been made which, though I have not tried it, I feel sure must be of considerable use as against possible leakage. It is that a deep groove should be cut into the bars for their whole length on each side on their inner surfaces, so as, in the event of water gaining admittance, to lead it away towards the eaves. It will be observed in cases of leakages that the water rarely drops down where it actually enters, it usually "follows" for some distance the angle of glass and bar, and will then, perhaps, travel along the front face of the latter before it falls. This is one cause of the difficulty of localising the exact spot where the leakage exists. It will be judged from this that I have not been without leakages: though certainly they have been few, and would have been fewer still if my instructions had been carried out by the glaziers. At this stage it will be as well to point out a very important matter about arranging the roof. Whether for periodical painting, or for carrying out alterations and reconstructions, the inevitable workman will at times be on the roof, and it will be wise to provide against him and for him. I have experience of the array of ladders and boards slung on the glass, the time wasted, and the

damage done, and for many years past have arranged a method by which this inconvenience could be reduced to a minimum. Each side of my glass roof is provided with a specially constructed ladder for the workmen to use. The roof of my present studio is a wooden ridge, well protected with lead, and upon this ridge the ladders rest, prevented from slipping by a pair of iron hooks, which grip the ridge piece and prevent any danger of slipping. The ladders are always kept on the roof ready for use, and workmen greatly appreciate the safety and convenience of such an arrangement These ladders have long cross pieces at intervals to rest upon the window bars, and prevent swagging and pressing upon the glass; further, they are guarded on the side next the glass, to prevent a careless foot slipping through, by longitudinal laths. My present ladders are nearly worn out through constant service, and I am hoping to be able in the next to introduce still further little improvements.

In addition to these ladders, the skylight bars have permanently let into them, and projecting some distance, strong thick screws, for the purpose of supporting the long planks which the British workman generally finds it necessary to employ when he is on a roof. This prevents the surreptitious use of a nail or two, which he is to apt to insert in the woodwork to aid in securing his paraphernalia, with the inevitable consequence of starting a leak. One other point as to workmen on the roof. The studio I built before my present one was on a lofty building overlooking a large yard, over which I had no rights or easements of any kind. I could not build even a projecting spout, nor put out a window. In consequence, to obtain the effect of side light, I made the wall of the studio on that side only four feet above the floor, and then the glass roof shot up sheer and steep till the ridge was over twenty feet high. It was difficult to get workmen to venture on to it, and when they were there I was so uneasy as to their safety, that eventually I got the builder to erect a kind of iron bar fencing the whole length of the roof against a possible accidental fall, and, further, encroached upon the glass by fixing a narrow wooden pathway for the workmen to pass along, taking care to line the glass for a few inches above it with narrow wooden strips, to avoid breakage by an inadvertent footstep. When this was done my mind was at ease, and I found no difficulty in getting workmen upon the steep roof.

At the risk of unduly lengthening my paper, I will here narrate a personal experience. A plumber and glazier had undertaken the job of putting up the fence, and, when completed, I went upon the roof to examine and test it. I was leaning against it; if it had given way, I should have known nothing about it, for the drop would have been fifty feet on to the flags, and the workman said, "You had better not lean against it, sir, it might give way!" He had actually made this safety fence of narrow thin iron gas piping, further weakened by cutting the threads for the screws which joined the sections. I was horrified at the risk I had been in, and, I need not say, greatly incensed at the way the work had been executed. Of course, all this had to be taken down, and a solid iron rod put in its place. It is so entirely possible that others might meet with a similar experience, that it will not be thought a needless encumbrance to have narrated this occurrence.

G. Watmough Webster, F.C.S.

THE INFLUENCE OF DEVELOPMENT ON GRADATION.*

My next experiment was principally directed to finding how gradation was affected by length of time in development, and again I found reason to believe that the conclusions of Messrs. Hurter & Driffield did not apply under the altered and extended conditions under which I was working. A half-plate (plate D) was given the same series of exposures as before, except that the last was increased to 100,000 C.M.S., as I wished to have an example of reversal; this 100,000 C.M.S. patch was very distinctly darkened before development. The plate was cut into six pieces, marked with consecutive numbers, and four of them were developed together in the No. 2 developer for varying lengths of time. The 100,000 C.M.S. patch appeared before any other, and kept the lead for some time. The other two pieces were treated with developer No. 1. The following table will give the details of the experiment and the resulting densities:—

PLATE D.

		Developer No. 2.				Developer No. 1.		
	Number of strip.	1.	2.	3.	4.	5.	6.	Strip 5 × 1·4.
	Time of Development.	4 mins.	10 mins.	20 mins.	50 mins.	2 mins.	4 mins.	
Exposure.	C.M.S.							
	1	·00	·00	·06	·43	·22	·30	·31
	10	·00	·06	·58	1·44	·57	·87	·80
	100	·06	·35	1·54	2·59	·86	1·19	1·20
	1,000	·12	·71	2·08	3·07	·97	1·30	1·36
	100,000	·19	·76	1·66	2·37	·90	1·20	1·26

The different action of the two developers is again very strikingly apparent; a comparison of strip 3 with strips 5 and 6 shows that very strongly. In regard to the length of time of development, Messrs. Hurter & Driffield's experiments led them to the conclusion that the ratios between the densities, produced by varying exposures, were always constant, and that the only difference in result to be expected from a long time of development over a shorter one was, that all densities would be increased, but that the increase would always be in the same proportion all through the scale, so that the ratios would still remain unchanged. Now, in the case of strips 5 and 6, where the alterations in time and density are within comparatively narrow limits, that rule proves fairly correct; by multiplying the smaller densities by 1·4 (as I have shown in the last column) we obtain figures nearly corresponding to those of strip 6. But the strips developed with solution No. 2 certainly show no evidence of their being subject to such a rule. In every case, an alteration in the time of development has led to a complete change in gradation, and, so far as any theory can be formed from a single experiment, this one appears to show that the parts which have received the fullest exposure are the first to develop and the first to flag. They have a long lead at first, and are always more and more nearly overtaken by parts less exposed as development proceeds. I mentioned that the 100,000 C.M.S. patch appeared before any other and kept the lead for some time; this is quite in accordance with general opinions, as it has often been noted that, when negatives are reproduced by the reverse action of light, a *positive* appears at the first stage of development, which is afterwards overpowered by the superior density of the less exposed parts. The figures are quite in accordance with that fact, and show that, up to the time of ten minutes of development, no reversal had taken place. If a negative, therefore, had received so long an exposure (on an "Ilford Ordinary" plate) that it amounted in some parts to as much as 100,000 C.M.S., it appears that the picture might still be saved and all reversal avoided by treating the plate with developer No. 2 and stopping the action after ten minutes. It is true that the result would be very thin, but still a fair negative might probably be made from it by intensification. By comparing this with some of the previous results, some idea may be formed of the great range of exposures from which it may be possible, by proper treatment, to produce passable negatives. If we suppose a subject to be chosen in which the intensities of the light vary as much as 1 : 1000 between the brightest and darkest parts, and consider firstly such an exposure to be made on it as would give a range equal to ·1 to 100 C.M.S. by means of rather prolonged treatment with the No. 1 developer, there is little doubt a fairly good negative might be made from it on an "Ilford Ordinary." The tables I have given show some considerable density on the 1 C.M.S. line, and, in another experiment, an exposure of ·1 C.M.S. has produced quite distinct though thin deposit; so that in such a negative we need have absolutely bare glass nowhere, and every variation in intensity of light through the picture would be represented by *some* difference in gradation in the density of the negative. Now, if that exposure had been increased *a thousandfold*, we should then have only reached a range of exposures of from 100 to 100,000 C.M.S., and it has, I think, been shown that even then the case would not be hopeless. And this is taking it for granted that the presence of either bare glass or solarisation on any part of a negative would be a fatal defect, which is not the general opinion of photographers. Of course the possibility of obtaining the ideal "perfect negative," which has all the "values" correctly represented, would not exist in these extreme

* Concluded from page 185.

cases. Messrs. Hurter & Driffield have shown how such negatives may be made, and the principles they advance on the subject are no doubt generally correct, although I think they will have to be modified by the conditions that the developer must be normal in constitution, and the time of development regulated; but whether the same end may be reached by other means, whether the necessary "period of correct exposure" would be shifted in position under altered conditions such as those I have described, or whether it would exist at all, would require much more elaborate experiments than mine to discover. It is interesting to note how, in the last table, the density of the 100,000 C.M.S. gradually falls behind the others. It is first in strip 2, between 100 and 1000 C.M.S. in the next, and considerably less than the 100 C.M.S. patch in the strip 4 column.

The following table will give the details of another experiment in which I endeavoured to test the action of different *species* of developers. The proportions given of the ingredients represent grains per fluid ounce (minims of ammonia), and, except as regards strips 1 and 6, I think they are in about ordinary working proportions. Sodic sulphite was employed in all the solutions, but, as it was unlikely to affect gradation it has been unnecessary to give the amount used in each case.

PLATE E.

Number of Strip.		1.	2.	3.	4.	5.	6.
Developer.		Pyrogallol ..... 1 grain Potass bromide ..... 1 " Ammonia 2	Eikonogen ..... 5 Potass carbonate 12	Amidol ..... 3 Sodic sulphite ... 30	Hydroquinone ... 2 Potass carbonate 12	Pyrogallol ..... 1 Potass bromide... 1 Ammonia 2	Pyrogallol ..... 2 Potass bromide... 3 Ammonia 1
Time of Development.		5 Minutes.	8 Minutes.	4 Minutes.	10 Minutes.	6 Minutes.	30 Minutes.
Exposure.	C.M.S.						
	·1	·01	·02	·01	·02	·01	·00
	·25	·03	·07	·08	·07	·03	·00
	1	·24	·42	·47	·31	·32	·03
	10	·93	1·74	1·75	1·37	1·51	·44
	100	1·33	2·66	2·75	2·22	2·42	1·12
	1,000	1·48	2·86	3·04	2·55	2·84	1·63
	100,000	1·45	2·25	2·35	1·91	2·52	1·62

A comparison of strips 1, 5, and 6 will show, once more, that very great alteration in gradation results from altering the constitution of the pyro developer; but in regard to the four *species* of developers, when used in normal working proportions (as in strips 2 to 5), I do not find so much variety in the ratios as I should have expected. These densities may be compared more conveniently by examining their ratios when compared with a standard exposure. I have therefore taken 10 C.M.S., which is a fairly regular exposure, and now give the ratios of other densities when those of 10 C.M.S. are made equal to 1, omitting, however, the results of shorter exposures than 1 C.M.S., as the accuracy of such small figures cannot be depended on.

Number of Strip.		1.	2.	3.	4.	5.	6.
Exposure.	C.M.S.						
	1	·26	·24	·27	·23	·21	·07
	10	1·00	1·00	1·00	1·00	1·00	1·00
	100	1·43	1·53	1·57	1·62	1·60	2·55
	1,000	1·59	1·64	1·74	1·86	1·88	3·70
	100,000	1·56	1·29	1·34	1·39	1·67	3·68

The range of exposures used by Messrs. Hurter & Driffield would be covered by the difference between the 10 and 100 C.M.S. lines, and the ratios between these in regard to strips 2 to 5 certainly vary very little, not more than in similar experiments described by those gentlemen; and even on the 1000 C.M.S. line the variation is not great, although eikonogen is found (as it was also by Messrs. Hurter & Driffield themselves) to give less density than other developers. The phenomenon of reversal, however, seems to be much influenced by the species of developer used, being far less strongly marked when pyro has been employed; but perhaps it is the alkali used which has the principal influence in that matter. In strips 1 and 6, it will be noticed, the density of the 100,000 C.M.S. patch is practically the same as that of the 1000 C.M.S. I do not think, however (taking the experiment with plate D into consideration), that this absence of reversal is altogether owing to the composition of the developers. It is probably mainly due to the fact that the action was not carried so far in developing those strips as in the other cases, so that, in consequence, the less exposed part only just reached the same density as the 100,000 C.M.S. patch; more prolonged development might probably have given the former a considerable advantage. Apart from reversal, this experiment shows little difference in the actions of the various kinds of developers, but I doubt whether other experiments may not give very different results. The experience of Messrs. Hurter & Driffield with para-amidophenol may, very possibly, be repeated in other cases, and what has been found to apply to that one developer, prove to be true of all. That is, that the special action of a developer may be found to depend very much on the quality of the plate, so that, while two species may give very similar gradations for equal series of exposures on some makes, they may yet prove to be very different in their effects when other plates are used. In using eikonogen in the autumn, on a different quality of plate, it certainly seemed to me to have an advantage over pyro and amidol for short exposures, which is not shown in this experiment with the "Ilford Ordinary."

On the whole, I think the experiment shows that development is, unfortunately, not so simple a matter as Messrs. Hurter & Driffield's experiments gave good reason for believing. Considering that there are now so many varieties of developers, every one of which may be greatly modified by altering the proportions of its ingredients as well as by various additions or omissions, and considering also how great is the difference between various qualities of dry plates, it would have been very satisfactory to have found that, after all, there was a simple rule which applied to every case. But, as that now appears to be more than doubtful, we have scarcely any scientific guidance to fall back upon, and development is likely to remain a mere rule-of-thumb matter, but it is much to be desired that those photographers who have time on their hands will devote some part of it to an attempt to add something to the small knowledge we now possess of the action of developers.

I ought to mention, perhaps, that I have in all cases used the expression "density" in the sense adopted by Messrs. Hurter & Driffield, viz., as representing the logarithm of the reciprocal of the transparency. A density of 1 stands, therefore, for a transparency of $\frac{1}{10}$; a density of 2 for a transparency of $\frac{1}{100}$, &c. It is the ratios between such logarithms, and not those between the transparencies themselves, which, if Messrs. Hurter & Driffield's original principles, as described in the paper on *Photo-chemical Investigations*, were correct, *should be* unalterable (after exposure), and not at all dependent on the method of development employed.

H. J. CHANNON.

FURTHER NOTES ON GUAIACOL AND ALLIED PHENOLOID COMPOUNDS AS DEVELOPERS FOR GELATINE DRY PLATES.

[Photographic Society of Great Britain.]

IN May, 1890, I brought to the notice of the Photographic Society of Great Britain, that guaiacol, or methyl-catechol, possessed fair powers of developing dry plates. It cannot be recommended as a practical developer, on account of its very strong smell, and its slow and weak action as compared with the ordinary developers. It has, however, recently been found useful by R. E. Liesegang as a developer for bromide paper prints.

In a very interesting paper published in the *Bulletin de la Société Française de Photographie*, vol. xxxvii. p. 310, Messrs. A. and L. Lumière, of Lyons, have given some results of their investigations into the relations between the chemical constitution of a large number of reduciug agents, and their action on silver bromide altered by light, and have found that in various bodies belonging to the aromatic series of benzene derivatives, to which most of the ordinary organic dry-plate developers belong, certain conditions must be fulfilled in order that they may possess the power of developing a latent image on silver bromide.

The principal of these conditions are:—

(*a*). In order that a substance of the aromatic series may act as a developer of the latent image, it is necessary that the benzene nucleus should contain at least two hydroxyl groups OH or two amidogen groups NH_2, or even one hydroxyl and one amidogen. The power of developing also holds good when the molecule contains a larger number of groups OH or NH_2.

(*b*). Substitutions which may be effected in the group OH or in the group NH_2 destroy developing power in all cases in which at least two of these groups do not remain intact in the molecule.

Now guaiacol ($C_6H_4<^{OCH_3}_{OH}$) presents a substitution in one of two hydroxyls, and although Messrs. Lumière's first experience as to its developing power agreed perfectly with my own, the fact that it is a developer seemed to them opposed to the principle laid down in (*b*). They remark, however, that the guaiacol of commerce is not a perfectly defined product, and contains, besides methyl pyrocatechin, a number of other substances, among which may be some diatomic phenols to which the developing properties may be due, and that the question is one for further inquiry.

Is Guaiacol a Developing Agent?

In a more recent communication to the Photographic Society of France, Messrs. Lumière announce that they have been able to prove that pure guaiacol is not a developing agent, and that the developing powers shown by certain samples are due to impurities. I have not yet had an opportunity of seeing their paper, nor am I a sufficiently good chemist to carry out an investigation on the lines they have laid down in their first paper, even if I had the leisure to do so; but I have again tried my first sample of guaiacol, together with a fresher and apparently purer one, and have also made some experiments with creosote and creosol, which should have been made earlier, and find that there is every probability of Messrs. Lumière's statement being correct as regards guaiacol. Creosote and creosol have both shown developing powers, and even carbolic acid itself, when oxidised, shows this power, though it does not do so when pure.

The guaiacol used in my first trials in 1890 is now quite brown and oxidised. It is labelled "*guaiacol puriss*," and was obtained from Dr. Schuchardt, of Görlitz; but he prepares a still purer product, which I have not tried. It would be impossible to obtain here an absolutely pure sample, but a fresher and perfectly colourless sample which came from the same source as the first, and is nominally of the same quality, but has been with me for about a year unopened, has also been tried and found to be a very much weaker developer than the first sample was and now is. Whereas the brown oxidised guaiacol with potash will develop a well-exposed plate with fair rapidity and moderate intensity, the colourless sample will, under the same conditions, only give a very weak but well-detailed image, even after a very prolonged development. From this it appears highly probable that an absolutely pure sample would not develop at all, and it is possible that the slight developing action observed may be due to the oxidising action of the air during the prolonged development, as seems to be also the case with carbolic acid. It may be noted also that when first tried the now oxidised sample of guaiacol showed a slight green tint with alkalies, and it now gives quite a dark green solution, while the solution of the fresher sample in alkalies is almost colourless, and shows no trace of green oxidation.

In these last experiments the guaiacol has been dissolved in caustic potash solution, about 1 c.c. of guaiacol to 5 c.c. of a 10 per cent. solution of the potash, and the clear solution diluted to about 35 c.c. It was noticed that the old guaiacol was not so readily soluble as the new.

Guaiac Resin.

If the developing power shown by guaiacol be not due to oxidation products, but to some impurity, it becomes interesting to know what that impurity is, because it may possibly be a powerful and effective developer in itself, as it must presumably only be present in very small quantity in the purified samples of guaiacol I have tried. The nature of this impurity will no doubt depend on the method of preparation of the guaiacol, as to which I have no information. As this substance forms the principal constituent of beechwood creosote, and may be obtained by fractional distillation from it, the guaiacol of commerce is probably obtained in this manner, but it may also be produced by the dry distillation of guaiac resin, and by other chemical methods.

As regards guaiac resin, I find that a solution of it in aqueous caustic potash solution is only a very feeble developer of silver bromide in gelatine dry plates; the developing agent in commercial guaiacol would therefore not appear to be one of the constituents of guaiac resin in its ordinary state, and we may look for it with better chance of success in creosote, some samples of which have been found to possess much stronger developing powers than guaiacol.

By destructive distillation guaiac resin yields guaiacene (C_8H_8O), guaiacol ($C_7H_8O_2$), creosol ($C_8H_{10}O_2$), and pyroguaiacin ($C_{39}H_{44}O_6$). If the latter product fulfils Messrs. Lumière's conditions, it might be worth examination.

Creosol a Developer.

Creosol is a colourless oily liquid, with a strong aromatic odour, not so pleasant as guaiacol. It is not more soluble in water than creosote, but mixes in all proportions with alcohol, ether, glacial acetic acid, and alkaline leys. The sample I have is, however, of a brownish tinge, and is not so soluble in alkaline solutions as guaiacol. A developer was made up as follows:—

Creosol	1 c.c.
Solution of caustic potash, 10 per cent	7 c.c.
Water, to	30 c.c.

The solution of the oil was not complete, a well-exposed plate took a long time to develop, but seemed to give fair density, which went off somewhat in fixing. With carbonates of soda and of lithia it only gave very weak images. It should be noted that, as in the case of guaiacol, the specimen of creosol I have used is not pure, and the experiment should be repeated with the pure product, which is unobtainable here.

Creosote also has the Power of Development.

Creosote from wood tar is a very complex mixture of phenoloid compounds, varying in character and quantity according to the method of distillation employed. In Thorpe's *Dictionary of Applied Chemistry*, Mr. B. Nickels gives the following list:—

Monohydric phenols: Phenol, paracresol, xylenol or phloral.

Methylic ethers of dihydric phenols: Guaiacol, creosol, homocreosol, cœrulignol.

Methylic ethers of trihydric phenols: Dimethyl-pyrogallate, dimethyl-methyl-pyrogallate, dimethyl-propyl-pyrogallate, and methyl-pyrogallate.

The principal constituents are, however, guaiacol and creosol, the former predominating in Rhenish beechwood creosote, while creosol forms the chief constituent of creosote from Stockholm tar.

Of two samples of creosote, one "beech-tar" creosote of German origin and the other ordinary creosote, probably English, obtained from a local druggist, I find that both have the power of developing a gelatine dry plate when mixed with alkali; but, while with the former the images obtained have been weak, those obtained with the latter show a good printing density, and are of a good brownish colour, free from stain or fog. The developer was made up as follows:—

Creosote (English)	1 c.c.
Solution of caustic potash, ten per cent.	5 c.c.
Water, to	35 c.c.

With ammonia the German creosote was only slightly soluble and developed a very weak image.

The English creosote had quite a different smell from the German, and more tarry. Both were only slightly yellowish in colour.

It is difficult to ascertain what is the cause of the great difference in the developing powers of these two samples of creosote; but further investigation may lead to its discovery and the isolation of the substance which produces it. In any case the developing powers of creosote seem to be worth further inquiry, though it is not likely to come into use as a developing agent in ordinary practice.

Old Carbolic Acid has Developing Powers.

I have also found that some very old carbolic acid (Calvert's No. 2) which has been kept here for some years, and become brown and oxidised, possesses distinctly marked developing powers when mixed with potash. The colourless crystals of unoxidised carbolic acid of the same manufacture have almost no such power, though after prolonged development in contact with the air a feeble image becomes visible. In this case the developing power is probably due to the formation of hydroquinone and pyrocatechin under the oxidising influence of the air.

Electrolysis of the Developers.

I have tried some of these developers by the electrolytic method, noticed in a recent paper on the amidol developer, published in the December number of the *Journal of the Photographic Society of India*.

A solution of

Guaiacol (colourless)	5 c.c.
Caustic potash solution at 10 per cent.	30 c.c.
Water, to	120 c.c.

was electrolysed in a voltameter with platinum electrodes about one inch apart, using four gravity cells giving a current of ·18 ampère with a pressure of about 4·2 volts. At first the current through the voltameter was about 7 milliampères with a pressure of 1·3 volt, but it ran down steadily, and after thirty minutes was only 2·3 milliampères, with a pressure of ·8 volt. Hydrogen was given off in a frothy form, at first fairly briskly, the yield being about ·4 c.c. in five minutes, ·6 c.c. in ten minutes, 1·0 c.c. in twenty minutes, and 1·3 c.c. in thirty minutes. The anode became coated with a brown resinous

substance, which stopped the current. This substance was only partially soluble in alcohol with a maroon-brown colour, and was very similar to a deposit formed by treating English creosote with baryta water. The same coating of the anode was noticed with silver electrodes, and the current was almost stopped, although the coating was very thin. The colour of the solution after electrolysis was a light maroon-brown with greenish reflections. The developing power of the solution was not found to be improved much by electrolysis, though the formation of the image seemed to be somewhat accelerated.

A solution of the old discoloured guaiacol with carbonate of potash electrolysed under the same conditions gave similar results as to the yield of hydrogen, though the current through the voltameter at starting was about 6·5 milliampères with a pressure of 1·8 volt, and after forty minutes was 4·25 milliampères with a pressure of 1·4 volt, which is very much higher than in the first experiment. The yield of hydrogen was about ·3 c.c. in five minutes, ·6 in ten minutes, 1·0 in twenty minutes, and 1·9 in forty minutes. The solution, to start with, was a very dark green colour, which became paler in the hydrogen tube and still darker in the oxygen tube. The solution generally also darkened. The anode had a reddish-brown deposit upon it. The developing power of the solution after electrolysis was not tried till next day, and was found to have decreased considerably.

Carbolic acid solutions electrolysed gave somewhat similar results as to the coating of the anode with resinous matter, and the consequent stoppage of the current.

A solution of :—

Old carbolic acid	8 c.c.
Caustic potash solution, ten per cent.	32 „
Water, to	120 „

was electrolysed with three dry cells giving a current of six ampères with a pressure of 3·75 volts. The evolution of hydrogen was very brisk, and some oxygen or other gas was given off at the anode. The yield of hydrogen was 1 c.c. in five minutes; 1·9 c.c. in ten minutes; 2·6 c.c. in twenty minutes, the yield of gas from the anode in the same time being ·5 c.c. The current through the voltameter at starting was six milliampères with a pressure of 2·75 volts, and in twenty minutes was six milliampères with a pressure of 1·5 volts. The solution in the hydrogen tube became lighter in colour, while that in the oxygen tube darkened. The electrolysed solution seemed to have considerably increased developing powers, but this is uncertain, as it was tried under different conditions to the unelectrolysed solution.

A similar trial of fresh carbolic acid and potash in the same proportions, using platinum electrodes and four gravity cells, was made. The current through the voltameter at starting was 5·75 milliampères, with a pressure of 1·3 volts. This pressure remained almost constant for thirty minutes, but at the end of that time the current was only 3·5 milliampères. The yield of hydrogen was ·5 c.c. in five minutes; ·9 c.c. in ten minutes; 1·3 c.c. in twenty minutes; 1·8 c.c. in thirty minutes, and ·8 c.c. of gas was given off into the oxygen tube. The solution in the hydrogen tube remained colourless, that in the oxygen tube took a bluish dirty violet colour, and the solution generally had a turbid greenish tint. In a V voltameter with silver electrodes, the anode became coated at once with a brown varnish-like substance, and the current from six dry cells (about eight volts) barely passed through. The solution after electrolysis had no apparent developing power.

I have not yet been able to complete these electrolytic observations, or to try creosote and creosol in that way.

With the exception, perhaps, of creosote, none of the substances experimented on appear likely to be of any practical use as developers, but I have thought that the fact of their having developing powers might be worth recording, and a further investigation of the substances which cause impure samples of non-developing phenoloid compounds to exhibit developing powers may have useful results.

Addendum.

Since the above was written, the mail has just brought the *Moniteur de la Photographie* of December 1, containing Messrs. Lumière's last paper, in which they show that guaiacol, after thorough purification, no longer reduces haloid salts of silver after exposure to light, and therefore is not a developer. They made a search for the substance which communicates its developing power to guaiacol, but without the slightest success; the ammoniacal liquor in which the crude guaiacol was first washed develops an image, but all efforts to isolate and analyse the active agent failed, probably because it was only present in very minute proportions in the ammoniacal liquid. They remark that of some substances a very small quantity is sufficient to bring about the reduction of silver bromide. For instance, a photographic plate may be developed with an alkaline solution of para-amidophenol at one-ten-thousandth or less than two grains to a quart.

As noted in my paper, my later experiments with guaiacol tend to confirm Messrs. Lumière's conclusion that it is not a developer. Messrs. Lumière do not seem to have observed with the pure product any trace of an image which could be attributed, as I have thought possible, to oxidation products. Consequently the faint images I have observed with my purer sample of guaiacol, and with clear crystals of carbolic acid, are probably due to oxidation products or other impurities present in my samples, and not generated during development. The question is a complicated one, and would require much closer investigation than I am able to give it.

In connexion with the foregoing, Colonel Waterhouse has the following on the above subject in the *Journal of the Photographic Society of India*:—

Guaiacol, Phlorol, and Cresols.

Since my last note, in the January number, was written I have tried two fresh samples of guaiacol, one of them purified from potash and the other an ordinary sample of English origin, obtained locally, which seems to be very pure, judging from its freedom from colour when mixed with potash and the slowness with which it develops. Both these samples have, however, undoubted developing powers, and it seems difficult to obtain a sample of perfect purity and without any developing power, unless one prepares it for oneself, as Messrs. Lumière have done. It is an operation requiring more care and time than I can give it at present.

I have also tried some other derivatives of creosote, among them crésol, para-cresol, and phlorol, and find that, mixed with potash, they are all capable of developing an image on a dry plate, though not practical developers. Phlorol seems the most active, but cresol develops without difficulty, while para-cresol only gave a very weak image in two days. The solution of the latter in caustic potash has a strong orange colour, which deepens by exposure to the air. It remains to be seen if this strongly coloured solution may be turned to useful account in conjunction with other developers. In this case also it is probable that the developing power may be due to impurities or oxidation products formed during the progress of development.

As it seemed possible that the impurity which confers on these phenols the property of developing might be pyro-catechin, or some homologous substance, an experiment was tried to ascertain how small a quantity would suffice to bring out an image. It was found that a solution of one-fifty-thousandth of pyro-catechin in a one per cent. solution of caustic potash (or about one grain of pyro-catechin in five pints of a five-grain solution of potash) was sufficient to develop a distinct but very weak image. It is possible that even a smaller quantity would suffice, and under these circumstances it may readily be understood how enormously difficult it is to obtain these complex derivatives of wood-tar and creosote absolutely pure and free from substances which have developing power.

Colonel J. Waterhouse, I.S.C.

ENLARGEMENTS PRINTED ON PREPARED CANVAS.

In the "Answers to Correspondents," on page 95, two alternative methods of making enlargements on prepared canvas are mentioned as being suitable because they give permanent results—"carbon transfers" and "dusting-on." Both are bichromate processes, and both, although the colouring materials are permanent enough for this purpose of being printed without the canvas being removed from the stretcher, and for painting upon in oil colours after having been printed, are about the most unsuitable that could be recommended.

The carbon print must be made and developed on another (the flexible) support, and transferred to the oil-painted canvas, adopting suitable means to secure it thereon. I have tried to, and succeeded in, squeegeeing the carbon tissue when printed direct on to the canvas, and developing it there, but it will be seen at once that the risk run of spoiling the prepared canvas by the hot water is so great that it is not a desirable way to work, nor would any artist of note risk the destruction of his after-work on such a ground if he knew of it. The coloured gelatine of more or less thickness is also so antagonistic to the oil surface that, even when properly fixed, it is, so to speak, always struggling to remove itself. So opposite are the two bodies that a coating of gelatine, glue, or size, is used to prevent the preparation sinking into and spoiling the appearance of the back of the canvas, and this is sometimes done so maladroitly that pictures, especially if they are of considerable age and kept for a lengthened period in a damp place, will frequently scale off in large blisters as thick as egg-shells. This takes place where the sizing which the canvas generally undergoes is,

as previously mentioned, too thickly coated or the sizing too strong. The size first swells from the absorbed damp; then, after a time, decomposes, giving forth vapours, and the paint and canvas part company, entailing, where the picture is a valuable one, no end of care, time, and trouble in putting a new canvas on the back of the old and rotted one, or otherwise removing the canvas, thread by thread and fibre by fibre, from the scale of paint and picture, and cementing that down on a new canvas. Such a thing can be done, but never without injury to the picture. Where a gelatine film of appreciable thickness is interposed between the prepared ground and the oil colours which compose the picture—say, portrait—there the elements of destruction are laid. I have seen such an example, even with a silver enlargement, where gelatine in excess had been used; the entire picture reticulated, so that, on looking through it in sunlight, it seemed as if pierced with a fine network just like a Meissenbach of transparent cracks, which they were. This was one of the present President of the Edinburgh Society's works, which he will remember, for he condemned it at once as unfit to leave his establishment, asking my opinion of the probable cause of so unusual an appearance, and had another executed in its stead. A well-known master, the late Norman Macbeth, R.S.A., a frequent contributor to these columns, Sir George Watson Gordon, P.R.S.A., as well as others who could be named, would never allow their cloths to be sized at all, but primed on the cloth direct, almost forcing the first coat through to attach the paint and canvas thoroughly together, just as plaster is forced through lathing and riveted, as they call it. So much for the association of the gelatino-carbon image with the oil-painted portrait enlargement. How this is, or may be, produced need not be noticed here.

The dusting-on process is one that is based on a very different principle, the bichromatised colloid body being so treated that it becomes hygroscopic, and in printing from a negative a negative is the result, from a positive or transparency a positive. The print is produced by action of the humid atmosphere upon the insolated surface, and brushing over it a colour which sticks to the slightly tacky surface. For this purpose very finely levigated black lead is probably the best. Gas black, or lamp black, also do well. Ivory black is recommended, but has not been so successful in my hands. There are also many of the other colours in powder which can be chosen if black is too strong in tint for the painter's scheme. The specifically lighter they are, the better will they take on the tacky surface of the colloid composition. One great objection to the working out of this process with any large size of plate and canvas is the difficulty in our climate and in most work places of keeping the air sufficiently dry and at an even equable temperature and degree of humidity during the process of brushing on the powder. Even in breathing upon it to confer the requisite degree of humidity, there is the great probability if the subject is large, say up to life size—of making one place more tacky than another, and so causing a heavy, blurred, smeary image, which no after-working seems able to clear This, which annoying in large subjects, is quite unfelt on small sizes, where the aid of a friendly open fire assists in securing images fine enough for enamels, of which I have made several examples on opal glass as well as on the orthodox enamel plaque. The image, when finished from the enlargement, after washing, drying, &c., is too delicate to stand rough work with the painter's brush, and must be floated over with a coat of thin varnish, the thinner the better. All this trouble and care must be taken to produce an image which, in addition to its colloid nature, although that is hardened by exposure to light in conjunction with a bichromate, yet even that which is hardest, and also that which has not been so affected, must retain, even when washed free of all surplus bichromate, and such sugar, or honey, or glycerine, or other hygroscopical addition, acted upon by acid, alum, &c., a most undesirable quality as an intermediary between two surfaces of oil paint, the canvas ground, and the artist's colours.

The same remarks apply to another medium which is often used for cheap enlargements in oil, "collodion transparencies" transferred to the canvas, and for that class of work they should be more strongly emphasised.

Remains now the printing of the image on the prepared canvas ground itself, without an intermediary, or only that with which the artist paints, which will allow intermixture and penetration so that the material of which it is formed becomes one with the colours and the ground, and that is our old and safe friend, nitrate of silver, which, in spite of all that may be said as to permanency, is, in the method to be described, most permanent, one proof of which may be quoted.

I was shown a short time ago by one of our best artists one of several such prints on canvas that had been done by myself considerably over twenty years ago, which had been knocking about the studio for all that time. It was a figure subject, copied from one of his own designs, on 26×15 stretcher, and there was no sign of change or fading whatever; the whole thing was so vigorous that I was amazed it did not tempt the artist to begin and finish it, and said so; but he said, "I have already painted half a dozen of them, and am tired of it, even though I have been asked to finish it. I'll rather paint a new subject on the same canvas;" and, on again calling at a later date, it had been painted out and was ready for the new subject.

To begin with the prepared canvas itself: do not, as is the usual photographic habit, purchase the lowest priced, "made-in-Germany" kind of material at so many or so few pence each, or shillings a dozen, stretchers included, kind of thing; for, if that class of stuff is made use of for this purpose, it is almost certain to prove a failure. Rather use, although it costs more, that material made by such old-established London houses as Charles Roberson, Winsor & Newton, Newman, Lechertier, Barbe, & Cie., and people of that stamp, who have a reputation to lose. If the buyer has a choice, take the oldest in stock. Prepared canvas is like collodion and wine—time ripens and improves it; and, in selecting it, see that it is sound and somewhat elastic, and without that habit, which some over-sized rolls have of cracking when handled, bent, or folded. Age also seems to abolish some of the bad habits of the newer or more youthful material, habits not suited to the best qualities of photographic printing, for which proceed as follows:—Take the strained canvas, wash it over with a cloth (flannel by preference) and water, using a little dry, washed whiting along with it to remove any surface impurity, finger marks, or grease, which often occur to sully the surface: wash clean with water, after this, and while the painted surface is still damp rub over and into it, with a small bit of cloth rather than a brush, or pad of cotton, a sponge kept for the purpose does well enough, the salting solution, which is made up of half a pint of tepid water, 40 grains of common salt, to which add 10 drops of acetic acid and 5 grains of previously melted gelatine. When this is dried, which can be done in front of a fire, take a 30 to 40 grain solution of ammonia nitrate of silver, the method of making which is, or should be, well known, and with a bit of Canton flannel, or a fine sponge does as well, having marked with a pencil round the negative or negatives, say of the head and hands, the position they are to occupy in the picture, those places only need to be salted and silvered, rub lightly over with the ammonia nitrate in all directions, and dry at once in front of an open fine. Go over the same places a second time, dry as before, and the canvas is ready for printing. It is well to have a board the thickness of the stretcher and slightly less than the inside size, to keep the canvas level, and, having arranged this where the canvas can lie flat, place the negatives in their proper place with any little thing to weight them, on two sides only, there is need for nothing more in the way of pressure. The printing is very rapid, as silver printing goes, and may be fairly well judged by the colouration of the parts outside the negative or through the broad crosses, which should be scratched through the film to the glass. These also assist the registration when examining the print, which can easily be done by holding the edge of the negative with one hand and raising it slightly with the other. When sufficiently printed, wash with water run on from the tap until the surplus free silver is removed; do not tone, as there is no need for that, and fix with hyposulphite of soda poured on and kept in motion till fixation. This can be determined by the simple test of rubbing with the finger, when, if not fixed, the silver remains fast; but, if sufficiently so, then the silver will rub off easily under the finger. All that remains is to run the tap for a few minutes, for, the surface being impervious, there is nothing to retain any trace of hypo, the infinitesimal quantity of gelatine not being able to retain any of the fixing salt. The finished proof may be dried either in the air or in front of the fire, and is then ready for the artist. I have said nothing of the placing of the figure in the proper place, or of the sketching in with a crayon the outline of the figure where the negative is not made sufficiently large for this purpose, but will say a few words on the subject if that be needed. W. H. Davies.

PHOTOGRAPHIC INDUSTRIES—MESSRS. MORGAN & KIDD'S WORKS AT RICHMOND.

That the present popularity of the gelatino-bromide process for enlargements is due to the efforts of Messrs. Morgan & Kidd, of Richmond, more perhaps than to those of any other firm, will be easily recognised when it is understood that it is now some twelve or thirteen years since those gentlemen began to practise and exploit this system of photographic reproduction. The artistic beauties and technical excellencies of the bromide work which they themselves turn out to such a great extent, conjoined to the admittedly high qualities of the now universally known bromide paper of their own preparation, entitle them not only to recognition as among the earliest pioneers of the process, but also to the thanks

photographers generally for having been the means of firmly establishing an enlarging method which, on æsthetic grounds and on the score of permanence of results, has long since achieved a most favourable place in public estimation.

The growing use of gelatino-chloride paper may possibly tell adversely on bromide paper for contact work in small sizes, but for enlargements we have yet to make the acquaintance of the process which will displace gelatino-bromide, or even challenge its pride of position. This reflection was forcibly borne in upon us on the occasion of a recent visit to Messrs. Morgan & Kidd's works at Richmond, when we were favoured with the opportunity of making a rapid inspection of many of the departments in active operation. In what may be termed the exhibition gallery hang many charming bromide enlargements on paper and opal, both plain and coloured, which exhibit the capabilities of the process to perfection, while, before our departure we were shown some pictures over eight feet by four feet, intended for the Chicago Exhibition, and betraying a delicacy of gradation, wealth of detail, and harmony of effect such as one would expect to find in the very smallest work.

Numerous rooms are set apart for making enlargements, and in one of these, Mr. Kidd, who kindly piloted us through the intricacies of these many-roomed works, allowed an assistant to make a 23 × 17 enlargement for us "while we waited," and the vignetting of the picture and the masking off of portions of it during exposure by the deft use of a large card with an aperture in it, was in itself a capital object-lesson in a valuable item of photographic practice. It was also interesting to observe how the picture was developed in a very shallow glass-bottomed dish with a quantity of solution which scarcely looked enough to cover a half-plate print, let alone one the size under treatment. Needless to say that the dish was not merely rocked, but kept in rapid motion from side to side, so as to ensure the even flow of the developer. Iron still reigns paramount at Richmond, by the way. We notice that fixing of the prints is allowed to proceed in subdued light, that after washing they are well sponged down on an upright sheet of glass, and that they are cleared with acetic acid. For enlarging purposes daylight (with external reflectors) is used; in dark weather and at night the electric light is available.

A system of rapid contact printing, which we saw in progress, struck us as being very ingenious, and it will be of interest to the many thousands of readers of our Almanac, as the picture of the German Emperor given with the volume for 1892 was printed in this manner. The negative in a movable frame is fixed in an opening in the wall, behind which is a Welsbach light. The frame carrying the large sheet of bromide paper, upon which a number of exposures is made, is placed in position, the negative by a simple movement brought into contact, the exposure given, then the negative thrown out of contact, the frame carrying the paper moved, the negative again brought into contact, and the succeeding exposure given. At the time of our visit a large number of prints from one of Mr. Kidd's negatives of Durham Cathedral were being made.

Each batch of bromide paper that is made is subjected to test exposures under a graduated screen, and a trial picture is taken by exposure to a test negative having the widest range of tint. One room is set apart for the examination of the coated paper before packing; another for a critical review of prints before they are sent out. We saw the operation of packing the paper in the now familiar tubes, the making of frames for the finished enlargements, gilding, moulding, &c. (here a department of considerable extent and importance in itself), and were permitted to have a view of the large staff of lady and gentlemen artists at work on bromide paper and opal and carbon pictures.

Time did not allow of our making a detailed inspection of all the departments at Richmond, but we were fortunate enough in passing a considerable portion of our stay in the rooms devoted to the latest addition to their business which Messrs. Morgan & Kidd have made. This is the photo-mechanical and collotype department. Of the latter process a number of most charming specimens in various coloured inks, hang in an annexe of what we have called the Exhibition Gallery, which certainly take rank among the finest examples of this now favourite process of reproduction. In the collotype section, rooms are devoted to the coating, sensitising, and drying of the plates, the details of the process employed being given in a short paper by Messrs. Morgan & Kidd which we published a few weeks ago on the occasion of the demonstration given to the members of the Richmond Camera Club. Both hand and steam power are employed for the printing, the former for very small work. The collotype machines used are those of Messrs. Schmeira, of Leipzig, and work up to the largest sizes ordinarily available. Examples of Messrs. Morgan & Kidd's collotype work appear in the *Yachtsman*, *Knowledge*, and other publications; and while we were at Richmond we were shown, among other specimens, reproductions of corals for a work on the subject being prepared under the superintendence of Dr. Gunther, of the British Museum. Our last Almanac, as our readers know, also contains an example of the process, which has been highly eulogised.

As occasion requires the electric light is availed of for enlarging and illuminating purposes throughout the establishment. The non-actinic light employed in the enlarging rooms is of a most agreeable nature, oiled orange paper screening the lamps. Some of the developing trays in occasional use are of such enormous size that they can only be actuated on a species of ball-and-socket arrangement placed on the floor to support them. The ordinary water used at the works is drawn direct from the adjacent Thames, and passes through a huge carbon filtering apparatus much resembling a gasometer on legs. Asked how much paper was coated per diem, Mr. Kidd, in preference to committing himself to any arithmetical statement, smilingly said that the daily quantity would last almost any photographer a lifetime.

The premises cover a large area of ground, including, as they do, departments, in addition to those mentioned, for carbon printing, the coating and drying of the bromide paper, plate-making, &c. The number of rooms occupied defied our own attempts at counting, and Mr. Kidd's memory. But we did learn that the firm employs over a hundred persons (with the precise number of which, in contradistinction to the rooms, Mr. Kidd humorously said every Saturday made him acquainted), and in concluding these brief notes of a highly interesting visit we cannot more fitly do so than with congratulations to employers and *employés* at the good and cordial inter-relations which we did not fail to observe exist at Messrs. Morgan & Kidd's works at Richmond.

VARIOUS METHODS OF ADDING CLOUDS TO LANDSCAPES.

There has been so much said and written on this subject that one might think that everybody knew everything about it, and that the reiteration of the oft-told tale was but so much wasted time and paper. Notwithstanding this, a large percentage of those who practise photography for amusement consider it either a too troublesome a process to adopt, or do not feel themselves sufficiently expert to risk spoiling a print that is good in all other respects by an addition of which they feel somewhat doubtful of properly performing.

I am induced to make these remarks having occasionally met most painstaking and apt amateurs who would not hesitate to spend money and trouble over their hobby, and yet who make their prints with quite blank skies, or not more than slightly tinted, just sufficient to tone down the glaring whiteness of the paper. This, then, is my excuse for recapitulating the well-worn topic of how to put clouds to landscapes. The methods of performing this really simple process are somewhat varied, and most of them capable of producing satisfactory work when properly handled. The busy photographer will undoubtedly give the preference to that plan which is most easy to do and gives a minimum of waste. In the first place, a few words about taking a cloud negative will not be out of place.

We must not start with the idea of a cloud negative being necessarily that which will print an excellent study *by itself*, as many excellent pictures, from this point of view, are utterly unsuitable for adding to landscapes. The most useful in this connexion would probably make very poor, flat pictures by themselves. *Imprimis*, find your clouds by selecting some elevated or other position where there are no obstacles in the foreground or middle distance to interfere with a clear and unobstructed view of the horizon. The effect of perspective must be considered in clouds as much as in landscapes, and those taken with a *level* camera are generally the best and most effective. A little tipping of the instrument is of no consequence; but clouds, like the earth beneath them, are subject to the same laws of perspective, although these laws may be violated with less chance of attracting attention. It is preferable to set about copying them on a right principle.

The seaside offers the very best opportunities for good cloud studies, but it will be observed clouds formed over the sea are somewhat different in character to those over the land, especially as they approach the horizon. The photographer should have both kinds at hand. With regard to the position, one looking west affords most opportunity for effect, especially if we are desirous of moonlight or sunset effects. Of course, clouds may be found at all points of the compass, and those formed in the north-east or south-east are often very beautiful. A morning sunrise is not so good for our purpose as an evening sunset, owing to a greater proportion of vapour and haze than later on in the day, it being almost impossible to get sufficient

contrast in clouds if any haziness intervenes, a very little destroying the delicate nuances of shading that add so much to the cloud beauty. This fact makes cloud photography in towns difficult, for there is generally enough smoke to obliterate all clouds for some degrees above the horizon, if nothing else interferes in the form of chimneys and buildings. Clouds on the zenith are absolutely useless for any photographic purpose, always looking mappy and out of perspective when added to a landscape. This difficulty, no doubt, deters many from trying to make cloud negatives. Patience and opportunity are undoubtedly required, and a little disappointment must not be minded. Generally speaking, stormy weather provides the greatest variety of forms, and quiet after the storm is usually best of all.

Very fine cumulus clouds may be secured in settled summer weather, but the spring months generally afford opportunities for cloud work that should not be neglected. Some think a mackerel sky good for printing in; but, as this pattern of cloud depends for its effectiveness on the contrast of pearly white with deep blue, it is somewhat disappointing in the negative. Of all patterns of clouds, a rather dark one, with a bright edge, is most useful for combination printing, especially if there is only a small space to fill.

Our station being selected, its aspect carefully noted, there is no alternative but to wait for the clouds to arrange themselves to suit the fancy of the photographer. A finder in the camera is very useful. Unfortunately, a day when the most effective grouping occurs is often objectionable on account of wind or showers, and the elevated position selected adds to the discomfort. Bearing this in mind, a light, flimsy outfit is less suitable than a heavier and more substantial one. A good waterproof cover for the apparatus will often come in useful. It sometimes happens that the shutter of the dark slide has to remain open for some time longer than ordinary in order to make the exposure at exactly the right time. Extra precaution must be taken to prevent access of light to the plate in the interim. A cord tied to the camera screw, and pulled down firmly to the ground immediately beneath by means of a peg, a stone, or a loop in which the foot can be placed, will add considerably to the rigidity.

Any good, clear-working plate can be satisfactorily used, and should be backed. Excessive rapidity is a drawback. A plate such as the Ilford ordinary is quick enough with an exposure of half a second, and with a stop about *f*-64 for the time. No part of the limb of the sun should be visible in the negative if the clouds passing the sun are to be taken, or a dense patch of light will result, quite spoiling the effect.

The quality of negative required is a *clear*, *thin* one, showing good contrasts, and plenty of detail, with little density. The exposure and development must be calculated for this effect. Any lens giving a flat field and good definition is suitable. Very rapid exposures are not required, as a rule, although now and again an instantaneous one may be necessary; but better results for our purpose are obtained by longer exposures, the development being calculated accordingly. There are so many opportunities of taking clouds when they are nearly motionless, that such times should be selected for taking them. Owing to their distance, a slight movement in the masses of vapour is not noticeable on the negative with the short exposure required.

As to development, any of the usual kinds will answer. Such combination that would be used to render white drapery will make good clouds. Hydroquinone answers very well, but most of mine I have developed with pyro-ammonia well restrained. I would suggest that the kind of development to which the photographer is most used is best. Knowing what he wants, he sets about getting it as with any other sort of negative, and as far as I know there is no particular treatment required. A clear, thin negative is to be tried for, so thin that the prints over which it may be laid are distinguishable through all but the very densest portions. In a good diffused light (direct sunshine must always be avoided) a cloud negative should be sufficiently printed in ten minutes or less. The effect of using a too dense negative is to get a patchy effect, the dark clouds coming too dark for the landscape, and the light ones deficient in detail. If the printing is continued to get out detail, the whole thing will look heavy and bad, and the picture will lack atmosphere and become worthless; on the other hand, a clear, thin negative will enhance the atmospheric effect.

One great difficulty in using unsuitable cloud negatives is to so mask the picture that the junction between the two is unobservable. It is almost impossible to do this without either letting the clouds encroach on the distance of the landscape and get muddled up with it, or show a clear white space between the two, either of which is fatal to artistic effect. If the printing is properly managed with suitable negatives, if even two or three are used, the closest scrutiny should fail to discover the junction of them with the landscape, or any signs of double printing whatever.

EDWARD DUNMORE.

(To be concluded.)

ON THE APPLICATION OF PHOTOGRAPHY TO SEISMOLOGY AND VOLCANIC PHENOMENA.

THERE is scarcely a branch of art or science that does not at the present day call in the aid of photography, either directly or indirectly, and seismology is no exception. It may, therefore, not be out of place, in the case of a journal particularly devoted to this subject, to enumerate and briefly describe the various applications of photography that have actually been made, or that are suggested, in connexion with earthquake and volcanic phenomena.

EFFECTS OF EARTHQUAKES.

First, of course, we have the common application of photography to record the effects of earthquakes and of volcanic eruptions. The value of photographs of this kind cannot be over-estimated, but it will not be fully appreciated till considerable time has elapsed, and until future seismologists want to compare the effects of earthquakes and eruptions of their time with those of the present time. We can imagine of what value they will become if we think what we would give for an accurate set of photographs of the effects of any historical earthquake or eruption, say, of the last century. Undoubtedly, a hundred or two years hence, it will be of the greatest importance to geologists to be able to compare the condition, for example, of Bandai-san with its condition within a few days of the eruption that blew its upper half into the air nearly five years ago. The more rapid changes in the interior of the craters of active volcanoes can also thus be noted with advantage. Even such secular movements as the gradual rising or depressing of coasts may also, perhaps, be recorded more definitely than they have been heretofore.

There is one thing that should be emphasised here, and that is the importance of preserving systematically all photographs of the kind mentioned, printed by some permanent process. In cases where the photograph is of such general interest that the outside public may be looked upon for the purchase of anything over about fifty copies, the collotype process is, at the time of writing, to be recommended; in other cases the platinotype, in spite of its present comparative expensiveness, on account of the recent great rise in the price of platinum. Up to the present time, so far as the writer knows, such photographs as are of particular seismic interest are to be found scattered through various publications, but have not been systematically brought together in any single collection.

CURVATURE OF THE SIDES OF VOLCANOES.

Professor John Milne has used photography in determining the curvature of the sides of volcanoes.

That is to say, the inclination and curvature were measured from photographs at the time in existence. In using photographs for this purpose it is necessary to be sure that the swing back of the camera was vertical at the time the photograph was taken, otherwise the measurements will not accord with the truth. Now, although photographers have been pretty well drilled into appreciating the necessity of having the swing back of the camera vertical in the case of buildings, there are few that appreciate the necessity in cases where the subject contains no right lines, and the greater number of photographers "tip" the camera without bringing the swing back to the vertical again in photographing a high mountain. This is, indeed, one of the reasons for the commonly unsatisfactory rendering of mountains by photography. The effect of tipping back the camera without readjusting the swing back is to give an effect in the photograph as if the mountain were leaning away from the camera to just the amount that the ground glass leans back. In other words, the slope of the mountain is reduced, and the mountain is dwarfed. There may also be slight errors due to refraction.

COPYING SEISMOGRAPHIC RECORDS.

We next come to another set of uses of photography that need little more than enumeration. Thus the record of an earthquake, by nearly every seismograph, is scratched on smoked glass, the smoke film being afterwards fixed with common photographic varnish. It goes without saying that photography is the best way of obtaining copies of such records. The blue process is most commonly used, although, in the case of the small diagrams given by bracket and duplex pendulum seismographs, more delicate processes have a decided advantage. Except for want of permanency, albumenised paper is to be preferred to anything else.

It scarcely needs to be stated that photography has been useful in producing illustrations of seismological instruments, also, in a number of matters of detail such, for example, as the production of scales, with finer division than any that were readily procurable machine divided.

PROFESSOR W. K. BURTON.

(To be continued.)

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The second public exhibition of photographs by members and others of the above Society was opened on the 22nd inst. by the Mayor of Leicester (Alderman Underwood), in the Co-operative Hall, the latter a handsome apartment, no doubt admirably adapted for functions of a political or theological tendency, but leaving much to be desired when the object in view is to display to the best advantage a collection of pictures. However, arrived at length, mentally recalling a couplet well known on the Tyne-side—

"Stairs, stairs,
Who climbs them, *swears!*"

at the *locale* selected, we are able to chronicle a distinct success for the Leicester Society, and to congratulate them on a small but very creditable and interesting exhibition.

Some sixteen members sent in frames, and others were contributed by workers in various parts of the county. Dealing first with the work of the members, it is clear that the chief honours fall easily to the President (Mr. Porritt) and Mr. G. Bankart, both in reference to the artistic selection of the subject and careful, tasteful, technical handling of the negative. Mr. Porritt shows various enlargements, all excellent and pleasing, *Old Cottages at Knighton*, perhaps, taking the palm. The President's smaller work is also very good—No. 7, *Roman Bridge*, a difficult subject well rendered; No. 17, *Roman Baths;* and some charming studies in Derby and Wales, all worthy of particular notice.

Mr. Bankart's work is so well known and so good as hardly to call for further criticism. He contributes eighteen views—carbon prints—all, with one exception, rather cold in tone. It is a question whether a rigid adherence to one tone, say, engraving black or Indian ink, is desirable; we think not, and fancy that several of these fine pictures, notably the pure landscapes, would have looked better in sepia or brown. Mr. Bankart's carbon prints are, in quality and finish, up to anything we have seen in this beautiful process. Mr. Frank Brown shows several enlargements, all in his best style. Mr. F. G. Pierpoint also contributes three enlargements, all showing a considerable amount of work, but effective and pleasing, *Haddon Hall* making a striking picture. Mr. Pickering (the Hon. Secretary) is represented by a few architectural studies, all of good quality. Messrs. Seville & Co. exhibit, with other work, a very good enlargement in bromide, *Now for a Sail—Yarmouth Beach*, a familar and artistic subject. Mr. J. H. Seddon shows promise of better things to come in *Views in and around Knighton*. Other exhibits by members are contributed. Messrs. S. P. Baker, Cowdell, Robt. Frost, F. Jolliffe, S. S. Partridge, J. Toone (whose landscape work is the better), G. E. Woodcock, and A. W. Wilson. Mr. T. Scotton also proved a tower of strength to the home side by his collection of fine enlargements and architectural subjects, *Lincoln* and *Peterborough Cathedrals* being particularly deserving of praise. The exhibits loaned, and most of them shown at other exhibitions, comprise work by Bernard Alfieri—*The Grey Dawn, Sunset, Against the Sky*, &c.; examples by Mr. S. Francis Clarke; some half dozen charming studies by Mrs. Clarke; medal pictures by A. R. Dresser; studies and enlargements by the Autotype Company and G. W. Wilson & Co., the latter's exhibit including also work by F. M. Sutcliffe, the ever-welcome *Water Rats* and *A Stern Reality;* and Chas. Reid. Mr. J. Pike, of Leicester, sends six frames; Mr. Martin J. Harding, of Shrewsbury, some fine "bits" and snap-shot pictures, these latter very good indeed; Mr. Isaac Slater, of Llandudno, six landscapes, which for detail, selection and perfect tone are very hard to beat; and Mr. R. Keene, of Derby, a series of his well-known views.

Lantern slides by the President (Mr. Bankart), Mr. Wilson, Mr. Pickering, and others, were shown on the screen at intervals during the evenings; vocal and instrumental music also diversifying the proceedings.

It should be mentioned that the Hon. Secretary (Mr. Pickering), immediately after the opening ceremony, became the happy recipient, at the hands of the Mayor, on behalf of the members, of an optical lantern by Archer & Co.; this lantern was used for the projections, and is evidently a very fine instrument. It only remains to be said that the exhibits were well arranged, that a neat little catalogue was issued, and that the public attendance was everything to be desired.

Our Editorial Table.

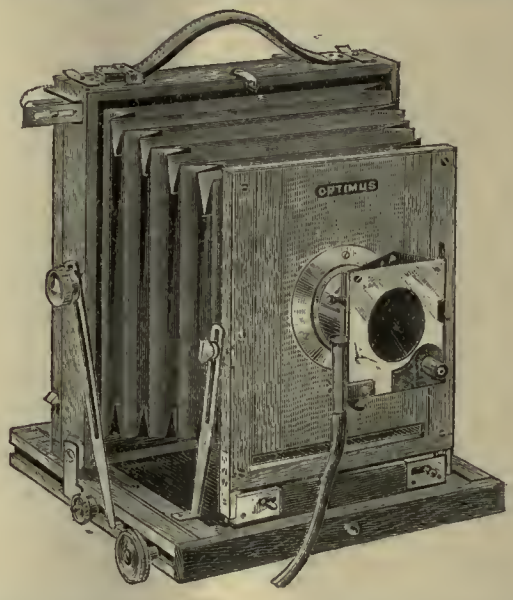
Stereographs.

By Horatio N. King.

Mr. King has sent us some choice stereographs, both ancient and modern. Those of the former class are views on paper of the Burnham Beeches, from collodion negatives, taken by him, in company of the late Frederick Scott Archer, over forty years since. The negatives from which these were printed must be in a state of good preservation, showing, as they do, no evidence of having faded. The others are transparencies on glass, forming views respectively in Windsor Castle, Haddon Hall, and Hampton Court Palace. These are backed by a matt varnish having an exceedingly fine grain.

Optimus Spirit-level.

Messrs. Perken, Son, & Rayment are introducing a small spirit-level for attaching to the side of the camera, and capable of being



used either laterally or horizontally, as indicated in the cut, the level itself folding back to the side of the camera, and being observable when in that position. It should prove a useful little adjunct.

RECENT PATENTS.

PATENTS COMPLETED.

Improvements in the Manufacture of Pyroxyline Solutions and Compounds for Varnishes and Coatings.

(Communicated by Frederick Crane, Bloomfield, New Jersey, United States of America.)

No. 6542. Joseph Sinclair Fairfax, 433, Strand, London. *February* 18, 1893.

This invention, as communicated to me by my foreign correspondent, relates to improvements in the manufacture of pyroxyline solutions and compounds thereof for various useful purposes; and it refers to solutions and compounds of a similar nature to those employed in my application No. 6543 of even date herewith.

The pyroxyline, or nitro-cellulose, used in the manufacture of these compounds is of the kind or grade known as soluble pyroxyline, and is obtained by subjecting vegetable fibre to the action of nitric acid, or of nitric and sulphuric acids, in a manner well known.

The solutions and compounds referred to are in a liquid, or semi-liquid, condition at the time of their use or application as varnishes or coatings, and which eventually become set and hard. The invention consists in the employment of certain known fluids which have been discovered to possess the property of dissolving pyroxyline at ordinary temperatures, and which also impart to the pyroxyline solution or compound made by their aid certain peculiar and desirable properties. For many purposes for which pyroxyline compounds are used, and particularly where such compounds are used in the form of thin solutions for lacquers or varnishes—or in the form of heavier solutions to be evaporated down to a solid film—it has been found especially desirable to use a solvent for the pyroxyline which would volatilise with considerable rapidity, and at the same time would not absorb water or moisture from the atmosphere to any appreciable extent. So far as hitherto known, no one solvent for pyroxyline combined both these properties of quick drying and non-affinity for water, and it has been customary to use a compound solvent therefor. By this is meant a solvent consisting of several distinct substances artificially united for the purpose of producing the kind of solvent required, and this compound solvent would consist—in part at least—of liquids having an affinity for water; as, for example, methyl alcohol and acetone. The compound solvent would also partly consist of non-hygroscopic liquids (not having an affinity for water), such as amyl acetate and benzine, the two classes of solvents being mingled in such proportions as would be necessary—in each case—to produce a solvent sufficiently non-hygroscopic for the use for which the pyroxyline compound was required.

Now, it has been discovered, and communicated to me by my foreign correspondent, that the substance commonly known to the trade as acetone oil, when purified as hereinafter mentioned, is not only a powerful solvent of pyroxyline, but dries with considerable rapidity: that it is practically non-hygroscopic, and can be used either alone or in combination with some miscible and cheaper liquid (such as benzine) as a solvent for pyroxyline in all pyroxyline compounds where heretofore it has been necessary to use compound solvents.

This acetone oil is composed mainly of what are known as volatile ketones, boiling below 140° C. These ketones may be obtained by the destructive distillation of metallic acetates. While a chemically pure and dry acetate should yield a pure acetone with simultaneous formation of the corresponding carbonates, the crude or commercial acetate will yield a distillate containing in addition to acetone and water these higher ketones along with certain acetates and other decomposition products.

The acetone and water having been eliminated by the usual processes of fractionation and absorption with dehydrating agents, there remains an oil, which my foreign correspondent informs me has valuable properties.

For some uses, however, it is not necessary to remove the acetone, for it is a solvent of pyroxyline, and, where a non-hygroscopic liquid is not required, it is not injurious to the compound, even if present in considerable proportions, while, if a practically non-hygroscopic solvent is desired, a small proportion of acetone is rendered innoxious by the presence of these non-hygroscopic higher boiling ketones.

When the acetone oil has been purified, as above stated, by removing the excess of acetone and water, the volatile ketones remaining are but slightly absorbent of water—that is, are practically non-hygroscopic—and are miscible in large proportions with petroleum and mineral naphthas, and many of the other liquids useful in pyroxyline solutions or compounds.

It is to be understood that I do not confine myself to any particular source for, or process of, obtaining this mixture. For example, the acetates of calcium, barium, strontium, lead, and probably others, when destructively distilled, all decompose with the formation of ketones as an invariable feature; and therefore I desire to avail myself of any of the acetates as a source of the said ketone oil mixture. In applying the invention I may employ these ketones alone, or with other miscible harmonious liquids in compounds of pyroxyline. Nor do I intend to confine myself strictly to the boiling point mentioned, but merely give the boiling point of 140° C. as one at which the most valuable of these products will have come over in fractionation.

Having thus outlined the invention, I will now proceed to specify some of the mixtures and uses to which the same may be applied. For pyroxyline compounds to be used as lacquers or varnishes where it is essential that the film or coating remaining after the solvent has evaporated should be adhesive, tough, hard, smooth, free from cloudiness, and especially where quick-drying qualities are essential, the following formulas have been found useful:—

15 gallons methyl alcohol or acetone.
50 gallons petroleum naphtha.
35 gallons volatile ketones or acetone oil.
25 pounds soluble pyroxyline;

Or for a solution required to be still more non-hygroscopic:—

50 gallons volatile ketones or acetone oil.
50 gallons petroleum naphtha.
25 pounds soluble pyroxyline.

It will be understood that the consistency of these solutions may be varied by using more or less pyroxyline, but the above will dry at ordinary temperatures, and will produce a varnish film having the desirable qualities above mentioned, and that other substances may be combined with the above to meet special requirements.

Claims:—1. The combination of acetone oil with pyroxyline, substantially as and for the purpose hereinbefore described. 2. The combination of purified acetone oil or higher ketones with pyroxyline to form a practically non-hygroscopic quick-drying solution, substantially as and for the purpose hereinbefore described. 3. The combination of acetone oil, or of higher ketones, with pyroxyline and miscible harmonious liquids, substantially as and for the purpose hereinbefore described. 4. The combination of acetone oil, or of higher ketones, with pyroxyline and miscible harmonious liquids, substantially as and in the proportions hereinbefore described and specified.

Improvements in and relating to Automatic Photographing Apparatus.

No. 3014. Hector Joseph Bonaventure Thiroux, Boulevard Henri IV., Paris, France.—*February* 16, 1893.

This invention relates to photographing apparatus intended, on the receipt of the desired coin, to automatically expose a sensitive plate, and thereafter develop and produce a permanent photograph thereon, and deliver the same to the purchaser.

In the improved apparatus, the necessary baths into which the plate is dipped after exposure are arranged in a straight line, and the plate is carried, while in each bath, by a pivoted carrier, operated by a rack movement on, or controlled by, a carriage moving along over said series of baths.

Each carrier, on lifting the plate from the respective bath, holds the same under a rose, while the carriage automatically opens a cock by which water is supplied from a reservoir to flow over the plate; the plate is then transferred to the next carrier and immersed in the next bath. When any person desires to be photographed, that person stands in front of the machine and draws out a handle, which carries back the carriage to its commencing position, lifting the cover from in front of the dark chamber, and so exposing a sensitive plate in the camera by a lever action operated by the carriage. On dropping the requisite coin into the slot, the lens is uncovered, and at the proper time again covered. The carriage, having been as aforesaid drawn back by hand, on release of the handle moves gradually forward under influence of a weight, and under control of a suitable speed governor, so that the exposed plate, dropping into the first carrier, is dipped in the first bath, and undergoes the successive operations necessary for producing a finished photograph by being transferred from carrier to carrier and bath to bath, as before mentioned, until the carriage arrives at the end of its course, when the speed governor and carrier operating racks are thrown out of gear, so as not to operate when the handle is again drawn out. In connexion with this apparatus I employ an electric incandescent light, of sufficient power for illumination of the person photographed just at the time of exposure, causing the mechanism to close and interrupt the circuit exactly at the correct moments, so that the electric supply may not be wasted. I also employ a small continuous electric light upon the machine sufficient to enable the instructions, &c., to be read.

A further improvement consists in an electric heating device to dry the photographic plates previous to delivery. This device is also intermittent, being supplied with current at the time only at which the plate to be dried is passing adjacent to it. It consists of a fabric of wire warp—for instance, copper, platinum, or other convenient metal—to be heated by passage of the current, and a weft of asbestos fibre.

Improvements in Photographic Cameras.

No. 5744. Walter Palmer, Westfield, Reading, Berks.—*February* 25, 1893.

My invention relates more especially to the photographic cameras known as "hand" cameras, and has for its object to reduce the size of the camera and to enable the focussing to be very rapidly effected.

According to my invention I employ a frame or part known as the front of the camera (to which is attached the lens and shutter of the camera), a central frame or part, and a frame or part known as the back of the camera (which is arranged for the holding of the negative picture). These frames or parts may be of any convenient shape. They are connected together from points within or without their sides by a system of lazy tongs, which may be applied to either two or more sides of the camera.

The lazy tongs start from one point of attachment on any one side of the back or front, crossing the central frame in one point within or without that side, and ending in one point on the corresponding part of the front or back.

The systems of lazy tongs are in planes either parallel or at right or other angles to each other, and the centres or points of attachment on which the parts work are fixed on the front central frame and back respectively, thus ensuring a rigid and parallel backward and forward movement of the front and back, the central frame being at the same time maintained at the proper distance between the front and back, no matter what may be the amount of expansion of the lazy tongs.

The movement of the lazy tongs also enables me to arrange a convenient focus indicator.

Within or without or both within and without the lazy tongs is a non-actinic casing or covering, capable of expanding or contracting with the movement of the front and back.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 4	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 4	Bolton Photo. Society	10, Rushton-street, Bolton.
,, 4	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 4	Exeter	City Chambers, Gandy-st., Exeter.
,, 4	Hackney	206, Mare-street, Hackney.
,, 4	Herefordshire	Mansion House, Hereford.
,, 4	Lewes	Fitzroy Library, High-st., Lewes.
,, 4	North London	Canonbury Tower, Islington, N.
,, 4	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 4	Paisley	9, Gauze-street, Paisley.
,, 4	Rotherham	5, Frederick-street, Rotherham.
,, 4	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 4	York	Victoria Hall, Goodramgate, York.
,, 5	Edinburgh Photo. Society	33, Castle-street, Edinburgh.
,, 5	Leytonstone	The Assembly Rooms, High-road.
,, 5	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 5	Southport	The Studio, 15, Cambridge-arcade.
,, 5	Southsea	3, King's-road, Southsea.
,, 5	Wallasey	Egremont Institute, Egremont.
,, 6	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 6	Camera Club	Charing Cross-road, W.C.
,, 6	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 6	Glasgow Photo. Association	Philoso. Soc. Rooms, 207, Bath-st.
,, 6	Glossop Dale	
,, 6	Hull	71, Prospect-street, Hull.
,, 6	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 6	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 6	Oldham	The Lyceum, Union-street, Oldham.
,, 6	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
,, 7	Cardiff	
,, 7	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 7	Holborn	
,, 7	Leamington	Trinity Church Room, Morton-st.
,, 7	Maidstone	"The Palace," Maidstone.
,, 8	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

March 23,—Mr. A. Haddon in the chair.

Angle of View.

Mr. Haddon (having temporarily vacated the chair for the purpose) said that Mr. Everitt stated that some years back the late J. H. Dallmeyer, in a pamphlet, had given exactly the same rule for calculating the angle of view included on a plate as he (Mr. Haddon) had done in his Almanac article. He (Mr. Haddon) would like to say that he was ignorant of that fact. Criticising Mr. Everitt's remark that artists sometimes placed the point of sight outside the picture itself, and the same gentleman's rule for finding the angle included by measuring the distance from the point of sight to the furthest point of the plate, Mr. Haddon asked, "If the rule were carried to an extreme, and applied to only a small part of the picture, would it be right to say that, in the latter case, the angle included was as great as in that of the former?"

Mr. P. Everitt, in quoting Mr. Haddon's rule, said its mistake was in taking the long side of the plate instead of the diagonal, and quoted Professor W. K Burton and Dr. Eder as supporting his (Mr. Everitt's) views.

It was understood that the subject would be further discussed at a future meeting.

The Association's Technical Lectures.—II. Cameras, Dark Slides, and Tripods.

Mr. Edgar Clifton delivered the second of the series of technical lectures already announced. In it he showed the development of cameras in use at the present time, describing the simple form of box camera used by Niépce in 1818; the collapsible camera; the telescopic camera of metal, suggested by Grubb, and which Mr. Clifton was of opinion might be serviceable for large sizes now. The first bellows-body cameras were made on the concertina principle. Having shown that the Kinnear camera, introduced in 1853, had been perpetuated in the conical-bellows cameras now in present use, Mr. Clifton exhibited a modern camera of that form, also one of square form, and dilated upon their respective advantages and disadvantages from a practical point of view. Latimer Clark's stereoscopic camera was shown and described, and the lecture concluded with an examination of dark slides, ancient and modern, as well as the various types of tripods.

A discussion followed, the lecturer being thanked.

The lectures, with the discussions upon them, will be ultimately published in book form, hence the brevity of our report.

Affiliation of Photographic Societies.—Meeting of Delegates, March 24, Mr. Edgar Clifton (Photographic Club) in the chair.—The Secretary announced that, since the last meeting of delegates, seventeen more societies had been admitted, bringing the total to forty-six in all. The sub-committee which had carried out the technical lectures on photogravure presented their report, in which they expressed an opinion that their success yields great encouragement towards undertaking something on similar lines in the future, and that they were very greatly indebted to Mr. Herbert Denison, and to Mr. Horace Wilmer, for their assistance. On the proposal of Mr. F. A. Bridge (Photographic Club), seconded by Mr. Beckett (Hackney Photographic Society), the report was adopted. The Chairman said that, owing to the lamented death of Mr. William Bedford, it would be necessary to appoint a fresh chairman, and on the proposal of Mr. P. Everitt (London and Provincial Photographic Association), seconded by Mr. A. Mackie (Photographic Society of Great Britain), Mr. Andrew Pringle was unanimously appointed. Mr. Everitt remarked that, up to the present, they had not received a balance-sheet, and he was of opinion that a regular date should be fixed upon which the annual balance-sheet should be presented, and he would propose that the Treasurer be requested to furnish a balance-sheet to date, and that such balance-sheet be presented at the next meeting of delegates. After some discussion it was seconded by Mr. Mackie and carried. The appointment of an independent Treasurer was raised, but at the suggestion of Mr. Bridge this was deferred until the balance-sheet should be in the hands of the delegates. The question of the organization of the Technical Albums was raised, and the Secretary was instructed to communicate again with the Secretaries of the Societies in the matter. A lengthy discussion ensued on the advisability of the Affiliation inviting a conference of Judges to consider exhibition rules, and it was finally decided that this should be done, and a sub-committee was appointed to arrange preliminaries, the sub-committee to consist of Mr. Beckett and Mr. Mackie, together with the Chairman, Mr. Andrew Pringle, with power to add to their number.

City and Guilds of London Institute.—March 22.—A paper was read by Mr. Staynes on *Pinhole Photography*. A special prize is being offered by Mr. Staynes for this class of work at the forthcoming competition of the Society.

North London Photographic Society.—March 21, Mr. Oakley in the chair.—A Special Lantern entertainment was given in the reading-room at Canonbury Tower, when there was a large attendance of the members of the Canonbury Constitutional Club as visitors. About 300 slides were shown, which, with few exceptions, were of excellent quality. A selection from the Leeds set was also shown, and some slides kindly lent by Messrs. H. M. Hastings and Guardia were much admired. The next meeting will be on April 11 instead of Easter Tuesday.

Harringay Photographic Society.—March 24.—A Lantern Lecture, entitled *The Thames from Source to Sea*, was given by the President of the Society (Mr. Dudley Towers), and a collection was taken for the liquidation of the debt on Emmanuel Church.

Hackney Photographic Society.—March 21, 1893, Mr. R. Beckett presiding.—Question: "Can any member give his experience of the Zoka hand camera?" Reply: "Good, as a low-priced camera." Question: "What lens is best for landscape work?" Reply: "Rapid rectilinear, or single landscape, if it will work at *f*-11." Mr. R. Beckett recommended having a lens that will cover a size larger than the plate, so that it will cover when the lens is raised. Mr. S. Herbert Fry then gave his demonstration of the Sandell plate. A question was asked, "If any special precautions were to be taken, such as against the light," &c. Reply: "No." A print was handed round—the subject showed the bright sun in one corner, boy on bicycle, rails against the sky in the background; there was no halation.

Putney Photographic Society.—The Members' Annual Lantern Slide Competition was held at the Society's rooms, Charlwood-road, on Monday, the 20th inst., Dr. W. J. Sheppard in the chair. Mr. A. Horsley Hinton officiated as Judge. There were two classes, viz., (*a*) Landscape and Seascape and (*b*) Figure Studies, Street Scenes, Portraiture, &c. The Society's bronze medal was given as first and a certificate as second prize in each class. The slides, in sets of six, having been passed through the lantern by Mr. Ovey, Mr. Horsley Hinton awarded the prizes as follows:—Class A, first prize, Mr. H. Faulkner; second, Mr. A. E. Smith. Class B, first prize, Mr. W. F. Gorin; second, Mr. W. Martin, jun. Having the power under the rules to award a silver instead of a bronze medal to the best set should it merit that distinction, Mr. Horsley Hinton stated that he had no hesitation in giving the silver medal to Mr. Faulkner for his excellent set of landscapes.

Richmond Camera Club.—March 20, Mr. G. W. Ramsay in the chair.—Mr. J. R. Gotz gave an able and interesting demonstration of the treatment of the different varieties of gelatino-chloride, and colloido-chloride papers of the well-known Obernetter make. Having shortly traced the history of chloride papers from their first introduction by the late Mr. Obernetter in 1867, Mr. Gotz described the different makes of Obernetter paper now in use, and showed finished prints upon each of them. He then proceeded to tone a number of prints in different toning baths, such as "aurol" (consisting of gold, sulphocyanide of ammonium, and chloride of strontium), the phosphate of gold bath, "Platinol," and others. Very beautiful results were obtained, especially with the matt-surfaced paper toned with aurol. He then developed some lightly printed pictures on colloido-chloride paper, our old friend pyro being the agent, and toned and fixed some in a combined, and others in separate, baths. Printed-out transparencies on glass and celluloid, and opals were also shown, the same emulsion being used as for the papers; and specimens were toned with gold and platinum. Mr. Gotz also showed and explained his changing box for cut films, an admirably designed piece of apparatus capable of holding three dozen films.

South London Photographic Society.—March 20, the President (Mr. F. W. Edwards) in the chair.—A considerable number of prints for the "Winter Work" Competition were handed in for adjudication. Mr. Bainbridge Lyon was declared to have secured the first place with his picture entitled *Roydon*. Mr. W. E. Harman's two farmyard studies, and Mr. E. J. Lester's snow-covered trees came next in merit in the order mentioned. The judging was done by the President, assisted by Mr. H. G. Banks and the Secretary. Mr. Ransom exhibited a hand camera called "The Queen," the invention of a South London resident, Miss Nellie Crouch.

Brixton and Clapham Camera Club.—March 21, Annual General Meeting, Dr. J. Reynolds, F.R.G.S. (President) in the chair.—The statement of accounts showed that for the year's working the income slightly exceeded the expenditure, notwithstanding the fact that considerable additions had been made to the apparatus and general stock. The new officers are as follows:—*President:* Dr. J. Reynolds, F.R.G.S.—*Vice-Presidents:* Messrs. J. W. Coade, F. Goldby, and W. H. Harrison.—*Committee:* Messrs. Bartrop, Butler, Dockree, Edwards, Kent, and Levett.—*Hon. Treasurer and Curator:* Mr. R. G. F. Kidson, 37, Villa-road, Brixton, S.W.—*Hon. Secretary:* Mr. B. E. Pinder, 7, Macdowall-road, Camberwell, S.E.

Tooting Camera Club.—March 22, Annual General Meeting, the President in the chair.—The Hon. Secretary read his report, and submitted Treasurer's balance-sheet for the past year, showing a balance in hand of 3*l*. The following officers were unanimously re-elected: *President:* Mr. A. H. Anderson.—*Vice-President:* Mr. J. H. Beckett.—*Committee:* Messrs. H. Berger, G. H. Dollery, W. Irwin, and R. Simmons.—*Hon. Treasurer:* Mr. C. D'E. Stowell.—*Hon. Secretary:* Mr. J. F. Child.

Croydon Camera Club.—March 22, the President (Mr. H. Maclean, F.G.S.) in the chair.—A large number of members' slides were passed through the lantern for selection to show at the Exhibition which opens on April 5. So numerous were the slides that, after nearly three hours, the further completion of the task was adjourned to March 29. The slides submitted were limited to such as would illustrate the following subjects:—"A Trip on the Continent," "In and About Croydon," "Holidays by the Sea," and "Rural Surrey," which will be respectively the titles of the sets shown by the members on the four evenings of the Exhibition, in addition to those of Messrs. Gale, Wilkinson, Brownrigg, and Hodges. Messrs. Ryan and Hereford were elected members.

Ashton-under-Lyne Photographic Society.—March 20.—Mr. L. E. Morgan, of Messrs. Fuerst Brothers, London, gave a demonstration of *Amidol Developer*. Mr. Morgan said that amidol was a new developer of one solution, and was very useful for the tourist. He also showed its working by developing a half-plate negative, a bromide print, and also a lantern slide exposed in the room. One of the members brought a quarter-plate negative he had exposed during the day, which Mr. Morgan developed very successfully.

March 23.—Mr. J. T. Lees gave a lecture on *Photographic Optics*. He explained the different forms of lenses by means of a large number of diagrams, also the use of the stop, and why and when it ought to be used. His lecture was very instructive, and of great benefit to the members present.

Glasgow Photographic Association.—March 23, Mr. William Lang, jun., F.C.S., President, in the chair.—The lecturer was Mr. J. Buchanan, who gave a very interesting and graphic account of his personal experiences of Chili and Chilian civil war. Gold mining and prospecting in the Andes were fully described, as was also the nitrate industry. The lecture was illustrated with a large series of slides from photographs taken by the lecturer, some showing the bombardment of the towns by the fleet; others, gold mining and nitrate operations on the Andes, at a height of 10,000 feet above sea level. At the close, Mr. Buchanan was awarded a vote of thanks.

Photographic Society of Japan.—February 3.—Dallmeyer's new "telephotographic" lens was shown and explained by Mr. W. K. Burton. The lens consisted of a Dallmeyer patent portrait lens, with a back attachment in the form of a diverging lens of short focus. The lens gives an image many times larger than can be got by an ordinary lens, with the same extension of the camera; moreover, by making certain adjustments, the focal length of the combination can be changed at will, so that, within very wide limits, any size of image that was desired could be obtained. For example, a photograph of Ueno, from Kaga Yashiki, had been taken on a 12×10 plate, with a single rapid rectilinear lens of sixteen-inch focus, and a photograph had been made with the new "tele" lens, adjusted so as to have the same back focus. The photograph taken with the rapid symmetrical lens showed half of the race-course with the hill behind; but the whole of the grand stand could not find room on the plate with the "tele" lens. Mr. Burton had been successful from his very first experiment, but had to admit that he had found some difficulty in making the adjustment for correcting spherical aberration when the focus of the lens was changed. This difficulty he had no doubt, however, he could overcome. It was necessary to ensure absolute steadiness of the camera, as the slightest motion resulted in lack of definition. The lens shown was mounted

n aluminium, and was ext ordinarily light. Negatives taken on the 'Sandell" plate were shown, an l an explanation of the plates was given. The plate was coated with several films of the emulsion, one over the other. Next the glass was a film of very slow emulsion ; on the surface, one of the highest sensitiveness. It seemed impossible to get halation with this plate. The explanation of this lay in the fact that a very slow emulsion transmits red light only, so that no actinic light can reach the back of the glass to be reflected therefrom. Further than this, if under-exposure were avoided, it was not of much consequence how long an exposure was given. If the upper film were ever so much over-exposed—even solarised—it was only necessary to continue development till an image was developed in the film below. The fog of the upper, over-exposed film could be removed by a reducer.

FORTHCOMING EXHIBITIONS.

April 5-8 ..... *Croydon Camera Club, Braithwaite Hall, Wellesley-road, Croydon. Hon. Secretary, G. R. White, 55, Albert-road, Croydon.

,, 10-29 ..... *Crystal Palace. The Executive, Crystal Palace, S.E.

,, 12-15 ..... *Bolton Photographic Society. Hon. Secretary, J. E. Austwick, 10, Rushton-street, Bolton.

,, 17-29 ..... *Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.

May 4-6 ..... *Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Correspondence.

RAPID SOLUTION MAKING.

To the EDITOR.

SIR,—In response to the challenge of "Atticus," I herewith send you the required list in a sealed envelope, merely premising, firstly, that, before opening and publishing it, you satisfy yourself that the money will be forthcoming if the adjudication be against that correspondent; and, secondly, that "Atticus" consents to your adjudication being final.

With regard to such other part of his letter not thus touched upon, I can only say his quotations are mainly incorrect or garbled, and his statements mainly incorrect. The original article referred to, and the letter of "Atticus," are all published, and any one sufficiently interested to refer to them can see that. I am stating pure facts. "Atticus" refers to "gentlemanly and just criticism." I think the space of the JOURNAL would be less wasted if he confined his remarks to subjects he was familiar with.

As to Messrs. Martin, I at once accept their disclaimer as intending a covert sneer, but I must say that I think any ordinary reader would see it as I did; but, if the paragraph quoted from their first letter on the subject had used the words of this last, "photographers uninstructed in chemical manipulations," no objection would have been raised.

I regret that Messrs. Martin still persist in accusing me of making a false claim in the same breath that disclaims any such act. They say, quoting me, "What is this but a claim to having invented an article on sale at Doulton's?" I reply I made no such claim, for, if I did, it would be false; the words I use bear no such interpretation.

I do not think it is worth more discussion, and I can sincerely say I hope to be able to have a friendly hand-shake with Mr. Martin at the Plymouth Convention.—I am, yours, &c., G. WATMOUGH WEBSTER.

March 27, 1893.

[The sealed envelope referred to by Mr. Webster is in our possession, and we shall be glad to hear from "Atticus" as to his willingness to accept our adjudication as final.—ED.]

MASKING NEGATIVES.

To the EDITOR.

SIR,—I see in your article in THE BRITISH JOURNAL OF PHOTOGRAPHY of to-day's date on "Composition Printing" the plan of painting over the part to be masked with gamboge or some other non-actinic colour is attributed to Mr. Edge. I may say the device was my own, introduced at the time I was manager for Mr. Edge, and which I have found a plan of great value many times since, and for many other purposes than that of adding natural backgrounds to portraits.—I am, yours, &c.,

27, *Glenthorn-road, W., March* 24, 1893. EDWARD DUNMORE.

INTENSIFICATION.

To the EDITOR.

SIR,—Mr. T. N. Armstrong always writes with such a completeness of knowledge, and out of such a fulness of experience, that whatever he propounds is of interest, and whenever he recommends a departure from the ordinary, one is ready to believe that he has found some good reason for such departure. May I therefore, as one who has used the cyanide of silver process of intensification for, say, some years, ask whether the formula given by him has any advantages over the ordinary formula as originally given by Dr. Monckhoven, and known by his name? The formula is simplicity itself, being just.

No. 1.

Bichloride of mercury ..... 10 grains.
Bromide of potassium ..... 10 ,,
To each ounce of water.

No. 2.

Nitrate of silver ..... 10 grains.
Cyanide of potassium ..... 10 ,,
To each ounce of water.

which at least is easier to recollect than Mr. Armstrong's arrangement.

Further, I would ask intending users to pause before they throw away their used solutions. They are not the cheapest solutions that photographers use, and I, for one, have never found the least detriment to result from using them over and over again *ad libitum*, and almost *ad infinitum*. If my experience has been unusual, I should be glad of correction by others who have also fairly used the process.—I am, yours, &c., W. BISHOP.

25th March, 1893.

ANOTHER "HARD CASE."

To the EDITOR.

SIR,—Could you inform me when the Photographers' Assistants' Union is going to think about business? Although long talked of, nothing seems to move, and I think, as every other assistant I meet thinks, it is high time we had some Union, considering the way employers are imposing on us. I have a wife and four children to keep, and the highest wages I can now obtain is 25*s.* per week (which is next door to starvation), although I have been an operator these last fifteen years. I have just been compelled to give up a situation at above wages because, not being able to afford to ride, I had to walk sixteen miles per day, and work from 9 a.m. till 7 p.m. with nothing inside me but a few slices of bread and butter every day. Myself, wife, and children are in nothing but rags, and we have to all live in one room. I cannot put it down to depression of trade (although I know trade is bad enough), for the last man I worked for, whose takings averaged about 40*l.* per week, only paid me 25*s.* per week to do about three people's work, but thought nothing of squandering away 6*l.* to 7*l.* per week in cigars, cabs, and champagne nearly every week. A friendly hint in your paper would do much towards some sort of Union amongst assistants, and would secure you our most hearty thanks.—I am, yours, &c., SWEATED.

March 27, 1893.

REDUCING ACTION OF HYPO ON AMIDOL-DEVELOPED PRINTS.

To the Editor.

SIR,—I had a curious experience a few days ago which I have not seen previously mentioned, *i.e.*, the reducing power of a hypo bath in which bromide prints developed with amidol have been fixed.

I developed four bromide prints with amidol and fixed them in a freshly made hypo bath. On the following day I developed another print with amidol, and as I had not time to mix a fresh fixing bath I used the one of the day before. I left the print in the bath rather longer than usual (about half an hour) and was astonished to find that the image had almost entirely disappeared. I tried another print afterwards as an experiment, and the same reduction took place. The bath was certainly not fit to have used a second time, being discoloured through insufficient washing of one of the prints fixed the previous day, which had probably carried a good deal of the amidol developer into it. I should like to know if this reducing action has already been noticed.—I am, yours, &c.,

18, *Hough-green, Chester, March* 27, 1893. J. N. HIONETT.

MIXED DEVELOPERS.

To the EDITOR.

SIR,—In reference to your remarks on the above, I may mention that I find metol a very useful addition to pyro developer in certain cases. If the detail hangs back after the full quantity of soda is added, I find a small quantity of a two-grain solution of metol is wonderfully active in bringing it out.—I am, yours, &c., CLIFFORD E. F. NASH.

Cheltenham, March 27, 1893.

A PAIR OF COMPLAINTS.

To the EDITOR

SIR,—From an advertisement in your paper I forwarded on approval a camera and three slides to a photographer in a small town on the borders of Wales. The camera and slides were quite new, and I sent them on

just as they came from the makers in a wooden box by parcel post. After a good deal of delay and writing several times, I hear from the photographer that the camera is in a "swollen" condition (note it was perfect and just as it left the maker's), and that he would not pay return postage; so I sent stamps for it to be returned. Not contented with this, he actually keeps the wooden box camera was sent in, and returns it and the slides simply wrapped up in paper without any protection, and the consequence is it arrives in a damaged condition, and will cost probably 10*s.* to 20*s.* to repair. Truly a mean act, and a specimen of what the borders of "gallant little Wales" can do.

I should also like to say a word as to my experience of how some of the "cash with order" firms treat their customers. Say a varied order amounting to 2*l.* or 3*l.* is given and cash sent. From this will be deducted 3*s.* to 5*s.* for box and packing, when the box often consists of a frail piece of cardboard, or at best an old grocer's box, probable value 3*d.*; and goods accordingly are kept back, thus adding ten to fifteen per cent. to the price of the articles. Often, again, goods ordered are not in stock, and you are kept weeks and sometimes months waiting without any compensation; and should you mildly suggest that having paid the money you expect the goods in a reasonable time, you are told it would be simply impossible to keep everything catalogued in stock, &c., &c. Should firms insist upon "cash with order," they should be in a position to supply the same or refund money by return.—I am, yours, &c.,

Finnart House, Ballantrae, Ayrshire, March 25, 1893. JOHN POWER.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2, *York-street, Covent Garden, London.*

H. PICKERING.—Received; thanks. We had already arranged to be represented.

C. GARDNER.—The collotype process is not patented. The patent for the Woodburytype process has expired.

J. C. W.—If you have not registered the copyright, there is no redress. Treatment such as you detail is by no means unusual by the illustrated papers.

A. WHITE.—Send a sketch or rough plan of the proposed studio and the surrounding buildings. On the other matter, refer to the local regulations as to buildings.

S. W.—A lens with an an aperture of *f*-6 will do admirably for a hand camera, but we doubt whether any lens of this aperture, of four-inch focus, will cover with fine definition to the edge of a quarter-plate.

H. THORNE.—Quite true. It is illegal to copy a bank note by photography or any other means, even if the size be different from that of the original. Probably, if the size was an inch or so less, no notice would be taken; still the illegality is the same.

W. WILLOUGHBY.—Burton's work on *Photo-mechanical Printing*, published by Messrs. Marion, Soho-square, deals fully with collotype. Numerous articles on the subject have also from time to time appeared in this JOURNAL, which should be of assistance to you.

SODA.—1. See reply to H. Mace. 2. In the same way as albumen prints are burnished if they are made perfectly dry. 3. Not if you can get practical lessons from a competent teacher. 4. It depends upon the result required. The majority of sitters are not satisfied with prints from negatives that have not been retouched.

H. MACE.—Without knowing the form of the studio, it is difficult to advise as to the area of glass that should be employed; but, if it be of the usual ridge roof form of the dimensions stated, then the glass, starting, say, four feet six inches from the background end, may extend for ten or eleven feet at the side and top. If you send us a sketch of the studio, we shall be able to advise you more definitely.

STUDIOS.—Several correspondents have written of late, asking advice as to glazing studios—the amount of glass, its position, &c. If these communications had been accompanied by a rough sketch of the structure, and its aspect, we should have been enabled to advise more definitely. The amount of glass in a studio should be dependent upon its size, its aspect, and the purpose for which it is required.

T. BIGGS.—We cannot advise you authoritatively. The case had better be submitted to a respectable patent agent. This much, however, we can tell you, if you have made, and publicly used, or sold the apparatus prior to the date of the patent, and can prove that you have done so, you can go on making it without let or hindrance. If the patentee, under these conditions, takes proceedings, he is sure to be defeated.

A. MCCANN.—Mildew stains can be removed from engravings by "cleaning or restoring" them. The usual method is to treat the engraving with a solution of hypochlorite of lime, to which an acid, such as oxalic, has been added, and then well wash with water to remove the bleaching agent. If the engravings are valuable ones, this kind of work had better be intrusted to experienced hands, or good prints may be ruined.

PERCIVAL & CO.—The so-called "gold bronze" on the tissues does not seem to us to contain any gold at all; at any rate, it all disappeared when touched by nitric acid. As gold is quite unaffected by this acid, you may draw your own conclusions. We do not think, however, it will prove injurious to the photograph, more especially as the ink upon which the bronze is dusted and the paper intervene between the bronze and the picture.

E. G.—If the prints turn yellow in the fixing bath, it shows that the solution is out of order. "Two ounces of hypo to the sheet" is no criterion as to the strength of the solution used. That should be four ounces of hyposulphite of soda to the pint of water, and should be made fresh for each batch of prints If this strength be employed, and the hypo is good, there should be no yellowness in the prints, provided the time of immersion is sufficient.

C. WADE.—From what you say of the camera, we think it wants thoroughly scraping and re-French polishing. If you are not up to this work, and do not have it done for you, we should say the best thing would be to obtain one or other of the commercial furniture polishes, and use it according to the directions supplied with it, taking care, first of all, that all dirt is carefully removed with soap and water. If this be not done, the dirt will show more prominently than it did before.

RECEIVED.—W. Coles, and others.

FALLOWFIELD'S "REMEMBRANCER."—The last issue of Mr. Fallowfield's list has been received. It contains particulars of a wide range of bargains and novelties.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—Fixtures: April 3, Excursion to Ely Cathedral, starting from Liverpool-street Station at a quarter to nine. 5, Annual Meeting. 17, Lantern Evening, *North Wales*, Mr. John A. Hodges.

PHOTOGRAPHIC CLUB.—April 5, *The "Sandell" Plate*, and adjourned discussion on *Toning and Fixing Baths for Gelatino-chloride Paper*. 12, Members' Open Night.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—April 6, a Paper by Mr. G. F. Williams on *Determination of the Speed of Plates*. 13, Paper by Mr. W. D. Welford, *The Influence of the Hand Camera*. Visitors are welcomed.

FORFARSHIRE INTERNATIONAL PHOTOGRAPHIC EXHIBITION.—The Committee of this Exhibition ask us to say that the 3rd of April is the last day for receiving entry forms from intending exhibitors, and exhibitors requiring forms must apply at once.

NATIONAL PHOTOGRAPHIC EXHIBITION.—Owing to the Easter holidays intervening, it has been decided to extend the time for receiving entry forms to Wednesday, April 5, 1893, and it is hoped that exhibits may be delivered at the Crystal Palace not later than that date.

KODAK CONCERT.—The Kodak Dramatic and Musical Club gave an entertainment to their fellow workers and friends in the "Mona Hotel" on Thursday, last week. The room was crowded, and the programme very attractive. Much credit devolved alike upon those who managed and those who took part in the proceedings.

WE understand that Mr. W. J. Belton, the well-known photographer of 26, St. Paul's-crescent, Camden-square, has been appointed by the Paget Prize Plate Company to demonstrate their printing-out opals and lantern slides before the photographic societies. Secretaries desirous of arranging a demonstration should apply to the Paget Prize Plate Company, Watford, N.W.

DR. ANDRESEN'S PHOTOGRAPHIC DEVELOPERS AND CHEMICALS.—We are informed that Messrs. Sharp & Hitchmough (of Liverpool), Messrs. James Woolley, Sons, & Co. (of Manchester), and Messrs. Mawson & Swan (of Newcastle-on-Tyne), have been appointed wholesale agents for Dr. Andresen's preparations in those towns and their surrounding districts respectively.

THE "SHASIN SOWA."—We have received a set of the *Shasin Sowa*, a monthly journal that has been running for over a year. Anglicised, the *Shashin Showa* is "Photographic Chat," and it is published (at Tokyo) in Japanese. Mr. W. K. Burton is an occasional contributor, and his articles are (fortunately) printed in English, otherwise it would have been difficult for us to decide as to the precise character of our young contemporary.

PHOTOGRAPHIC COMPETITION AT THE WELSH NATIONAL EISTEDDFOD.—At this Eisteddfod, which takes place at Pontypridd in August next, the following photographic competition will take place:—For set of not less than six or more than twelve photographs, illustrating the coal industry from the cutting to the shipment; prize 5*l.* For set of not less than six photographs illustrating the industries of Wales; prize 5*l.* For set of six instantaneous photographs of a football match, illustrating various phases of the game; prize 2*l.* For landscape photograph; prize 1*l.* For architectural photograph; prize 1*l.* Adjudicators:—Messrs. T. Forrest, B. Thomas, and Lawrence. Photographs to be sent to the General Secretary, National Eisteddfod of Wales, Pontypridd.

*** *Several answers to correspondents are unavoidably held over till next week.*

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1718. Vol. XL.—APRIL 7, 1893.

COMBINING ENLARGEMENTS FROM DIFFERENT NEGATIVES.

If an enlargement from two or more negatives were required to be made on bromide paper, so as to form one picture, there are many who would not know how to proceed in order to obtain a successful result. We have, indeed, known professional enlargers to decline to undertake this class of work. Yet, the matter is easy enough, provided the system of protecting the first exposed image with a non-actinic pigment, while the second is being impressed as described a fortnight ago, in connexion with combination printing, be adapted to the circumstances. Of course, as the image after the first exposure has been made is not visible to the eye, the procedure has to be somewhat modified. By way of illustration of the method, let us take two negatives similar to those cited in the article referred to, namely, a group of several persons, and it is desired to introduce a figure or two that is in one negative into an enlargement from the other. The latter being the principal subject, we will term this the first, and the other the second negative.

In the first instance, make a print from each of the negatives, and cut out such portions of that from the second one as are to appear in the enlargement, and stick them in position on the print from the other. This picture is to serve as a guide for arrangement in making the enlargement. Then stop out with black varnish all portions of the second negative, except those utilised in the guide print. In place of stopping out with black varnish, a paper mask cut out from a print may be fixed on the negative; but, by whichever plan the blocking out is done, it must be complete, as any light that would pass through it would destroy brilliancy. Now take the two negatives together with the guide print into the enlarging room, and put the masked negative into the enlarging camera or lantern. Project the image on to a piece of white paper, fixed on the easel, of the same size as the enlarged picture is to be, and arrange it in the position it is to occupy in the finished picture, as guided by the small print, and focus. Cap the lens, and substitute a piece of bromide paper for that focussed upon, then make the exposure, giving such time as this negative may require. It will be obvious that, if the paper were developed at once, the figure would be obtained on a perfectly plain white ground.

It is now necessary to protect this already impressed image while the exposure to the primary negative is being made. Cover the lens with a piece of orange glass; that will allow of the optical image still being seen, while the light will have no action whatever on the paper. Now, without disturbing anything, neatly paint over the image with a non-actinic pigment. With prints on albumen paper, almost any water colour can be employed; not so, however, with gelatine paper, owing to the coating being more absorbent of water, so that a permanent stain of the pigment might be produced. The best pigment to use is powdered gamboge—to be obtained from all druggists—mixed with alcohol, as then the gelatinous coating of the paper is not moistened with water at all, and the risk of staining from the colour is thereby avoided. As, however, the gamboge is difficult to see in the feeble orange light, it is advisable to mix some other pigment with it so as to make the brushwork more easily distinguishable. A little finely powdered ivory black answers admirably, and the resinous character of the gamboge serves as a sufficient adhesive to fix it temporarily to the paper. The pigment will dry in a few minutes, though it is not at all necessary to wait for that.

When the first exposure has been properly protected, the negative is removed, the paper being left undisturbed; the other, the principal, negative is now put into the enlarging apparatus, the yellow glass still being kept on the lens, and adjusted so that the enlarged image from it will occupy its right position as regards that already impressed on the sensitive paper. The small print must here be brought into requisition as a guide once more. It is at this stage of the work that the advantage of strengthening the colouring power of the gamboge in the yellow light, with the little black, will be most appreciated. After the right position of the principal negative is obtained the image is focussed, the yellow glass still being retained on the lens. When all is ready, the second exposure is made, of course, in accordance with the density of this negative, and quite regardless of what the previous one may have required.

The doubly exposed paper is now taken to the dark room, and the pigment removed with a soft sponge or pledget of cotton wool moistened with spirit. It is then ready for developing and fixing in the ordinary way. There is, however, a little precaution to be taken. The spirit, when the pigment is applied, has a slightly hardening action on the coating of some gelatine papers, so that they become rather less readily absorbent of water. Therefore, it is a good plan to allow the paper to soak for a rather longer time than usual in the water before the developing solution is applied. This prevents any unequal action of the developer on the two exposures.

In the foregoing it has been assumed that the proportions of the images in the two originals are identical, but it often happens that they are widely different. Hence they have to be brought into unison by the greater or less amplification of the one than the other. This often necessitates the paper being removed from the easel and replaced between the two

exposures. Therefore an accurate system of registration is imperative. Want of space necessitates this portion of the subject being deferred till some future occasion.

WASHING THICKLY COATED FILMS.

The tendency during recent years in the preparation of gelatino-bromide plates has been in the direction of thicker films than were in vogue in the earlier days, that is to say, films of greater robustness, both in the matter of silver and of gelatine. Films composed of a more than ordinarily thick layer of gelatine, containing a comparatively small proportion of silver—making up in thickness, in fact, what they lacked in richness—had been tried, as had also the reverse conditions, a maximum of silver salts in conjunction with a minimum of gelatine; but, while the former were usually found to be slow in action and deficient in range of gradation, the latter were wanting in delicacy, and too often wanting in keeping quality.

Perhaps, however, the greatest difference to be found between the two classes of plates was in their physical character, more especially in their behaviour under the action of developing, fixing, and washing. With the earlier workers in gelatine plates the great difficulty experienced was in conjunction with the length of time occupied, as compared with collodion, in development, and, subsequently, in fixing and washing. It was soon found that this difficulty increased in proportion to the comparative richness of the emulsion in gelatine, and that, if the same quantity of silver bromide were spread upon the plate with less gelatine, the result was an image of equal or greater vigour, and capable of passing through the various operations in a far shorter time. The difference, in fact, in the behaviour of different makes and batches of the earlier plates was very puzzling, if not misleading, and slowness of development was frequently set down erroneously to want of exposure, and *vice versâ*.

For many years past, the necessity has been recognised of a fairly robust film of gelatine, if the plate is to possess the intrinsic qualities now considered desirable, and also the capability of withstanding ordinary wear and tear both before and after exposure and development. But still more recently several of the leading makers have put on the market special plates, bearing films of more than ordinary richness both in silver and in gelatine, and the present season sees the introduction of two, and even three, films, coated one on top of the other. The advantages claimed for such special films are sufficiently obvious, and need not be discussed here, our object being rather to consider what have been put forward as their disadvantages, or as objections to their use.

These objections—if they can be so called—centre, as we have suggested, in the length of time the various solutions take in acting upon the thick layer of gelatine. It stands to reason that, if a careless operator, accustomed to the use of thin films, or those weak in gelatine, gets hold of one of the thicker ones, and tries to treat it in the same way, failure will be the inevitable result; but he can scarcely blame any one but himself, as the instructions issued with such plates invariably draw attention to the necessity for increased care, especially in the matter of washing. But, on the other hand, the most careful worker may find the extra time occupied in fixing and washing too great a tax upon him for ordinary work, in which case the remedy is, we think, very simple, namely, to reserve the specially coated plates for the particular purpose for which they are intended, and for all ordinary work to use ordinary films. In thus acting, he will be only following the dictates of common sense; for, clearly, it must be an unnecessary outlay, both in money and time, to employ say, a triple-coated film—necessarily an expensive article—where a single one would answer every purpose as well or better. Let special films, in fact, be reserved for their special work.

Where, however, abnormally thick gelatine films are employed, it will be as well always to bear the fact in mind and to act accordingly. In the first place we have to deal with the development, which, like the various other operations, takes place more slowly than with a comparatively thinner film. Except, however, in the matter of a slightly increased difficulty in judging density, no trouble will be experienced here. There are possibly still some operators who adhere to the old-fashioned plan of soaking the film in water before applying the developer, but a very short experience with the thickly coated films will suffice to cause them to relinquish that system for reasons already sufficiently obvious.

The first portion of the manipulations in which unsuspected trouble may lurk is the washing after development and before fixing. In the ordinary course of work perhaps too little care is generally given at this stage, though with plates of normal character the result is not very serious. The necessity for washing at this stage arises from two causes: to stop development, and, which may appear to amount to the same thing, though it really does not, to remove the developing solution from the pores of the gelatine. The first result is arrived at, for all practical purposes, by rinsing the solution from the surface, after which very little further action will occur; but the application of a very weak solution of bromide will effectually arrest all further action. But if the plate—we are speaking now of one of the thick films—after but a brief rinse, be passed into the fixing bath, with its pores still impregnated with developer, another action altogether is set up. The hypo commences to dissolve the silver bromide, with the result that there are present side by side on the film, not only a soluble salt of silver, but also a reducing agent in the form of the unremoved developer, and until that developer is exhausted it will go on reducing the dissolved silver, and so cause fog or veil.

This is no imaginary picture, but actually what does occur, as may be proved in five minutes by actual trial. Where ordinary care—the ordinary care bestowed upon a normal plate—is given to one of the double-coated and no more, the result as regards veil is not great, but it is sufficient to take away from the negative that sparkle and purity of colour that belongs to a perfect image. The result does not take the form of a stain that may be removed by means of the alum bath, but consists of reduced silver of precisely the same nature as the image, and can only be removed by similar means—in other words, by reducing solutions.

Very many operators are in the habit of examining their negatives by daylight before fixing, a practice which has been over and over again condemned, but still prevails. With the thick films of to-day there is more than ever reason why the negative should be completely fixed before it sees daylight, owing to the greater difficulty of eliminating the developing solution, which, under the renewed action of light, must inevitably veil the plate.

The question of the possibility of preventive measures may be considered, although, in similar matters, we are always in favour of letting matters take their proper course with correct

treatment—that is to say, with fair washing, and plenty of it. The alum bath, either plain or acidified, may be applied after development; but it is, in our opinion, objectionable, for the same reason already referred to, the difficulty of removing it before fixing; for, as has frequently been pointed out, the application of a solution of alum to a film containing hypo, or *vice versâ*, is highly injurious instead of beneficial. But if a solution of metabisulphite of potash, or, what is nearly equivalent to it, a solution of sulphite of soda, acidified with citric acid, be applied to the film, it may be passed into the fixing bath almost immediately without danger, while the action of the developer will be completely arrested, as well as its staining power destroyed.

So far as the subsequent action is concerned of the fixing agent and alum, if used, and their removal, there is, we fear, nothing but patience and care. To facilitate the fixing operation itself, the bath must be of good strength, and the temperature kept up to 60°, or even higher. The practice of throwing a few handfuls of hypo into a quantity of cold water, to make an ice-cold solution for immediate use, will certainly not work satisfactorily with thick films. The temperature must be kept up, and, to ensure perfect fixation, a second bath should be used, and plenty of time given after fixing is apparently complete. After that, very thorough washing in a changing stream of water is the only means by which the stability of the negatives can be ensured.

A Large Photographic Society.—We learn that the Photographic Society of Vienna has a membership of over 500. With one exception, we in this country have no society with such a membership.

Platinum or Platinum-toned Prints.—At the last meeting of the Photographic Society of Great Britain the Chairman (Mr. John Spiller) stated that a solution of cyanide of potassium formed a test for ascertaining whether a print be in pure platinum or is a silver print toned by the agency of that metal. In the latter case, the silver forming part of the image is attacked by the cyanide, while the print in pure platinum is unaltered.

Meeting of Exhibition Judges.—The Affiliation Committee of the Photographic Society of Great Britain and the allied Societies are, we understand, taking steps to call a meeting of Exhibition Judges with a view of arriving at rules for their guidance. It will have been observed that Mr. Andrew Pringle has been appointed Chairman of the Committee, as a successor to the late lamented Mr. Bedford. The choice of Mr. Pringle could not well have been bettered.

Gaiacol (or Guyacol).—As bearing upon Colonel Waterhouse's recent experiments with gaiacol, Messrs. A. Béhal and E. Choay's remarks on the subject may be of interest. They find that the guyacols of commerce are essentially variable products, their boiling points ranging from 200° to 215°. None of them contain more than fifty per cent. of definite guyacol, the rest consisting chiefly of cresylol and cresol. Pure guyacol is a white, crystalline solid, fusible at 28·5° and boiling at 205·1°.

The Central Photographic Club.—We understand that the Committee of the Club, as the result of several meetings, have formulated a set of rules for the government of the Club, and have also come to a decision as to the financial basis upon which it will be carried on. A recommendation as to suitable premises has also been arrived at. In addition to the foregoing, several other matters of importance will be laid before a meeting of intending members and others interested in the Club, to be held at the Memorial Hall, Farringdon-street, on Monday evening, April 17, at eight o'clock.

Hyposulphite of Ammonium.—At a recent meeting of the Société Française de Photographie M. Labarre detailed the results of some experiments with hyposulphite of ammonium as a fixing agent. He recommended it for paper prints in preference to hypo, used at the same strength. It is more easily eliminated from the print, while it keeps better, and, if any deposit forms, filtration suffices to leave the efficacy of the solution unimpaired. These characteristics, as well as the ready solubility of the salt, its colourlessness, &c., confirm the results of the German experimentalist's conclusions which we quoted a few weeks back. The salt at present is very costly, but M. Labarre promises to give a method of preparation on an industrial scale.

"The First Photograph."—According to a daily contemporary, an interesting object for exhibition at the World's Fair at Chicago has just been dispatched to America. It is the first sun picture of the human countenance ever taken, and it has been lent by Sir William Herschel to the University of the City of New York, and will form a part of their exhibit. This Daguerreotype of his sister was taken by Professor Draper, of the New York University, on the roof of one of its buildings, and early in 1840 was sent as a present from that gentleman to the late Sir John Herschel, by whose family it has been preserved to the present time in exactly the same state as that in which it was sent to England. The loan of this interesting photograph has been made by Sir William Herschell at the request of the Rev. Henry M. MacCracken, Chancellor of the University, transmitted through the American Minister in London. The lady of which it is a portrait still lives, at the age of eighty-seven, and a recent portrait of her will be exhibited side by side with the picture mentioned above.

NATURALISTIC PHOTOGRAPHY.

[Photographic Society of Great Britain.]

Two years ago I withdrew my book, *Naturalistic Photography*, and I owe you some explanation for so doing. My researches into the subject of vision and perspective drawing were mainly responsible for that act, and if you will bear with me for a little I will endeavour to explain my position. When I first took up photography I was told by the whole photographic world (including optical experts)—told by all, without exception, that if the photographic observer closed one eye, and placed the other eye at the focal distance of the lens used in taking the photograph under observation, he would see the picture "true to nature." I felt all along that such was *not* the case, and maintained the "sharp" or any other photograph, when viewed under such conditions, was not true to nature—to nature as the *two eyes* see it, and hence arose a long and inky warfare.

Gentlemen, it was in this as in many other disputes—we were both right and we were both wrong.

The opticians were right from the mathematical standpoint, and I was right from the physiological and psychological standpoints, and so it was evident there were two truths to nature—the perspective or mathematical truth and the psychological or visual truth. After many practical experiments I found the closest truth to nature IN PHOTOGRAPHY (*from the physiological point of view*) was to be obtained by throwing the background of the picture out of focus to an extent which did not produce *destruction* of structure—that was my limit; the principal object of the picture being either sharp or just out of the "sharp." This convention I termed the naturalistic method of focussing, and pointed out it had no connexion with a general *soft sharpness* such as that produced by Mrs. Cameron's badly corrected "Jamin," or by pinholes, or by throwing the *whole* of the picture out of focus—practices all inferior from the naturalistic standpoint, in my opinion, to my method—which is a deliberate and conscious act to be modified according to circumstances, and no hap-hazard "dodge" like the "soft sharpness" or "bastard naturalism," as my friend, Mr. Balfour, calls the more mechanical "soft-sharp" method.

This naturalistic method I practised and advocated, and found later on, by further research, that it was justified by physiology. Well, gentlemen, all this led to a great storm in a teacup, and disputes arose as to how we did see with two eyes, and what was really *truth to Nature* from the visual standpoint. In the course of this

argument, I was pleased to find a broad-minded optician taking an interest in these matters. I refer to my friend Mr. Dallmeyer, whose acquaintance I did not make till after the publication of my book, and whose knowledge in practical optics has enabled him to make a lens of my conception (*i.e.*, the tele-photo lens), a lens which, to my mind, is the most powerful tool yet put into the hands of the decorative photographer, but still a lens that, I hope, is only a step to a better.

Well, gentlemen, all this argument—though warm at times—did good, and set many thinking, and at last I was lucky enough to drop upon the key to the solution, which key I published in April, 1890, in a number of *Photography*. It was a short paper, entitled, "A Note on Naturalistic Focussing." My friend Mr. Goodall, who has always been interested in the practice of photography, was told by me of this little research, and immediately he took it up enthusiastically, and suggested some new proofs and experiments, and together we published the results in a pamphlet, entitled, *Perspective Drawing and Vision*, a pamphlet that created another storm in the teacup, but a pamphlet whose propositions, I venture to say, still remain unshaken, though the Royal Astronomer at Sydney was invited to a public argument in the *Photographic News*—a challenge still open to him, or any other person of physiological or psychological training; and here I may say Dr. Griffiths and Mr. Sutcliffe were the only two photographers who were acute enough to see and acknowledge in public the force of the pamphlet.

Well, gentlemen, from this pamphlet it was self-evident to me that there is no *absolute* truth to Nature from the visual standpoint, for, as each man's sight is different, the only absolute truth to Nature for each man is his own view of her (though certain broad features remain true to all). On the other hand, from the mathematical standpoint, or perspective drawing standpoint, there is an absolute standard, such as the sharp photograph taken with rectilinear, and otherwise duly corrected, lenses.

Now, gentlemen, I will quote you a paragraph from a text-book on psychology, published only last year, a passage which shows how this view is now so far accepted that it has entered psychological text-books for students. The quotation is:—

"Almost all the VISIBLE shapes of things are what we call perspective *distortions*. Square table tops constantly present two acute and two obtuse angles, circles drawn on our wall-papers show like ellipses, &c., and the transitions from one to another of these altering forms are infinite and continual."

That, gentlemen, is the position. Whence it is evident that NO photograph gives things as we *see them* with our two eyes, though some photographs give results NEARER to what we see than others, and those are the naturalistic photographs.

The next question I put to myself was, "How true must the photograph be so that it may be considered naturalistic?" And this gave me much trouble, but at last I think I can offer the solution, which is, it must be true in fundamentals to the point of *illusion*. Thus a man's boots must not be twice as big as his head, and so on with everything.

So, gentlemen, what I advocate is, truth to the point of illusion (for I am not considering to-night scientific photographs, but decorative or pictorial photographs); and I may now say the methods of practice I advised in *Naturalistic Photography* I still advise, and the artists I held up for admiration in that work I still hold up as the best exemplars of their various crafts, but my art philosophy is different, as I shall show you to-night; and, lastly, I do not consider photography an *art*, but regard it as a mechanical (I say *mechanical* advisedly) process, whose results are sometimes more beautiful than art, but are never art, just as Nature is often more beautiful than art—just as the beautiful Japanese *lilium auratum* surpasses the painted lily—yet is the real lily not art but Nature. So the photograph is not art, but a mechanically recorded reflection of Nature. To state this matter more clearly, I have adopted a genealogical form of presentation.

NATURE.

(The fountain-head of sensuous impressions, but not necessarily of *ideas*.)

One | branch.

PHOTOGRAPHY.

(A cross between *Nature* and a *machine*.)

Two | branches.

Realism.
(The sharp photograph — wherein sentiment, illusion, and decoration are disregarded; merely a register of bald facts mathematically true.)

Naturalism.
(The more or less correct reflection of Nature, wherein truth of sentiment, illusion of truth (so far as possible), and decoration are of first importance.)

From which it is self-evident that I believe there is no true realism nor naturalism in the arts proper, but only in *photography*; for TRUE realism and naturalism are *impersonal*—the results of a mechanical process, which photography logically is—because, under the same *physical* conditions, the same *results* will always follow. Place the camera under certain physical conditions, and the same results will always follow, which is *not* the case with art, which is *personal;* indeed, the personal element in real art is paramount and all-pervading. Thus, art is a cross between *man* and Nature, or:—

ART.

(Cross between man and Nature—no machine intervening.)

Two | branches.

Impressionism.
(Which is a purely *personal* vision of Nature as thus: an impressionist may paint *sharply*, or may paint colours wrongly from defect of vision—as does Monet.)

Idealism.
(Cases in which the imagination is used; that is, the combining of several ideals into one harmonious whole. The idealist may transcend *known* Nature, and so the vase is produced.)

In brief, what I submit is, that all *artists* (who do not use photography, and such are bastards) are either impressionists or idealists, and that logically they *cannot* be either realists or naturalists, for they can never be truly *impersonal*. M. Zola *calls* himself a "naturalist," but he is not, as Mr. Thomas Hardy has pointed out; were I to classify him, it would be as a morbid impressionist. On the other hand, M. Viaud, a far more sensitive artist, has been called a "naturalist;" he has publicly denied it, calling himself an "idealist," which he is not—he is an impressionist; morbid, too, in his way. On the other hand, Theocritus I should call a sane impressionist, and Milton an idealist—or, to put it into paint, Mr. Whistler is a sane impressionist, and Rossetti an idealist. And there can be insane impressionists and idealists, as lunacy students know, as well as mediocre, mattoid impressionists, as was the late Richard Jefferies in literature, and (say) Prout in paint.

But still there is a link binding Nature, art, and photography together—a touch of kinship—and that is, *decoration*. The artist admires Nature when she "sings in harmony," *i.e.*, is *decorative;* he admires the photograph when it "sings in harmony," *i.e.*, is *decorative;* and he admires works of art when they "sing in harmony," *i.e.*, are *decorative*. Thus photographs must be *decorative* to appeal to artists, but that does not make them *art* any more than Nature is art when she is decorative. In a word, art is the personal expression of a personal vision of Nature or ideal. A decorative photograph is a mechanical reflection of Nature when she "sings in tune," the good photographer requiring to know when Nature does "sing in tune." In a word, he must have true perception of the beautiful to succeed, after that he is merely the starter of a machine.

If you will allow me to digress for a moment, let me here make a reservation. It is that it matters not, for *merely* decorative purposes, what lens be used, or how it be used; what exposure be given, or how it be given; what developer be used, or how it be used; what printing method be adopted, or how it be handled, *provided* always the result be *decorative*, for no photograph can be said to have any "art qualities" (this does not allow it can be art) without being first of all decorative—a harmonious whole. That is the first quality which differentiates the few photographs from the thousand. But there are higher qualities—degrees of interest and distinction, as it were—and to possess these it must be illusively true, and fine in its *natural* sentiment, as well as decorative; in a word, "naturalistic." And even Mr. Whistler (a far greater artist than philosopher) gives himself away upon this very point in what I, years ago, called his brilliant but illogical "Ten o'clock," though such an acute critic as Mr. Henley has called this lecture the greatest art writing of the century, which I submit it is not. In this "Ten o'clock," Mr. Whistler advocates throughout his work art, for art's sake (*i.e.*, pure decoration), as the be-all and end-all of art. But I submit that he gives his case away when he writes:—"*As did her high-priest Rembrandt, when he saw* NOBLE DIGNITY *in the Jews' quarter of Amsterdam.*" Or—"To the day when she dipped the Spaniard's brush in light and air, and made his people . . . . STAND UPON THEIR LEGS, that all nobility and sweetness, *and tenderness and magnificence should be theirs by right.*"

Gentlemen, "noble dignity," "tenderness," &c., have *nothing* necessarily to do with decoration, but they are the ALL-ESSENTIAL qualities for fineness of sentiment in the pictures cited.

It was on this very point that our greatest poet, Mr. Swinburne fell foul of Mr. Whistler and got worsted. I venture to think had Mr. Swinburne merely quoted these and similar passages his position would have been invulnerable, but he must "write." Indeed, truth

of sentiment and fineness of sentiment are distinctly advocated as virtues in these passages, and as I have always claimed them to be, and so what becomes of *l'art pour l'art* theory and the nonsense that "subject" has nothing to do with it. I have always maintained "subject" is as necessary as decoration for the perfect work, and I still maintain it; but the incompetent misunderstand "subject"—confounding it with "story-telling."

What is wanted in naturalism is a decorative illusion of Nature, a decoration embodying some fine and true *natural* sentiment, the decoration without the sentiment (not sentimentality) is a mere sensuous patchwork of colour, the sentiment without the decoration is mere "literature in the flat," and the truthful illusion without either sentiment or decoration is a mere statement of fact, which explains why Mr. Whistler's masterly "Carlyle" must always be of more *interest* than (say) a "still-life" picture by the same hand.

This may be a fitting place to insert a warning against an error born of misunderstanding. It has been said many times that, by-and-by, photographers will do works of art when they get "soul" into their photographs; this and all sorts of pretentious rubbish has been written by third-rate painters and second-rate photographers. Gentlemen, the photograph that is fine in sentiment and decoration and true to illusion can never be *improved upon* any more than can the statue of the Venus of Melos. A perfect work is good for all time, as Mr. Whistler has said. Means are now at the command of photographers to produce the perfect black and white photographic work, though in future increased *facilities* for producing such work may be found by inventors.

P. H. Emerson, B.A., M.B. (Cantab.)

(To be concluded.)

ON THINGS IN GENERAL.

One of the events of the month must be considered Mr. Taylor's paper on *Spirit Photography*. What were the results, and how obtained? That is the question, and the reply has not yet been given. It was amusing to see the truly logical reply of the veteran fencer to Mr. Downey, who thrust at him straight, "Does Mr. Taylor think there were such things as spirit photographs?" "The question is outside the subject," was the ready reply. Here was an exact parallel to the once famous, or notorious, lecturer who roamed the country under the name of Parallax, delivering a course of three lectures proving, or to prove, that the world was not a globe, but a flat surface. Wonderfully ingenious were his arguments, and relentless the logic with which he was usually able to demolish the opponents who disputed with him in the public discussion that followed each lecture. The usual taunt cast at him by the overthrown logicians was, "Oh, you don't believe the earth is flat, after all!' Mr. Taylor's reply was on all fours with his.

Another paper on a perennially interesting topic that was bound to attract attention, if only from the personality of the writer, was that of Dr. Emerson on "Naturalistic Photography"—almost the same old story and stale arguments, the trite aphorisms that are always used to adorn the subject, all the more interesting as being from the mouth of a recusant teacher. This time, however, Dr. Emerson has soared to a height of repudiation that the most rampant of photographic detractors has not attained. Not content with denying all claims to fine art, he will not admit photography to be even an art. Now, on the point of fine-art photography, as those (if any) who give my lucubrations any thought will be aware, I have consistently held that it is not only an art but a fine art—one, it is true, with an extremely limited range, but still a fine art. I never have seen a satisfactory reply to two queries I make. If there is no fine art in photography, how is it that it is possible to produce by photography a scene, a view, or a representation (I will not use the word "picture" for fear of offence) that no artist can tell by simple inspection whether it is an engraving in one class, or a sepia or monochrome painting in another? Secondly, if a painter of repute took pains to learn photography, would, or would not, some of his results be more artistic than those of the photographer with no art education? If the reply be in the affirmative, would not the cause of the difference, the art feeling of the painter put into his photographic work, be rendered evident to those who looked at the photographs? Dr. Emerson argued that sharp photographs were not true to nature; but, using his words exactly in the sense he uses them, it is very certain that many a painting of acknowledged excellence is not true to nature, and indeed is further from it than most photographs. Bearing on this topic, Mr. H. W. Bennett's paper in last week's Journal may be read with considerable interest, and I may be forgiven for quoting from it. "The indiscriminate use of a method of treatment or printing surface, suitable only under special conditions is certainly not artistic—it is either studied eccentricity or want of judgment." Then, again, "etchings or engravings are invariably on smooth surface paper, and water-colour drawings (excepting those of very large size) on that of fine grain or moderate texture; but they are not considered inartistic on that account. Those photographers who affect extremes in either roughness of surface, or out-of-focus methods, or misty, gloomy effects, might study with advantage the works of leading etchers, which show that smoothness of surface, fineness of definition, delicacy of treatment, bright and sunny scenes are not inconsistent with the highest artistic quality."

We have further matter in the same issue of this Journal which will well repay careful perusal, in a paper by Mr. Xanthus Smith. He writes most justly on the relation of part to part, a most important consideration in photography. What he says about foregrounds and backgrounds, under particular cases, is pregnant with food for thought. He appears, however, to be wrong in one part of his paper, an unimportant part as regards photography, though the writing is so involved as to leave his meaning in some obscurity. He says that we feel the shortcoming of art, which cannot in any way advance or recede beyond the surface plane of the canvas or paper, except as in the case of scenery in theatres. Now, as a matter of fact, paintings on a flat surface have been exhibited in which advance and retreat were so positive that ninety-nine out of a hundred spectators were utterly unable to say whether it was a painting or nature that was before them. I am not sure whether I have apprehended Mr. Xanthus Smith's meaning, taking his preceding paragraph into consideration, but I think I have.

The paper by Mr. H. J. Channon on the influence of development on graduation is an excellent contribution to a much-discussed subject. He shows clearly by experiment that, as every careful and practical photographer knows is the case, graduation can be controlled by development. Messrs. Hurter & Driffield say in effect, in their original paper, that has been the basis of many arguments, that it cannot be so influenced. It is, however, of little use to prove the existence of this power of control, for if these experimenters intervene they will be able to point to a letter in which they say that they have not asserted the impossibility of this control. This blowing hot and cold with the same breath is disconcerting to a searcher after truth; thus, after all, it may be made to appear as merely incidental, and not proper to the argument proper of Messrs. Hurter & Driffield.

I will conclude my letter by expressing the great pleasure I felt on reading a letter (which I hope will be the forerunner of rigid investigation on the subject) from a firm of English card-manufacturers referring to the integrity of the mounts supplied to photographers. This is far above everything the most important question of the day. I hope the Editor will put in italics my assertion *that more faded silver prints are due to the mounts they are printed on than to all other causes put together. Photographers have tamely submitted too long to their pictures being ruined from this cause. They should call upon the Photographic Society of Great Britain to select a committee to investigate the matter. The result would be a gigantic surprise. Hundreds of thousands of photographs are yearly placed upon mounts that will with certainty lead to their utter ruin.* This matter should be investigated thoroughly by every means at command till an *ex-cathedra* statement can be given to photographers everywhere.

Free Lance.

VARIOUS METHODS OF ADDING CLOUDS TO LANDSCAPES.*

Great diversity of opinion exists with regard to masking. The following plans are adopted by various operators:—Painting out the sky on the landscape with opaque colour or black varnish, then making a mask of a print and laying it in close contact with the print to be clouded below the cloud negative. This plan leads to much trouble in spotting the finished print, for it is almost impossible to get them in accurate register, a white or dark line showing here and there round the edges. The fact of painting out a sky invariably destroys a proper

* Concluded from page 203.

artistic effect, however correct the register may be in *all ordinary landscapes*. Strictly architectural or sea views, where the line of the horizon is not diversified with hills, are the only subjects that can be so treated with a fair chance of success.

If it can be possibly avoided, never block out a sky *close* up to the subject on the face, the tint on it is an advantage rather than otherwise. An undoctored sky printing rather patchy and uneven will look all right on the addition of clouds. A mask, roughly following the outline of the landscape and laid *outside* the cloud negative, is better; but a duster or cloth roughly folded and laid over the part, to be protected, is best of all, and a plan I always adopt. It occasionally happens that a picture with a church spire or similar brightly lighted object projecting above the line of the horizon into the sky, requires protection from the light more effectively than can be managed with ordinary shading. If this occurs, paint over the projecting object with a *thick* coating of gamboge on the print itself, and let it dry. It will all come off in the wash water without leaving a stain or trace, and is by far the best method of doing it. An alternative plan is to make a print, cut out the sky and the projecting objects of importance, but not otherwise following the outline, and gum it on to a piece of glass sufficiently large to cover the whole of the sky portion. This mask can be laid on the prints and the cloth used as already directed. The reason the *glass* must be large enough to cover the whole of the sky and distance is to prevent the edges of it making defects on the print.

The next plan of adding clouds is by painting them on the negative itself. As compared with real clouds, this is but a make shift; still there are occasions when this plan has its advantages. For commercial work, where large numbers of small pictures have to be printed, it would scarcely pay to double print each one; then, painting on the negative adds nothing to the trouble after being once done. A well-painted sky would pass muster as a real one with nineteen of twenty of the general public. Even the knowledge of its being hand work will not decrease but rather enhance the artistic value of the subject.

In many cases mere suggestions of clouds are sufficient for the purpose of breaking up a blank space. The density of the sky in the landscape negative determines the best plan of proceeding. When a sky prints *absolutely white* (but very few do so), it is no use painting clouds on it; but if there is the least suspicion of tinge when contrasted with unprinted paper, a little thin black varnish put on the back with the finger tips or short-haired brush in the form of clouds, will break up the blank space and show plainly on the finished print. If it is permissible to doctor the negative itself, the sky portion may be reduced by any of the usual methods before doing anything to the clouds, which can then be put in in the orthodox fashion.

It is necessary to prepare the backs of negatives for painting upon, either by grinding the glass itself with moistened emery powder rubbed on with a small block of glass, or by attaching some papier mineral to it with gum. Providing the glass is *quite* flat—patent plate, for instance—grinding is far and away the best; but with irregular surfaces the labour incurred to get an evenly ground surface is so great and occupies so much time that the papering process is generally adopted, albeit it may require more frequent renewals.

The back of the sky portion of the negative being prepared, clouds can be painted or drawn upon it with India ink or black lead. If paper is used, the lower edge of it should be made to follow the outline of the landscape in such a way that any little difference in density will not be very observable. The distance itself is often improved by the covering of paper. It seldom happens that any improvement can be made in the *clouds* on the *face* of the negative, although much may be done on the landscape itself. Negatives so prepared must not be printed in the sun, or the *edges* of the paper will make defects on the prints; as the paper gets soiled with use, this precaution becomes more and more necessary. There is no trouble of this kind if the surface of the glass is ground and the clouds worked on that. Clouds may be drawn on a separate piece of ground glass, and the two printed together; but this plan scarcely commends itself to the busy printer, who very often resents any addition to the risk and trouble of his work, however slight.

Natural clouds may be made on a film and attached to the negative providing the sky is sufficiently thin, but with most of those of the usual density the delicate gradation of natural clouds is quite lost, and they really do not look so real on the finished print as the imitations made in a coarser manner. In almost all instances the prints on which artificial clouds have been impressed are much improved by slightly tinting down the whole of the sky by a short exposure to the light, it seems to harmonise them with the landscape better than any other plan. When we print a cloud negative on to a print prepared for it, the print is laid down on a perfectly flat surface, glass for instance, the cloud negative properly adjusted, a cloth thrown over the landscape portion, and the whole exposed to diffused light for a sufficient time to get the required depth of printing.

When we examine the picture to find out how the printing is progressing, great care must be exercised not to shift the arrangement and blur the impression; if the hand is firmly pressed on the lower edge of the plate, so that it acts a hinge and the upper edge raised, the progress of the work can he ascertained without difficulty. To print clouds by development is a much more troublesome task, for we cannot see what we are doing at the time. Artificial light is preferable for this work, not only on account of its being more under control, but because of its uniformity in comparison with daylight, an exposure of a definite number of seconds, at a uniform distance from it, will give identical results, other things being equal. Let us suppose that the landscape has been printed; we mark with a lead pencil the space occupied by it on the edge of the print to act as a guide and also on the frame, the cloud negative is adjusted, a piece of cardboard, with the edge roughly made to follow the outlines of the landscape, and large enough to cover the whole from the action of the light is cut, the exposure is made, during which time the card is kept gently moving in front, always keeping the landscape part covered, and vignetting it, as it were, into the sky.

As a matter of economy, it is best to try various exposures on small pieces of paper until one is found to suit the landscape by causing the sky to develop the proper strength with it. Once found, there will be no further trouble in this respect. It is best for all exposures by gaslight to filter the light through a piece of ground glass. The illumination will be found more equal, and very little difference in the exposure than when the naked light is used. The distance of the print from the light should not be less than two feet. A fairly long exposure is much more under control than a rapid one, and more especially advocated for this class of work. A cloud negative that would be suitable for printing out may be quite unworkable for development. Clouds made specially thin are best. A strong, bright negative will probably develop patchy, although it will give unexceptionally good results for printing out.

With platinotype an actinometer of some kind is required, as there will be no visible image until development. As in the bromide process, a few small pieces of paper should be used as trials, and, when the right exposure is secured, a small piece of sensitised silver paper laid on the frame in which the printing is done, or in the same light, on attaining a certain tint will be a good future guide. In other respects it is precisely as a printing-out process. One is able to see the landscape, and can judge of the best position for the clouds to be placed without any difficulty.

General directions may be summed up by saying: Always print the clouds subservient to the landscape, never allow them to encroach on it, or show through light objects in relief against it, or exhibit any decided line of junction in any part whatsoever.

EDWARD DUNMORE.

PHOTOGRAPHY AT THE CAPE OBSERVATORY IN 1892.

I RECOLLECT once reading a story about an individual who resolved to be his own architect, and design and superintend the building of his own house. All went well until the ground floor was finished, and then it was discovered that he had forgotten to provide a staircase. Most new schemes suffer from such defects. It is easy to design, but when the practical working of the scheme comes to be carried out it is surprising how many essential details have been overlooked. So it was with the International Star Chart. Not that a part so important as the staircase was unconsidered, but it was found that in many important respects our knowledge of stellar photography was in its infancy, and these points had to be investigated. The instruments were ready and set up, the heavens had been parcelled out to the participating observatories, but much experimental work had also to be distributed before the work could be really commenced on a uniform plan. What exposure was to be given, and were screens to be used or not as guides to the various magnitudes? what degree of accuracy was advisable as to the pointing of the instruments? should the catalogue or the chart plates take precedence? and so on. It is not my purpose to take all the various questions in detail and state how they were worked out. It will be quite enough for the general reader to know what is now actually being done, and with that end in view I will give an outline of the various operations carried out now the work is in actual progress. But first, and this is the chief reason for my writing, I want to give a few particulars of some researches of a purely physico-astronomical character that were carried out here before the regular work was definitely started. Some

of those results are now being exhibited in the form of lantern slides in England. Few in number, they might furnish matter for several lectures in astronomy, but too long a description at an ordinary lantern show would be out of place. Hence I only penned the slightest sketch by way of description, and that sketch I wish to supplement here in order to indicate to those interested what important problems yet await solution that only photography can elucidate. This article, then, let me say at once, is an elaboration of my brief article in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC.

Basing my remarks on the lantern slides, let us consider them first. Taking a general view of it, it may be regarded as, in one respect, a specimen of the shorter exposure or catalogue work of the International scheme. The slide is on about the same scale as the International, but, being only one-fourth the size of the regulation star plate, it only shows one-fourth of what the International Catalogue plate would show. The exposure of five minutes which it received would be rather less than that given to a Catalogue plate on an average night; but, as it was taken on a good night, we may speculate on its showing stars up to, or about, the eleventh magnitude. The diameter of the slide is about twice that of the moon; consequently we must not expect to find many stars on it that the naked eye would see. Yet there are a very considerable number, for it represents one of the richest parts of the sky, but not one of the many stars visible in the photograph can the unaided eye distinguish. Viewed particularly, it is of special interest, for not only is that region one of the brightest parts of the Milky Way, but it is centered by a star which is one of the still unsolved problems of the stellar universe. η Argus, the central star, is of a reddish colour, and about the eighth magnitude. "It seems to me it is a little brighter than it was, but I don't know; that we shall have to look into," said Dr. Gill when he saw it last. The great astronomer Halley found it visible to the naked eye, and classed it as of the fourth magnitude in his catalogue, constructed A.D. 1677, the first catalogue that can be depended on. Lacaille, who did some splendid work here in the middle of the last century, ranks it as of the second magnitude, and the later catalogues of Brisbane—Johnson, Fallows, and Taylor—also give it as a "second." When Sir John Herschel first saw it, in 1834, it appeared as a very large star of the second magnitude, or a very small one of the first, and for three years its magnitude remained apparently unchanged. "It was on the 16th of December, 1837," says Sir John Herschel, "that, resuming the photometrical comparisons in question, in which, according to regular practice, the brightest stars in sight, in whatever part of the heavens, were first noticed, and arranged on a list, my astonishment was excited by the appearance of a new candidate for distinction among the very brightest stars of the first magnitude, in a part of the heavens with which, being perfectly familiar, I was certain that no such brilliant object had before been seen. After a momentary hesitation, the natural consequence of a phenomenon so totally unexpected, and, referring to a map for its configurations with the other conspicuous stars in the neighbourhood, I became satisfied of its identity with my old acquaintance η Argus. . . . . From this time its light continued to increase. On December 28 it was far superior to Rigel, and could only be compared to α Centauri, which it equalled, having the advantage of altitude, but fell somewhat short of it as the altitudes approached equality. The maximum of brightness seems to have been obtained about January 2, 1838, on which night, both stars being high and the sky clear and pure, it was judged to be very nearly matched indeed with α Centauri, sometimes the one, sometimes the other being judged brighter." On the twentieth it was "visibly diminished." By April 14 it had so far faded as to bear comparison with Aldebaran. But again it advanced in lustre until it was almost as bright as Sirius, according to the Rev. W. S. Mackay, 1843, and Mr. (afterwards Sir Thomas) Maclear, Astronomer Royal at the Cape. In 1844 it had again slightly diminished, but at the beginning of 1845 it had blazed out again, and then began to decline. A similar phenomenon had previously been noticed by the traveller, W. J. Burchell, long after Halley's observations, but some years previous to those of Sir John Herschel. Now, as I have before stated, it is only of the eighth magnitude. Will it ever blaze out again? As I hope to show, there is some probability of its so doing. It is not a temporary star. Some stars have suddenly appeared, and just as suddenly been extinguished; but η Argus, bright or faint, has been visible for centuries.

And now let us take the second photograph, that exposed for forty-five minutes. The stars visible in the five-minute photograph have visibly increased in size, owing to the longer exposure; but, in addition, are a large number of star discs, not visible in the first slide. Roughly speaking, all the stars visible up to the thirteenth magnitude now appear, and possibly even a few fainter ones still. But note, too, that round some stars a curious phenomenon is appearing. Clinging to those stars, as it were, is some nebulous matter. It is not halation, for halation round a point appears in the form a ring, whose diameter varies according to the thickness of the glass. Besides, the plate was backed with that best of all backing, optically speaking, a backing that gives some trouble to manipulate though, common Brunswick black, procurable from any oil and colour shop. A glance through the ten-inch telescope, moreover, reveals to us a great deal more than appears in the forty-five minute photograph; the small field embraced by the eyepiece is full of nebulous matter, save and except a shoe-shaped dark portion in the centre, midway between the toe and the heel, lying to one side of the red star η Argus.

With an exposure of about three hours, we get on the photographic plate a representation of what is to be seen in the telescope, but it is far more definitely outlined. In addition to the nebulous matter is a vast congregation of stars—as many stars as Sir John Herschel saw in his twenty-four inch reflecting telescope, but hundredfold as many stars as he dared attempt to map. To map as many stars as appear in the three-hour exposure would have taken him best part of his natural life. Yet photography has done it in three hours.

And now we go on to the twelve-hour exposure. It was not done on one night. Four nights were occupied. The slide was shut and covered with dark cloths, to exclude light. When the next night came, the star η Argus was brought back to its same position on the cross wires, everything connected with the eyepiece of the observing telescope being clamped up rigidly. The photograph shows more of the nebulæ than Sir John Herschel could depict with months of patient watching and careful toil. It might have shown more still, but, unfortunately, the nebula surrounding η Argus is not particularly actinic—far from such in comparison with other well-known nebulæ. But the stars! Slowly but surely their light has been gradually accumulating on the sensitive film. On a space of sky that might be covered by a shilling held at arm's length are to be seen something like 200,000 stars—only six times as many as have been catalogued in the space of, say, ten years, by an indefatigable astronomer, backed by an efficient staff.

But let us disregard the stars. The nebula is actinically faint, and therefore better suited for eye observation. But what does Sir John Hersehel say in reference to his own drawing?

"The accurate representation of this nebula with its included stars has proved a work of very great difficulty and labour, owing to its great extent, its complicated convolutions, and the multitude of stars scattered over it. To say that I have spent several months in the delineation of the nebula, the micrometrical measurement of the coordinates of the skeleton stars, the filling in, mapping down, and reading off of the skeletons when prepared; the reduction and digestion into a catalogue of the stars so determined, and the execution, final revision, and correction of the drawing and engraving would, I am sure, be no exaggeration. Frequently, while working at the telescope on these skeletons, a sensation of despair would arise of ever being able to transfer to paper, with even tolerable correctness, their endless details. However, by breaking it up into parts, and executing each part separately, it has been accomplished, and I trust with such exactness as may afford a record capable of being appealed to in future, whether the question of internal changes of the form and situation of the nebulous branches shall be gone into."

Comparing Sir John Herschel's drawing with the photograph, it is strikingly noticeable how the draughtsman had seized the most conspicuous features, and, so far as they agree with the photograph, with remarkable fidelity. But in the photograph also is a vast amount of small detail that is absent in the drawing, to say nothing of the multitude of stars which the telescopic camera has charted down with unimpeachable fidelity. The great astronomer when he made some of the important discoveries that advanced the early progress of photography, when he took, over fifty years ago, the first photograph on silver chloride obtained in the camera, little knew to what goal his efforts would ultimately lead; and no one would have rejoiced more than he to see the present state of the science, though his own labour of love, the work of many a night's watching and day's recording was to be superseded by a few hours' work of the gelatino-bromide plate. Carefully as his drawing was executed, too, and intended as a foundation for the observation of changes in the nebula, he little guessed that doubt might be thrown on the accuracy of his eye. Yet there are vast differences between the drawing and the photograph. In some parts, portions of the nebulæ are fainter or brighter in the one than in the other. One noticeable feature is a zigzag stretch of nebulous matter, visible in the drawing but entirely absent in the photograph. How are these discrepancies to be accounted for? Was it that, in drawing the separate

portions of the nebula on different nights, some parts got unduly represented, according to the atmospheric conditions being more favourable? Scarcely; for Sir John was not the man to omit considering the drawing as a whole, though the parts were done at different times. Was it that—in the fainter portions, for instance—the imagination had greater play? Perhaps; for we know that the eye has not proved entirely trustworthy in recording many physical phenomena. Or may we look for the cause in the supposition that various parts of the nebula are richer than others in rays of higher refrangibility? Possibly; for such affords a simple and reasonable explanation. All these and other questions naturally arise; but I consider it not improbable that many real changes may have taken place in the intervening sixty years, more especially when we consider the remarkable changes that have taken place in the star itself. But to decide this point we want the unimpassioned mechanical observer, and photography alone answers to this description. Time will tell, and future photographs of the nebula will be eagerly looked for. Photography will set this question at rest, as it has already decided so many others.

A question that naturally arises is, Is the star behind or before the nebula and disconnected with it, or do star and nebula form part of the one system? On this point the drawing and the photograph are in accord. No change can be detected in the position of the star relative to the nebula, and it is only reasonable, therefore, to assume that the two are part of one system; it is the conclusion that, in the present condition of our knowledge, is the more justifiable. And what is the connexion between star and nebula? Can we explain the sudden outbursts of splendour in the star by the impact of meteoric masses forming part of the nebula surrounding it? If not, in what other way? Photography, in the future, may reveal that to us.

In one corner of the original photographs, but not in the lantern slides, are two stars, which in the three-hour exposure begin to show surrounding nebula. In the twelve-hour exposure this nebula has extended so far as to show that there is a real, though in the telescope invisible, spiral nebula connected with and enveloping both stars. In many parts of the Milky Way photography is beginning to reveal many analogous phenomena. Years of patient labour are required to elucidate these many points that are outside the range of the regular Observatory work. The foundation has been laid by the Herschels. To take that work, and follow it step by step by the photographic method, would enlarge our knowledge of the universe in an extraordinary work, and that is why I suggested the research in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC. I foolishly talked there about the "young millionaire." Happily, much more modest pecuniary possessions are all that is required.

I trust that I have not written at too great a length to tire the patience of Editor and reader. As it is, I have omitted to describe two important photographs exhibiting the power of the photographic compared with the older method. I must reserve them for another article, when I will also, by describing in brief detail the ordinary international work as carried on here, conclude the subject of the title of this article.

C. RAY WOODS,
Photographic Assistant at the Cape Observatory.

ON THE APPLICATION OF PHOTOGRAPHY TO SEISMOLOGY AND VOLCANIC PHENOMENA.*

SPECIAL ADAPTATIONS OF PHOTOGRAPHY TO SEISMOLOGY.

WE now come to a consideration of more special adaptations of photography to seismology, and, to avoid the necessity for repeating his name every few lines, I state here that nearly all these adaptations are the work of Professor John Milne, F.R.S., the writer sometimes giving assistance in some of the purely optical and photographic parts.

Some two years or so ago, an attempt was made to find whether any change in electrical potential between the earth and the atmosphere preceded, accompanied, or followed earthquakes. An instrument to keep a continuous potential record was devised on the following lines:—One terminal of a mirror galvanometer was connected with a metal plate in a well of considerable depth, the assumption being that the potential of the well water would be the same as that of the earth at the same depth. The other terminal was carried to a metal plate at the ground level. A beam of light was thrown on the galvanometer mirror and, being reflected, was received on a photographic plate, narrow and long, kept moving slowly in the direction of its length by clockwork. A continually changing potential was shown, and there were several cases in which there were decided deflections at the times of earthquakes, but there was not sufficient consistency in these to make it evident that they were the result of anything but the mechanical effect of the shocks on the galvanometer. The subject is one that yet requires attention.

EARTH TREMORS AND EARTH TILTING.

There has been much investigation of "earth tremors" and "earth tilting." We are accustomed to look on the "solid earth," apart from its planetary motions, as the very type of what is stable and steady, but it is now known that it is never at rest. It is always trembling, and there is reason to believe that its surface is often slowly tilting in one direction or in another. These motions are extremely small; to get indications of them, much less to measure them, is very difficult, and, up to the present, it has been impossible to separate them one from the other with certainty. Thus no tremor recorder has yet been made of which it can be said with *certainty* whether it is recording true tremors or "tips." An ordinary pendulum will be affected by "tilts" but not by tremors, unless these happen to coincide with its period. The difficulty is to record in any way the extremely small motion of the bob of the pendulum. A partly successful attempt was made to solve the difficulty by photography. A silver bead was suspended by a silk fibre in a hollow stone column, which prevented atmospheric influence. A beam of light was thrown on the bead, and the image of the point of light, passing through a micro-objective placed vertically below the bead, gave an image of the spot of light on a plane at a considerable distance below it, along which a photographic plate could be made to travel by clockwork, the motion of the bead being, of course, greatly multiplied—being, in fact, multiplied in the ratio of the distance between the bead and optical centre of the lens,* and the distance between the optical centre of the lens and the plate receiving the image.

A word or two should be said on the optical principles here involved. If a silver bead were a perfect sphere, or indeed, if the surface were everywhere convex, the form only approximating to a sphere, the spot of light produced by the reflection of any source of light, say a lamp flame, could be made as small as might be desired, without being reduced in brightness. The further the source of light is moved away from such a bead, the smaller becomes the spot, but its brightness remains the same, and is, indeed, at all distances, leaving air absorption out of the question, the same as the source of light itself, less a constant percentage of loss on account of absorption of light at the reflecting surface. This arrangement is, in fact, the "artificial star" used by opticians in testing telescopic and other objectives, when it is not convenient or possible to focus on an actual star.

It was thought that, in the case of this instrument, as the spot of light could be made indefinitely small at will, the image of the spot could be made as small as might be desired, however great the amplification. It was found, in practice, that this was not the case. If the amplification were great enough to be useful, the spot of light was too large to draw anything but a very wide line. The lens was a high class ¼-inch micro-objective, and the fault was probably not in it. It is likely that the bead was not really convex throughout, but that the surface consisted of minute facets, or more likely grooves. If a bead of mercury could by any means be used the results would probably be much better.

Excellent results have been got by the aid of photography by the tremor recorder described in a report on the "Volcanic Phenomena of Japan." (*British Association Reports*, 1892.)

The only difficulty here is that it cannot be known for certain whether these instruments are showing tremors or "tips." In this case the light passing through a narrow vertical slit, behind which there is placed a small lamp, passes farther through an objective, is received on the mirror, and is from it reflected on to a horizontal slit in the front of a box which contains a photographic plate moving vertically by clockwork. Of course any motion of the mirror of the instrument, whether produced by tremors or "tips," is amplified by the beam of light, whilst the horizontal slit cuts off all superfluous light, so that a spot only reaches the plate. Daily observations were taken on plates twelve inches long, two and a half inches broad, moved by clockwork, at such a rate that they took twenty-four hours to travel their whole length. With this slow travelling vibrations were not separately registered. The breadth of the line across the plate indicated the amplitude of the vibration at any particular time, and showed that there attained a maximum at intervals five to ten minutes. In working with these slow speeds it was found that the light of a small kerosene lamp was ample, if the plates were rapid, but it was considered advisable to get a record of the actual separate vibrations during "tremor storms." To do this the plate was caused to travel rapidly, at the rate of twelve inches in about thirty seconds. With this rapid travelling the light of a lamp was quite inadequate, and a

* Concluded from page 203.

* More strictly one of the "principal points" of the lens.

magnesium light produced by the burning of magnesium ribbon was used. I prepared a diagram to illustrate the sort of records that were got on the slow travelling and on the quick travelling plates, showing the result on a slow travelling plate, in actual size, representing a part of the plate only; and showing the result on a quick travelling plate, reduced to its present size from a length of twelve inches.

Of course the line of light that did the actual photographic work was an image of the slit, which slit was made very narrow. I was surprised, in connexion with this, to find how little difference it made what kind of objective was used to cast the image. A high-class portrait objective was suggested, as on account of the perfect correction for both the spherical and chromatic aberration of the pencil's axial, or nearly so, I thought that the results would be much superior to those got with an inferior lens. To my surprise there was very little difference between the results got by the use of such a lens and those got by the use of a single double-convex, or "crossed" lens, not even achromatised.

In 1887 MM. Fouqué and Michel Lévy described a set of experiments they had made to determine the rate of transmission of shock of an earthquake nature, produced by exploding dynamite, and in other ways, through different kinds of soil, using a photographic arrangement for recording the time and durations of vibrations. An incandescent electric lamp threw a beam of light at an angle through a lens and on to the face of mercury in a dish. The reflected beam of light was brought to focus on a revolving plate. If there were no motion, of course the light simply drew a circle; if there were any vibration, the beam of light was set in motion, and the circumference line of the circle was widened, and became indistinct. Thus the beginning, duration, and ending of the motion were indicated.

Contemplated Applications of Photography.

So much for what has already been done. It may be worth the necessary space to say a word or two about applications of photography that are, as yet, only contemplated.

In the case of all seismographs at present in use, the "steady point" is a comparatively heavy mass of metal. There are no objections to this in the case of slight earthquakes, but, in the case of great ones, when we have tilting the mass is liable to over-swing the mark and to exaggerate the motion. There is also the objection that it is never known for certain whether "tips" or lateral motions are being registered. It is possible that this difficulty may be got over by the use of very light "steady point," but, in such a case, the ordinary method of drawing the record by a point scratching through a smoked film or glass will not be admissible, as the friction would be too great. It will be necessary, in this case, to resort to photography, which introduces no friction to all.

At places where no regular seisological observatories are situated it is often desirable to have a record of the time of occurrence of earthquake. The simplest way of doing this automatically is to have an arrangement whereby a clock is brought to a stop at the moment an earthquake begins. One objection to this arrangement is that thus stopping a clock makes it often difficult for observers to reset it at standard time. It has been suggested that a photograph of the face of a common watch might be taken at the instant an earthquake occurs. Were earthquakes so considerate as always to take place in the day-time, there would be very little difficulty about the affair; but unfortunately they are not, and the difficulty is about a night illuminant, because, of course, the exposure must be very short to show the seconds hand of a watch fairly well, and this necessitates a very bright artificial light. Some experiments made several years ago were very encouraging. Since then "magnesium cartridges" have been introduced, and there is no doubt that an arrangement could be devised whereby one of these could be ignited at the instant an earthquake occurred, and, if the ignition took place fairly near the dial of a watch, a photograph showing the hands could be made even with a lens of only moderate angular aperture. It is somewhat doubtful, however, whether such an instrument could be placed in the hands of one unskilled in the use of scientific instruments, and the object of watch photography is to get an appliance that may be placed in the hands of any one.

On the other hand, it has suggested itself to the writer that the difficulty might be got over by fixing a minute silver bead on the end of each of the three hands of the watch. On the principle described above, in connexion with the pendulum tremor recorder, the spot of light reflected by such beads ought to impress themselves on a plate with a fairly short exposure, even if the light be nothing more powerful than an ordinary lamp. The arrangement whereby a camera, with shutter to be released by an earthquake, a watch, and a lamp might be enclosed in a box so as to effect the desired result would not be complicated.

There are various other investigations in connexion with which photography may possibly be used. Thus, although the motion of an earth particle during an earthquake has been very fairly investigated, there are still wanting data as to the relative motion of two earth particles at some distance from each other. It is of great importance to know what such relative motions are, as, according to whether the motions of the earth particles at some distance apart are nearly in the same phase at the same time, or are in entirely different phases, is the effect of an earthquake on a building due to the inertia of the mass alone, or is due to racking. The construction of buildings to best resist these two destructive influences would be entirely different.

It is possible that photography may be used in connexion with such investigations, but it is more probable that entirely mechanical means will be employed.

If the very long water level (at least several miles) proposed some time ago by Professor Milne to discover whether there is any slow, tipping motion of the land in certain planes, be carried out, it may be found convenient to register the height of the water at the two ends of the level photographically.

Professor W. K. Burton.

ON THE THEORY AND PRACTICE OF INTENSIFICATION.

[Croydon Microscopical and Natural History Society.]

Either from under-development or from the exposure not having been sufficiently prolonged (or it may be from other causes), a negative is sometimes found not to have sufficient density for printing purposes.

Due regard must, however, be had as to the final use to which the negative is going to be put. Thus, for all kinds of paper printing, *e.g.*, albumen, gelatino-chloride, or platinum, a strong negative would probably yield the best result; but for enlarging, bromide work, and lantern slides a weaker negative would possibly prove more satisfactory.

Preliminary Processes of Intensification.

When it has been decided to resort to the intensification of a negative, certain preliminary processes are essential, *i.e.*:—

1.—All trace of hypo must be absolutely removed; very thorough washing, followed, if there is any doubt, by immersion in—

(*a*) Peroxide of hydrogen, two drachms of the 10 vol. solution to five ounces of water. Soak for half an hour, and then wash.

(*b*) Alum solution, freshly made, and acidulated with hydrochloric acid (about half an ounce to a pint of saturated solution of alum). The acidification is desirable, not only to assist in decomposing the hypo, but to keep the gelatine soft, as alum alone hardens the film, and renders the subsequent removal of the soluble matter difficult. Soak for half an hour, and then thoroughly wash.

(*c*) Iodine solution, made by dissolving iodine in a strong solution of potassium iodide till it is of a black colour, adding some of this to water till of a sherry colour, and immersing the plates. When a blue colour is persistent, all the hypo is gone, and the plate is then rinsed, treated with sodium sulphite to remove excess of iodine, and then washed. The absence of hypo may be proved by testing the washing water from time to time, either with iodide of starch, which has its blue colour destroyed if hypo is still present, or with potassium permanganate, which has its beautiful pink colour destroyed and manganese oxide precipitated by hypo.

2.—Any trace of fog or veil must be carefully removed, because it must not be forgotten that any such fog or veil would be intensified too, a result not to be by any means desired. This is best removed by the careful application of a reducer, and possibly the hypo and ferricyanide of Howard Farmer is the best, care being taken to thoroughly eliminate the hypo.

3.—The negative must be soaked in water for half an hour if it has become dry, because it should be thoroughly and uniformly wet to ensure success.

Thus it will be seen that a certain amount of work has to be done before intensification proper is commenced. This preliminary work is, we are afraid, often neglected; in many cases we know it is so, with the usual result that the process itself is condemned, while the real fault lies with the operator.

We will now assume that the negative is ready for the actual intensifying processes, of which we have a considerable number to choose from; and in this connexion it is instructive and amusing to note how one process is strongly advocated in one text-book, while the very next book you pick up as strongly deprecates it. No wonder, then, that the mind of the beginner is as badly fogged as perchance his plate may be.

Various Processes.

For our present purpose we may divide these intensification processes into three divisions, *i.e.*:—

1.—The image is first *bleached* by the application of a certain chemical, while another chemical is employed to darken it again, producing greater density.

2.—The image is darkened by the application of certain chemicals *without* previous bleaching.

3.—The image, after being first bleached, is treated after the manner of an exposed but undeveloped plate. This is called intensification by redevelopment.

In the first case, in which bleaching precedes the darkening of the image, the bleaching chemical perhaps most generally employed is mercuric chloride.

We take

Mercuric chloride	100 grains.
Potassium bromide	100 ,,
Distilled water	10 ounces.

Or—

Mercuric chloride	5 parts.
Pure hydrochloric acid	1 part.
Distilled water	100 parts.

Dissolve and filter if necessary, as any undissolved particles of the mercuric salt would be liable to produce spots on the negative.

Into this solution place the negative, previously well washed (or soaked) and freed from hypo, until it is bleached right through, and appears of a white or greyish-white colour on both sides; it is then again thoroughly washed, and is now ready for the darkening solution. In this process the following reaction occurs:—

$$Ag_2 + 2HgCl_2 = 2AgCl + Hg_2Cl_2.$$

Now, there are several methods employed to darken the image. We propose to take three, and refer to them in the order of the effect they produce.

(*a*) If we have a fairly good negative, which is, nevertheless, somewhat thin and produces a flat print, we may introduce the necessary sparkle by using sodium sulphate as the darkening chemical. If the *bleached* and thoroughly *washed* negative be placed in a ten per cent. solution of sodium sulphite, acidulated with citric acid till it is darkened *through*, again washed, and dried, we shall attain our end. The reaction in this case is as follows:—

$$Hg_2Cl_2 + Na_2SO_3 + H_2O = 2Hg + Na_2SO_4 + 2HCl.$$

Should the density not be considered sufficient, the bleaching and darkening with sulphite may be done a second or even a third time.

(*b*) A more pronounced effect is produced by the employment of ammonia, and this chemical was very generally used, and is so still to a great extent. The *bleached* and *washed* negative is immersed in a *weak* solution of ammonia, *i.e.* about ten minims of the ·880 solution to one ounce of distilled water, till it is darkened right through, and then washed again and dried. The reaction here being—

$$Hg_2Cl_2 + 2NH_3 = NH_2Hg_2Cl + NH_4Cl,$$

the dark substance, NH_2Hg_2Cl, being dimercurous-ammonium chloride.

(*c*) The third method certainly gives very decided results, but with regard to it authorities differ. For instance, Captain Abney has great faith in it; Mr. Bothamley says the only drawback is in the use of the highly poisonous potassium cyanide; Professor Meldola does not raise any objection to it; but Mr. Chapman Jones says this formula has been proved to be unreliable, and there is no need ever to use such a process. For ourselves, all we can say is, that negatives intensified by it (carefully, of course) some five years ago show no sign of change. Putting difference aside for the moment, the process is as follows:—The bleached and *washed* negative is immersed in a solution made thus—

No. 1.

Silver nitrate	100 grains.
Distilled water	10 ounces.

No. 2.

Cyanide of potassium	100 grains.
Distilled water	1 ounce.

Dissolve. Add 2 to 1 gradually, and with stirring, till the precipitate first formed is *nearly* but *not quite* dissolved, as it is very essential not to have any excess of the cyanide, otherwise after intensification a weakening action ensues, the same result obtaining if the negative is left too long in this solution of potassio-silver cyanide. The reaction in this case is somewhat complex, but may be as follows:—

$$Hg_2Cl_2 + 2AgK(CN)_2 = Ag_2 + 2Hg(CN)_2 + 2KCl.$$

These comprise the process of mercurial intensification so far as previous bleaching is concerned; but those who have not already done so we would recommend to carefully study the paper by Chapman Jones in The British Journal of Photography for February 3, 1893, p. 70, and in *Photography* for March 9, 1893, p. 146.

Non-bleaching Processes.

We pass now to the second division of our subject, *i.e.*, intensification without previous bleaching, and for this purpose several chemicals are used, *e.g.*, lead, uranium, gold, platinum, biniodide mercury, and a solution made by the Platinotype Company called the "Perfect Intensifier."

In using lead several precautions have to be taken, and as it is a troublesome process, and is, moreover, liable to cause fog, it is but seldom used. Its chemistry depends on the formation of the ferrocyanide of lead and silver, by reduction of the ferricyanide by metallic silver when a negative is treated with the following:—

Lead nitrate	20 grains.
Potassium ferricyanide (clean)	30 ,,
Distilled water	1 ounce.

Dissolve, filter, and acidulate with acetic acid. But, as the ferrocyanide of lead and silver is *white*, it has to be blackened, after *very thorough* washing, with a dilute solution of ammonium sulphide, the first reaction being as follows:—

$$2Ag_2 + 2Pb_3Fe_2(CN)_2 = Ag_4Fe(CN)_6 + 3Pb_2Fe(CN)_6,$$

the *white ferrocyanides* afterwards becoming the *black sulphides*.

Instead of the ammonium sulphide, which is a very nauseous smelling body, and not an advisable adjunct to a dark room, one of the potassium chromates may be used, in which case we obtain, instead of the black colour, a *red* one if the dichromate is employed, and a *yellow* one if the chromate is used.

With the uranium intensifier an analogous action takes place, only that, as the uranic ferrocyanide is of a dark brown or chocolate colour, the subsequent application of a darkening agent is in this case unnecessary.

The solutions suitable for the purpose are those now commonly employed for producing warm tones on bromide paper, and are as follows:—

No. 1.

Uranium nitrate	20 grains.
Acetic acid	½ ounce.
Water up to	10 ounces.

Dissolve.

No. 2.

Potassium ferricyanide (clean)	20 grains.
Acetic acid	½ ounce.
Water up to	10 ounces.

Dissolve.

Mix these two solutions in equal proportions, and let the *very thoroughly* washed negative soak in it till the desired colour is attained. Should the action go on too far, a *careful* application of a *weak* solution of ammonium carbonate will weaken it, care being taken not to use a strong solution, or allow it to act too long, or the image may disappear altogether.

The next intensifier is simplicity itself. A solution is carefully prepared as follows:—

Mercuric chloride	1 drachm.
Potassic iodide	3 drachms.
Distilled water	12 ounces.

Dissolve.

The quantity of iodide being *just exactly sufficient* to redissolve the brilliant scarlet precipitate first thrown down. Into this solution the negative, first well soaked, is placed until the desired effect is attained, after which it is well washed. Objections, it is true, have been urged against this method, in that the image resulting from its use is, or may be, subsequently affected by the action of light.

Similar objections have been raised in regard to the uranium process, but we believe the supposed effects have been, in both cases, exaggerated.

In the case of gold and platinum the change is of the simplest character, one or other of these metals being substituted for the original silver, according to the following equations:—

$$\text{Gold} \ldots\ldots 3Ag_2 + 2AuCl_3 = Au_2 + 6AgCl$$
$$\text{Platinum} \ldots 2Ag_2 + PtCl_4 = Pt + 4AgCl$$

The last intensifier in the second division is the "Perfect Intensifier" of the Platinotype Company; the composition of this is, of course, a secret, but Captain Abney states that it contains mercuric chloride and a salt of platinum. We can speak from actual experience of the excellence of this intensifier, and also as to the easy and cleanly way in which it can be used. The process is simplicity itself. The first thing to do is to soak the plate in alum solution acidulated with hydrochloric acid, for the purpose, as previously explained, of removing all traces of hypo. Wash well, and immerse in the intensifier, somewhat diluted with water, until the desired effect is obtained. The action, quoting Captain Abney again, is gradual and effective, and seems to be unaltered by time.

Redevelopment Processes.

We now come to the third division of our subject, *i.e.*, intensification by redevelopment. In this, as in all previous cases, the first step consists in the thorough removal of all traces of hypo by means of the acidulated solution of alum and thorough washing. The negative is then bleached in an aqueous solution, cold and saturated, of mercuric chloride, to each ounce of which two or three minims of strong hydrochloric acid have been added (this is preferable to employing a solution of mercuric chloride with potassic bromide or ammonium chloride, as is frequently done). When thoroughly bleached and well washed, the negative may be developed after the manner of a newly exposed plate by most of the developers in common use. We have not had time to try them all, but may say that amidol appears to give a slight increase of density, is clean

in use, and gives a clear and quick-printing negative. Hydroquinone gives greater density, is also easy and clean to use, and produces a clear, good printing negative. In one case in which we tried it, and accidentally left the negative in too long, we got the orange hydroquinone stain, exactly as would have happened to a recently exposed and newly developed plate.

But perhaps the best method is that of the ferrous-oxalate development, which is strongly recommended by Professor Meldola, Chapman Jones, and others. In the first place it is simple, and then again a considerable increase of density is obtained, because all the silver and mercury present in the film is left behind in the metallic state; and, lastly, like the sodium-sulphite method, it can be repeated over and over again till the necessary opacity is obtained.

The solution used should be one part of the saturated solution of ferrous sulphate to six parts of the saturated solution of potassium oxalate, and it is essential that both solutions should be acid. Sulphuric, acetic, citric, or oxalic acid may be employed for this purpose, and three or four parts of water. No bromide is required.

The previously bleached negative is allowed to soak in this till the image is blackened right through to the back, and is then well washed. It is desirable that the first washing waters should be acidified with hydrochloric or acetic acid (as is done in developing bromide paper) to prevent the precipitation of any iron salt or lime from the water.

The reaction which takes place here may be represented by the following equations:—

Silver Chloride.	Ferrous Oxalate.	Potassium Oxalate.	Silver.	Ferric Oxalate.	Potassium Chloride.

$$1.—2AgCl + 2FeC_2O_4 + K_2C_2O_4 = Ag_2 + Fe_2(C_2O_4)_3 + 2\,KCl.$$

Mercurous Chloride.	Ferrous Oxalate.	Potassium Oxalate.	Mercury.	Ferric Oxalate.	Potassium Chloride.

$$2.—Hg_2Cl_2 + 2\,FeC_2O_4 + K_2C_2O_4 = 2\,Hg + Fe_2(C_2O_4)_3 + 2\,KCl.$$

We have thus endeavoured, so far as the time at our disposal will allow, to pass in somewhat hurried review some of the principal processes employed in the intensification of negatives, and to indicate the chemical changes involved in these processes, and it is in such work as this that a knowledge of chemistry comes in useful, for the purpose of teaching us not only what to do but why we do it, and to this end we hope the paper we have had the honour and pleasure of laying before you may have contributed. J. H. Baldock, F.C.S.

COPYING ENGRAVINGS AND DRAWINGS.

Before the West London Photographic Society, on March 28, Mr. H. Peal, President of the Ealing Photographic Society, gave a lecture on *Copying Engravings and Drawings*. As requisites, he recommended daylight, preferably a top light, including a wide angle of sky, and appliances specially arranged for the purpose. The lecturer described the apparatus employed by himself in copying engravings in books, consisting of a baseboard of box-girder form with sliding carrier for the camera, and an adjustable frame to hold the book or engraving. He advocated the careful ruling of sets of lines in rectangles upon the ground-glass screen of the camera to ensure facility in focussing. The camera front was raised and lowered by the turning of a disc mounted eccentrically. Coming to the method of working, the lecturer stated that the engraving must be centered with the lens, then focussed, and the final adjustment given. He used small stops, ranging from *f*-11 to *f*-22, to obtain due sharpness.

Mentioning the exclusive employment by professional photographers of wet collodion for copying, he claimed equally good results with less trouble from dry plates, such as the Mawson photo-mechanical plate.

He found no advantage in backing the plates, but he impressed his hearers with the necessity of carefully dusting them, and of excluding dust from the dark slides. For regulating exposure, he used the Watkins meter. For reference, he marked all negatives with a series number, a subject number (in relation the Watkins meter), and an initial to indicate the developer used. After mentioning that he employed his negatives for the double purpose of producing prints and making lantern slides, the lecturer described a convenient apparatus for the latter purpose, in which the top light was reflected through the negative by a ground opal glass plate. An ingenious arrangement of cams was employed for centering and holding the plate in the camera.

For development, the new developer, amidol, had many advantages, notably its quickness of action, cleanliness, and power of developing several plates in rotation, whilst it enabled the photographer to do with one-third of the usual exposure, and the developing dish required no rocking. The formula was—

Amidol	4 grains.
Sulphite of soda	45 ,,
Bromide of potassium	½ grain.
Water	1 ounce.

The lecturerer developed two plates with this solution, under somewhat adverse conditions, with complete success.

Our Editorial Table.

Die Photokeramik.

By Julius Krüger and Jacob Husnik. Vienna, Pesth, and Liepzig: A. Hartleben's.

This little work treats exhaustively of burnt-in pictures on porcelain, glass, &c., giving formulæ and working details of sufficient fulness and clearness for the ordinary photographer to take up this beautiful branch of photography with successful results. It is fully illustrated.

Messrs. Thos. Illingworth & Co., of Willesden Junction, have sent us their trade price list of printing, enlarging, finishing, framing, &c. The growth of Messrs. Illingworth's business is a testimonial to the excellence of their work.

We have received from Mr. G. P. Cartland, photographer, of Windsor, a flashlight photograph taken at midnight after the recent performance of *Becket*, before the Queen and Court, by Mr. Irving and his company. The scene represents the four knights and Rosamund gathered round the body of the murdered archbishop. The photograph is a fine piece of work.

Mr. J. R. Gotz, of 19, Buckingham-street, Strand, has submitted to us samples of Iris diaphragms which can be made to any size desired within limits, and to any possible aperture, and can be adapted to the lens without the tube being cut. The novelty Mr. Gotz claims is the adoption of vulcanite for the blades, which, for damp climates, should be an advantage. These Iris diaphragms are neatly made and work easily and smoothly.

Mawson & Swan's Exposure Note-book.

We have received the latest issue of Messrs. Mawson & Swan's *Exposure Note-book*. Besides useful hints on exposure and spaces for recording exposures given, a variety of formulæ and suggestions that would be serviceable in development and other operations are included.

Harrison & Sons, Leeds, send us an illustrated sheet showing their new form of head-rests, which, by comparison with their original stands, seem much lighter and in various forms, some for standing on the floor, others for attaching to the back of a chair. Several of them have also supports for the back of the subject.

The Weeks & Brill Co., photo-engravers, of 702, Chestnut-street, Philadelphia, have forwarded us several examples of their copper half-tone process. The reproductions, which are chiefly of well-known pictures, are charming in their softness and gradation, and are, besides, extremely well printed.

Anthony's *International Annual* contains more than the usual number of really fine photographs and engravings. The frontispiece is a lovely portrait by Dana; others are by Zabriskie, Dr. P. H. Mason, Romyn Hitchcock, John G. Bullock, Horace Gridley, Husnik, J. T. Bedford, Pach Bros., G. W. Wundram, W. A. French, and others. The literary matter is of the usual class.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 5922.—"Improvements in Apparatus for Separating and Manipulating Plates, Cards, or Films, primarily applicable to Plates, Films, &c., in Photographic Cameras." H. G. M. Contbeare.—*Dated March* 20, 1893.

No. 5932.—"An Improvement in the Manufacture of Photographic Plates." O. Magerstedt.—*Dated March* 20, 1893.

No. 5980.—"An Improved Hand Camera." A. C. Smith and A. A. Smith.—*Dated March* 21, 1893.

No. 5993.—"Improvements in, or appertaining to, the Exposing Devices of Hand Cameras or the like." C. Coventry.—*Dated March* 21, 1893.

No. 5894.—"Improvements in, or appertaining to, the Exposing Devices of Hand Cameras or the like." C. Coventry.—*Dated March* 21, 1893.

No. 6335.—"Improved Construction of Tripod Framing for Photographic Cameras, Music and Reading Desks." J. H. Rosoman.—*Dated March* 24, 1893.

SPECIFICATIONS PUBLISHED.

1892.

No. 5756.—"Photographic Dark Slides." KIRBY.
No. 8316.—"Photographic Plate-holder." SCOTT.
No. 8324.—"Photographic Cameras." BELL.
No. 8646.—"Photographic Cameras." ESTCOURT.
No. 8659.—"Photographic Cameras." EDWARDS.
No. 10,353.—"Photography." MARONIEZ.

PATENTS COMPLETED.

IMPROVEMENTS IN MEANS FOR OBTAINING PHOTOGRAPHIC IMAGES.

(Communicated by Auguste Lumière and Louis Lumière, 21, Rue St. Victor, Lyon Montplaisir, France.)

No. 5892. CLAUDE KENNEDY MILLS, 23, Southampton-buildings, Middlesex.—*February* 25, 1893.

IN treating alkaline manganates or permanganates with acids, and more particularly with organic acids, such as tartaric acid, citric acid, oxalic acid, lactic acid, &c., the communicators have succeeded in obtaining salts of sesquioxide, or of binoxide of manganese, the greater number of which have been incapable of preparation hitherto.

These manganic salts are sensible to light, and under its influence are reduced to the condition of manganous salts.

The invention consists in the application of this property to the obtaining of photographic images by a process of which the following is a description :—The salts of sesquioxide and of binoxide of manganese, employed alone or combined with reducing substances, or with bodies which increase their sensitivity, are reduced by light.

These salts can, therefore, be employed to impregnate paper (ordinary, gelatinised, coated, albumenised, &c.) either by using them in aqueous solution in a collodion, or mixed with mucilages.

The collodions with manganic salts, or the mucilaginous solutions of these same salts, can also be spread upon glass or other support.

The sensitive surfaces are brown, yellow, greenish, or red, according to the manganic salts employed. They become white at the parts acted upon by light.

In treating the proofs thus obtained with an approximate reactive inert upon manganous salts, but capable of giving a precipitate or a colouration with the manganic salts not reduced by light, the image will be fixed, and at the same time its colour and intensity will be modified.

In order that the invention may be more clearly understood, I will give the description of one method of working.

Permanganate of potash is treated with lactic acid, which gives a brown solution ; to this is added glucose, a reducing body which increases the sensitivity, then it is filtered, and on the surface of this liquid is floated a sheet of gelatine paper.

This is dried and exposed to the light behind a positive image. When the proof is well decolourised in the ground, it is treated with a solution of hydrochlorate of para-amidophenol, which, in becoming oxidised wherever the manganic salt has not been acted upon by light, gives a brownish black colour to these places. It is then only necessary to wash and dry it.

The lactic acid may be replaced by another organic acid (oxalic, citric, tartaric, acetic, &c.); the permanganate of potash may be replaced by another alkaline or earthy alkaline permanganate, or even by a manganate, and the glucose by another reducing agent (sulphite of soda, hydrate of chloral, &c.)

The following substances may be used as developer fixers :—Salts of monamines, of diamines, of amidophenols, their homologues, &c. The following substances have given good results :—

Nitrate of aniline, sulphate of diphenylamine, hydrochlorate of naphtylamine, toluidine, hydrochlorate of phenylene diamine, hydrochlorate of benzidine, sulphate of para-amidophenol, aniline, toluidines, gnaicaol, &c.

Various tones can be obtained by then treating with a base or with an acid.

What is claimed is :—The application to photography of manganic salts, employed alone or combined with reducing substances, to obtain a sensitive surface, which, after exposure to light, will be treated with reactives capable of differentiating the non-affected manganic salts from the manganous salt resulting from the reduction of the manganic salt by light.

IMPROVEMENTS IN OR RELATING TO THE DARK SLIDES OF PHOTOGRAPHIC CAMERAS.

No. 5756. ANTHONY HOGARTH KIRBY, 20, Cornwall-terrace, Manningham-lane, Bradford, Yorkshire.—*March* 4, 1893.

THIS invention relates to the dark slides or receptacles for containing plates or films sensitive to light to be exposed in photographic cameras, and has for its object to provide a means or stop for preventing the sliding shutters of such dark slides from being pulled out too far when exposing a plate or film to light.

According to my invention I cut out of sheet metal, preferably brass, two L-shaped or similarly shaped springs for each of the sliding shutters of the dark slide. These L-shaped springs are countersunk into the substance forming the inner lower portion of the sliding shutters, one on either side of same, and such springs are made fast at their bases by means of screws, for instance, to the said sliding shutters so as to slide up and down between the grooves in the framework of the dark slide. A small portion of the framework inside the top part of the grooves is cut away in such a manner that, when the sliding shutters are drawn out the full distance to effect the exposure, the L springs shall take into auch cut-away parts, and so prevent the shutters from being further withdrawn, but yet allow of their being easily slid back after the exposure.

IMPROVED PLATE-HOLDER OR DARK SLIDE FOR PHOTOGRAPHIC PURPOSES.

No. 8316. THOMAS SCOTT, Victoria-crescent, Eccles, Lancashire. *March* 4, 1893.

MY said invention relates to an improved construction of plate-holder or dark slide for holding plates or other sensitive media, and exposiug them in a camera.

According to my said invention, the "rabbet," or equivalent projecting part of the holder opposite to the shutter, and against which the plate bears when in register, is formed on, or attached to, a hinge or flexible flap, in such a manner that when the shutter is withdrawn the said flap may be raised and the plate may be removed. When, however, the sliding shutter is closed, the shutter presses down the said flap and retains the plate securely in position. When the plate-holder is in the camera, and the shutter is withdrawn, the said flap will bear against part of the body of the camera, and, being securely held thereby, the plate will be retained in register, and prevented from falling into the camera. A groove is provided for receiving the shutter, and more securely holding the flap down while excluding light. For the latter purpose the joints of the flap with the sides of the plate-holder are also made angular or bent. A corresponding hinged flap may be formed immediately under the shutter at the end where the shutter is inserted or withdrawn in such a manner as to simultaneously act as a "rabbet" for retaining the plate, and as an automatic "cut off" to exclude light when the shutter is entirely withdrawn.

My said invention is applicable to both single and double plate-holders. For the latter the flaps are arranged in pairs on opposite faces of the plate-holder.

One or more springs may be provided for causing the flap to be continually pressed upwards, and I preferably make the edge of the "rabbet" which receives the end of the shutter with a bevelled or curved edge, on to which the end of the shutter may easily slide.

The usual springs are provided for pressing the plate upwards against the bearing surfaces to ensure perfect register, as will be well understood.

IMPROVEMENTS IN MEANS FOR CHANGING FILMS AND PLATES IN PHOTOGRAPHIC CAMERAS.

No. 8646. ERNEST ESTCOURT, 8, Canfield-gardens, Hampstead, London, N.W. *March* 4, 1893.

THIS invention has reference to improved means or apparatus for transferring films or plates, one at a time, from a magazine adapted to be applied to a photographic camera into a bag or receptacle formed of material impervious to light, in order that the film or plate can then be transferred, in a manner well understood, into the exposing chamber of the camera, the object being to enable a greater number of films or plates to be carried in a magazine of a given size than has heretofore been usual.

For this purpose I provide at the back of the magazine a frictional feeding device that may advantageously consist of friction wheels or rollers covered or provided at the periphery with suitable material such as indiarubber. that will cause motion of a film or plate pressed in rubbing contact therewith.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 10	Camera Club	Charing Cross-road, W.C.
,, 10	Darlington	Trevelyan Hotel, Darlington.
,, 10	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 10	Lantern Society	20, Hanover-square.
,, 10	Norfolk and Norwich	Bell Hotel, Norwich.
,, 10	North Middlesex	Jubilee House, Hornsey-road, N.
,, 10	Putney	Boys' Gymnasium, Charlwood-road.
,, 10	Richmond	Greyhound Hotel.
,, 11	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 11	Derby	Smith's Restaurant, Victoria-st.
,, 11	Great Britain	50, Great Russell-st. Bloomsbury.
,, 11	Hackney	206, Mare-street, Hackney.
,, 11	Manchester Amateur	Lecture Hall, Athenæum.
,, 11	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 11	Paisley	9, Gauze-street, Paisley.
,, 11	Rochester	Mathematical School, Rochester.
,, 11	Stockton	Mason's Court, High-street.
,, 12	Ipswich	Art Gallery, Ipswich.
,, 12	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
,, 12	Leyton-stone	The Assembly Rooms, High-road.
,, 12	Munster	School of Art, Nelson-place, Cork.
,, 12	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 12	Southport	The Studio, 15, Cambridge-arcade.
,, 12	Stockport	Mechanics' Institute, Stockport.
,, 13	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
,, 13	Camera Club	Charing Cross-road, W.C.
,, 13	Cheltenham	
,, 13	Glossop Dale	
,, 13	Hull	71, Prospect-street, Hull.
,, 13	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 13	North Kent	Gravesend.
,, 13	Oldham	The Lyceum, Union-st., Oldham.
,, 14	Bristol and West of England	Rooms, 28, Berkeley-sq., Bristol.
,, 14	Cardiff	
,, 14	Croydon Microscopical	Public Hall, George-street, Croydon
,, 14	Halifax Camera Club	
,, 14	Holborn	
,, 14	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 14	Maidstone	"The Palace," Maidstone.
,, 14	West London	Chiswick School of Art, Chiswick.
,, 15	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

MARCH 28,—Technical Meeting,—Mr. J. Spiller (Vice-President) in the chair.

PLATINOTYPE PRINTING.

Mr. F. Hollyer, who was to have given a demonstration of platinotype printing, was unable to be present on account of illness. In his absence a short discussion on the subject took place, opened by

Mr. H. A. LAWRANCE, who asked how to prevent objectionable brown tones when printing from a hard negative?

Mr. CHAPMAN JONES said he usually found clear glass give good blacks.

Mr. E. W. PARFITT had been informed that the brown tones complained of were due to new paper.

Mr. W. E. DEBENHAM thought a brown image could be obtained by over-printing.

In reply to a question, Mr. LAWRANCE said he did not find the acid clearing bath affect the tones of platinum prints.

Mr. T. SEBASTIAN DAVIS remarked that the early experiments of the chairman negatived that.

Mr. LAWRANCE said it seemed to him that platinum paper had a comparatively small range of gradation as compared with carbon or silver.

Mr. CHAPMAN JONES said it depended on the negative. Platinum paper might be made to give almost any curve.

Mr. L. WARNERKE said he had tried platinum paper by means of his sensitometer, and found he could see the gradations a great deal better than on silver paper. He had found the same result with iron paper.

The CHAIRMAN asked what were the advantages in the new cold process over the hot, looking at the splendid results the latter gave.

Mr. WARNERKE said that it admitted of local development.

Mr. DEBENHAM also said that, when the prints were successful, a finer range of tone could be obtained.

Apropos of platinum-toned prints, the CHAIRMAN said that, in order to ascertain whether a print was in platinum alone or was a platinum-toned silver print, the application of a solution of potassium cyanide would decide the point. The cyanide would attack the toned print, and not the pure platinum print.

After further discussion on the subject, the evening concluded with a display of lantern slides sent by the Leeds Photographic Society, an affiliated Society.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 30,—Mr. J. S. Teape in the chair.

THE AFFILIATION SCHEME.

The HON. SECRETARY read a letter from the Photographic Society of Great Britain, stating that under the new rules of the Society members of affiliated societies who had been members of those societies for not less than two years were eligible for election to the Photographic Society of Great Britain on the nomination of the secretaries of their own societies and without entrance fee.

In reply to a question from the box asking for methods of getting clouds on the same plate as the landscape, Mr. R. BECKETT said that brushing the sky portion of the picture over with a solution of bromide had been recommended. Another plan was to start development with a very small proportion of pyro, in order to get the image out all over the plate before obtaining density.

THE SANDELL PLATES.

Mr. S. HERBERT FRY delivered an address on *The Sandell Multiple-coated Plates*. [The paper will appear in a future number.] In illustration of points in his address, Mr. Fry showed a number of negatives and prints by Mr. Sandell, and pointed out that although some of them were taken in strong sunlight soft results were obtained. The rapidity of the upper film was evidenced by several hand-camera negatives which were shown. Having described the nature of the double and triple films, Mr. Fry went on to speak of development, and said that, although the makers recommended eikonogen-hydroquinone, experience had shown that pyro was suitable. For over-exposure development should be tentative. Various claims had been made on behalf of the plates, namely, that they were suitable for instantaneous work and interiors, that they provided a cure for halation, that they gave better and rounder images with better "aerial perspective" than ordinary plates, and that they were specially useful for beginners. Having dealt fully with each of these claims, Mr. Fry concluded by advising users of the plates not to resort to stripping.

Mr. W. E. DEBENHAM observed that Mr. Fry had said that the use of the Sandell plates would enable one to obtain a larger range of gradation in a photograph, and had pointed out that, although some of the pictures shown were taken in sunshine, the brightly lighted parts appeared as well lighted as photographs taken of subjects where there was no sunshine. He (Mr. Debenham) regarded these as extremely valuable features. It had long been a reproach to photography that no method would give a full range of gradation, but in the examples before them they certainly got a much greater approach to it. As to the claim that this form of plate materially prevented the evil of halation, it was a point the importance of which he was fully alive to. They must all recognise that of the pictures sent to the most recent exhibitions a good many had suffered terribly from that evil. Therefore, anything which tended to show photographers how much better their work might be was exceedingly useful. How few pictures in an exhibition did we see where the gradation in bright sunshine beats that seen in the examples shown, particularly in the picture of the Queen's vinery? If the statements as to greater range of gradation and freedom from halation are borne out by repeated and careful trial and experience, as they appear to have been borne out in the specimens shown, photographers would learn so much that they would no longer be content to send to the next exhibition photographs defective in technical qualities.

Mr. SARGEANT said that a day or two before he had exposed four of Thomas's plates on the interior of a first-floor room in the Adelphi, but had not obtained the best results. He had tried again, using Sandell plates, and had obtained very successful negatives. The photographs were really beautiful. He had followed the instructions given as to exposure and development, his only trouble being in the fixing, which took a long time.

The CHAIRMAN had used the General plate experimentally to test its power of preventing halation as compared with an ordinary plate. He had compared an ordinary plate with a Sandell plate, and, as regards halation, the latter was undoubtedly a great advance, but members of that Association well knew that there were means that could be used to prevent halation, and if they were used the Sandell plate compared with ordinary plates backed was not such a great advance as it appeared at first sight to be. In his experiment he had used an opaque screen with eight diamond-shaped holes, and to these he had exposed a Sandell plate, an unbacked Paget XXX plate, and a backed Paget XXX. In the experiment he had not used the best backing medium, otherwise the result would have been still more remarkable. The three plates were exposed at the same time at a distance of fifteen inches from the illuminant, which was five inches of magnesium ribbon burnt in lengths of quarter inch half inch, and so on, up to the full quantity. The three plates were developed in one dish, and treated in precisely the same manner. The halation in the unbacked plate was enormous, in the backed plate there was a little halation, but in the Sandell plate very much more. After describing other experiments, the Chairman observed that his experience was that with backed plates with the most prolonged exposure there was no fear of halation. The backing he used was as follows:—

Caramel	1 ounce.
Gum solution	1 ,,
Burnt sienna	2 ounces.
Methylated spirit	2 ,,

In the course of his reply, Mr. FRY suggested that the Chairman should repeat his experiment with this modification, which is a vital one, that instead of treating both plates alike with the same developer, he should do the best for each plate. If he developed the Sandell plate in a tentative manner, he would secure the image clear and sharp. He (Mr. Fry) had made two exposures of three minutes on Sandell plates, and developing one had got the most horrible blurring and reflection. He cut the other one into four, and with a weak developer and the use of bromide he had got absolutely no trace of the blurring of the image.

The CHAIRMAN promised to repeat the experiment in the manner suggested by Mr. Fry, and after some further discussion a vote of thanks was passed to Mr. Fry for the paper.

North Middlesex Photographic Society.—March 27.—Mr. Cox produced a print toned with uranium, which had become bronzed in the shadows, but he showed that this bronze could be removed by rubbing with a soft rubber eraser, and showed no tendency to return. Mr. S. E. WALL then read his paper, entitled, *Photography and Archæology*. He fully explained the differences between the different styles of architecture, beginning with the Roman, and following with the Saxon, Norman, Gothic, &c. He exhibited on the screen numerous slides of the most notable examples of the different styles, explaining their beauties and chief characteristics, beginning with the Roman baths at Bath, erected about A.D. 400, and following with Norwich, Hereford, Tewkesbury, Canterbury, Winchester, Salisbury, &c. He strongly recommended photographers to pay more attention to architecture, as being a subject abounding with interest.

Hackney Photographic Society.—March 28, Mr. E. Puttock in the chair.—Mr. Gosling asked, "could a portrait lens be used for landscapes?" Mr. R. Beckett said, "Yes, in many instances; but there was a weakness, on account of the liability to flare-spot. Stopping down decreased spherical aberration." Mr. Dean asked if any member could say where a table could be found in which the relative proportions between light reflected and that refracted from a polished plane surface of glass at various angles, ignoring the factor of opacity in the glass diminishing the strength of rays refracted? Mr. Avent thought it could be found in *Monckhoven's Optics*. Work was shown from Mr. Cross. Mr. GRANT said, when the Sandell plate first came out, he took a view at sunset—light strongly reflected from water, very dark under trees, without halation—with an exposure that could not have failed to have produced it on any other plate. Mr. SODEAU suggested for comparison to try exposures on a Sandell and an ordinary, backed with caramel and burnt sienna. A series of views by Mr. Scamell, entitled *London Street Cries*, was then put through the club lantern, after which a few slides from Mr. Hudson were shown.

Blackheath Camera Club.—March 29, Mr. J. F. Field (Vice-President) in the chair. A lecture on the Sandell plate was given by Mr. S. HERBERT FRY. The lecturer laid much stress on the suitability of these plates for hand-camera work, as the top film is very rapid, and the plate will stand any amount of forcing in development. The claims that these plates will not show halation, and will give full details in the shadows without the high lights becoming blocked, were fully substantiated by the numerous prints shown, all of which were of very fine quality. Time exposures should always be ample, as the plates cannot practically be over-exposed, but in such cases development should always be started with a weak solution, to avoid darkening or fogging the upper film, and thus prevent the operator from watching the progress of the image on the lower film. In cases of extreme over-exposure, the upper film becomes solarised, the image being formed on the slower film underneath. A fixing bath of eight ounces to the pint was recommended, on account of the unusual thickness and richness of the films.

Ashton-under-Lyne Photographic Society.—March 29.—Dr. A. HAMILTON gave a demonstration on *Platinotype Printing* (new cold process), and developed three prints. The first was done by passing the print through the solution; the second, by placing the print on a sheet of glass, and then, by means of a brush, distributing the developer over it. The last was a picture

which he had not been able (by any other means) to get a satisfactory print from before. By this process he brought it out beautifully. He did this by local development with the brush.

Liverpool Amateur Photographic Association.—March 30, Mr. Paul Lange in the chair.—Seven new members were elected. Mr. F. A. Schierwater exhibited and explained a new dark slide for films, and Mr. B. J. Sayce showed some paper negatives taken in 1850 to 1852. Mr. W. J. Chadwick, of Manchester, gave a lecture and practical demonstration of the optical lantern, showing the advantages to be gained by the use of triple condensers; also the application of the lantern for scientific purposes, for chemical and electrical experiments, cohesive figures, &c. The first excursion of the season was announced to take place on Saturday, April 15, to Ince Blundell Hall.

FORTHCOMING EXHIBITIONS.

April 7–8	*Croydon Camera Club, Braithwaite Hall, Wellesley-road, Croydon. Hon. Secretary, G. R. White, 55, Albert-road, Croydon.
,, 10–29	*Crystal Palace. The Executive, Crystal Palace, S.E.
,, 12–15	*Bolton Photographic Society. Hon. Secretary, J. E. Austwick, 10, Rushton-street, Bolton.
,, 17–29	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.
May 4–6	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

TINTING PLATINUM PRINTS.

To the Editor.

Sir,—I enclose herewith a *cold-bath* platinotype print which has been toned with a *strong infusion of black tea;* and, as no other process with which I am acquainted gives the same look of age, I thought perhaps you might think it worth while to let the readers of the next issue of The British Journal of Photography know how simply this look of a very old print can be given to a platinotype when the subject is a suitable one to be thus toned. The enclosed was copied from a very old and *brilliantly coloured* engraving or print, an isochromatic plate and yellow screen was used, and the colour value is exceedingly well rendered.—I am, yours, &c.,

J. Reynolds, M.D.,
President of the Brixton and Clapham Camera Club.

11, *Brixton-hill, S.W., April* 3, 1893.

[In the print sent, Dr. Reynolds has well simulated the effects of age.—Ed.]

TEMPERATURE OF DEVELOPING SOLUTIONS.

To the Editor.

Sir,—I am half inclined to question a statement in the last number about the great danger in developing in cold weather with ordinary water, on account of its increased coldness, as I have always been under the impression that water supplied from the mains was wonderfully equal in temperature summer and winter; and that if to the hands water felt colder in winter than in summer, the feeling was due more to the state of the surface of the body than to an actual difference in temperature.—I am, yours, &c.,

Geo. H. Slight.

165, *Romford-road, Forest Gate, March* 29, 1893.

REDUCING ACTION OF HYPO ON AMIDOL DEVELOPED PRINTS.

To the Editor.

Sir,—A correspondent, in your last issue, asks if anyone has similar experience to his as to bromide enlargements, developed with amidol, fading away after thirty minutes in the fixing bath. I beg to say that I have had the same experience after twenty to twenty-five minutes. The hypo was a fifteen per cent. solution. I have not observed any ill effects after five to ten minutes.—I am, yours, &c.,

S.

April 1, 1893.

A PLEA FOR QUALITY.

To the Editor.

Sir,—Though, when writing my letter of March 7, which you had the kindness to publish, I was cognisant of the fact of samples and price-lists having been sent out by Messrs. Willis & Co., nevertheless it seems strange to me that this firm should in such a hurry apply my criticisms to itself personally and alone. This I never intended, and there is not a phrase nor sentence in my letter which could thus be interpreted. If Messrs. Willis & Co. supply something good in quality of board and *also in finish*, and at a cheap price, why, then all right, I will be the last to feel aggravated. I would not dare to intrude upon the columns of your Journal for the sake of fighting for material interests; even a business man—the man of figures—should also have *ideal* aspirations, and not consider his own personal existence as of paramount importance.

I pointed out in my letter that "I do *not* plead in my own *nor* [the type-setter put of his own accord, it seems, the word *but;* why, I don't know] in the interest of card-manufacturers of a higher level, *but* in the interest of the *photographic art!*" and in this way I think I defend best also the interest of the *consumers*. For a tendency in another direction—a degeneration of quality and finish—one can hardly ever expect to deserve or earn the gratitude of the consuming public. Finis!—I am, yours, &c.,

A Card-manufacturer.

March 30, 1893.

"ATTICUS'S" LAST WORDS.

To the Editor.

Sir,—Mr. G. Watmough Webster is mentally idiosyncratic, and "Atticus" had no desire, therefore, to disturb Mr. Webster's literary placidity. "Atticus's" first letter contained two points. First, he describes a home-made appliance for rapid solution making. Second, he owns to being amused at the "resurrection" of old methods and processes. This produced an ebullition of bile—literary or otherwise—causing Mr. Webster to reply offensively, stating that "Atticus" "was of no account, and made statements not to be found in any other copy." The succeeding letters of "Atticus" were therefore *purely defensive*, the quotations being from Mr. Webster's own articles, which your readers on reference thereto will find truthfully quoted. To insert the full text was impossible for obvious reasons.

Mr. Webster is entitled to his opinion; certainly "Atticus" has his, and Messrs. Martin & Co. have theirs. Opinions may differ, but statements and claims made in a public journal are permanent records, and open to public criticism. If Mr. Webster now denies making a claim for inventing the utensil in question, what *does* he mean when he stated, "In my own case the invention was spontaneous. . . . . Doubtless in our case the invention was original, whichever can claim priority of publication?"

Mr. Webster has objection to "covert sneers." "Atticus" don't like them—covert or otherwise. "Atticus" therefore indignantly protests against (as exceeding the limits of ordinary courtesy) Mr. Webster's "covert sneers"—under advice to the Editor—for that gentleman to be satisfied that the money is forthcoming in case of adverse adjudication against "Atticus." This request has a flavour of fishing for the verdict. "Atticus" considers this an unwarrantable impertinence and interference, and the only course open to him is to peremptorily withdraw from the controversy, which he now does regretfully in consequence.

However, the half-a-guinea promised to the funds of the Photographers' Benevolent Association, in case the award was adverse to "Atticus," is enclosed; "Atticus" requests that it be forwarded to the Secretary of the Benevolent as a further evidence of "Atticus's" interest in, and good-will towards this invaluable Institution.—I am, yours, &c.,

April 3, 1893. Atticus.

[As "Atticus" has withdrawn his challenge, we have returned Mr. Webster's letter to the latter gentleman—of course, unopened. "Atticus'" cheque for 10*s.* 6*d.* has been duly handed by us to the Hon. Secretary of the Photographers' Benevolent Association. The matter here terminates.—Ed.]

PROPOSED HAND CAMERA CLUB.

To the Editor.

Sir,—Will you kindly allow me to propose, through your columns, the formation of a Hand Camera Club. I consider the time quite ripe for such a movement, and it must be admitted that the hand camera receives but slight attention in the routine of ordinary society work. This must of necessity be so, as it only forms one branch of many. Yet I venture to think that the earnest hand-camera worker would like greater opportunity of discussing and hearing about hand cameras. Several well-known workers to whom I have mooted the idea think favourably of it, and I now ask any one interested to communicate with me direct. The proposed lines would be:—

1. A nominal subscription, say, about 2*s.* 6*d.*

2. Conducted on social lines, like the Photographic Club.
3. Confined strictly to actual workers, but no other restrictions.
4. Meetings monthly at first.
5. Comparing results, discussions upon new apparatus, and, in fact, the usual kind of society show, but confined to work.
6. Some system, perhaps, of a circulating portfolio to keep in touch with provincial members.
7. Some of the meetings, perhaps, in the provinces.

And, of course, there are other matters. If the idea meets with any kind of support, I shall be pleased to call a meeting.—I am, yours, &c.,

57 *and* 58, *Chancery-lane, W.C.* WALTER D. WELFORD.

A SOCIETY FOR CHEETHAM.

To the EDITOR.

SIR,—A new Society, open to amateur and professional photographers, has been formed in Cheetham, Manchester, and the Secretary is Mr. W. E. Hurnell, 21, Larch-street, Hightown. Next meeting, April 11, there will be a demonstration by Mr. W. T. Wilkinson (the President) on *Development*. The Society meets at 490, Cheetham Hill-road, Manchester, every alternate Tuesday.—I am, yours, &c.,

W. E. HURNELL, *Hon. Sec.*

21, *Larch-street, Hightown, Manchester.*

"A PAIR OF COMPLAINTS."

To the EDITOR.

SIR,—Whilst commiserating with Mr. John Power upon his unfortunate negotiation, I must say his sneer at "gallant little Wales" is most ungenerous. Does he think that *all* photographers on the borders of Wales are *Welshmen?* I can assure him not *five per cent.* are. Are there no *English photographers* in "Bonny Scotland?" It *may* have been a Welshman who served him the scurvy trick, but to apply the tar-brush to the *whole* borderland of Wales is a bit unjust. There are "black sheep" in most lands—Mr. Power happened to find one; but surely, having the man's address, a remedy lies in Mr. Power's hands, if it's "worth the candle."—I am, yours, &c.. J. HORTON.

26, *Caroline-street, Cardiff.*

THE CONVENTION SLIDES LOST.

To the EDITOR.

SIR,—May I ask you to give prominence to the fact that the circulating set of slides, issued by the Devon and Cornwall Camera Club in connexion with the forthcoming meeting of the Convention, has been lost in transit?

As I cannot recover any trace of them to the present, I am reluctantly compelled to provisionally cancel their engagements, but will put them on the road again as soon as I recover them, and will arrange fresh dates for those Societies that have been disappointed.

To the present I have absolutely no information as to their whereabouts, and can only express my regret to all who have been disappointed.—I am, yours, &c., B. HANSFORD WORTH, *Hon. Secretary.*

42, *George-street, Plymouth, March* 28, 1893.

"A HARD CASE."

To the EDITOR.

SIR,—Having passed through, in my early days of photography, the painful experience—or, rather, want of experience—of your correspondent in "A Hard Case," I can sympathise with him much.

Let "A. E. S." take courage from the following:—After three years' apprenticeship, which meant, in my case, a knowledge of silver printing and the art of mounting—and but little else practical photography except that gained in my back garden—I found myself expected to take a "sit." away from home. Not feeling any more confidence in myself than "A. E. S.," I took a place as assistant operator and retoucher, and managed (by hard work) to suit my employer. Leaving there, I next obtained a "sit." as operator and retoucher in a busy seaport town, and practised on the sailors, &c.; after nine months of that, during which period I had won half the battle, viz., gained confidence, I again sought pastures new, and obtained an appointment in a good-class business as operator and retoucher, which shortly resulted in my being made manager.

Therefore, my advice to "A. E. S." is to get a place in a cheap-class business first, and quietly work his way "up," and I feel sure he will soon reach his level.—I am, yours, &c., MANAGER.

March 28, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange whole-plate camera with three-fold stand for a cushion safety.—Address, G. CLARKE, Grove-place, Saffron Walden.

Wanted, exterior background, in good condition, in exchange for a fine-toned mandoline.—Address, W. J. RICHARD, Photographer, Fore-street, Collington, Cornwall.

12×10 camera, new, all movements, in exchange for good hand camera; also good *carte* lens, exchange for whole-plate wide-angle lens.—Address, W. G. MARTIN, 115, High-street, Merthyr Tydfil.

Will exchange a portrait lens by Lerebours (cabinet), a fine vignetted 8×6 background and burnisher, for whole-plate portrait lens.—Address, R. BROWN, Chateau Studio, Boulevard, Weston-super-Mare.

Wanted, set of Haddon Hall steps; offered, in exchange, Dallmeyer 15×12 lens, good as new, in leather case, or a midget camera for taking six on a half-plate, with six portrait lenses.—Address, A. DEBENHAM, 28, Union-street, Ryde, Isle of Wight.

Will exchange vol. xxxix. and Nos. 1618 to 1651, clean, unbound, THE BRITISH JOURNAL OF PHOTOGRAPHY, and vol. liii. *English Mechanic* (Hanover on "Construction of Microscope"), unbound, for Thornton-Pickard time and instantaneous shutter, or one of good make, size of lens-hood one and a half inches.—Address, W. H. NICHOLSON, 44, Windsor-street, Brighton.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street Covent Garden, London.*

PHOTOGRAPHS REGISTERED:

John Stuart, Glasgow.—*Four photographs of the Rev. Adam Cleghorn Welch, Helensburgh.*

Charles Walker Clarke, Devizes.—*Photograph of a drawing of the Market-place, Devizes, in the olden time.*

Francis Hoare, Cirencester.—*Photograph of a collection of enlarged photographs at the Cirencester Industrial and Art Exhibition, April* 3, 1893.

G. Watmough Webster, Chester.—*Photograph of the Chester Beagles, with group of people without the Master; also a photograph including the Master.*

W. BIRRELL.—Received; thanks.

F. C. GREEN (Chihuahua).—Received and forwarded.

P. BEBBINGTON.—Write to Mr. T. Samuels, Linden House, Hadley, Barnet.

J. AUSTIN.—1. Rives paper is mostly used. 2. There would not be any copyright in such prints.

F. B.—1. You will have to pay duty on taking English plates into the States. 2. Yes, 4¼×3¼ is an American size.

OUVRIER.—We cannot say whether you have a legal remedy; we should recommend you to consult a solicitor on the point.

HERR RICHARD LEO (Paulinenstrasse, 48, Stuttgart).—Mr. Gambier Bolton's address is, The Camera Club, Charing Cross-road, W.C.

DIAL (Glasgow).—In our volume for 1891 you will find a series of articles on Burnt-in Enamels, which will give you the necessary information.

A RUSSIAN READER.—The apparatus named is excellent. The makers would no doubt adapt the shutter to the camera front. A larger front could, of course, be made to take it.

B. F.—The formula will do very well. Use a gelatine similar to that employed for dry plates, say, Heinrich's. The paper must be used the day it is sensitised. In cool weather it will sometimes keep till the following day.

W. A. M.—If the lens is so firmly fixed in the flange that it defies the ordinary method of unscrewing it, run a little paraffin oil round the thread from the inside and allow it to soak for an hour or two. This treatment will generally enable the lens to be unscrewed with ease.

C. R.—If the lens is not in focus when it is set according to the scale on the mount, it is clear that the scale is in error. It may be that the camera is not the right one for that particular lens. Call the attention of the manufacturers to the matter. They can easily rectify it.

MEDAL.—The photographs in question were not taken direct from the coins. They were taken from casts in plaster of Paris specially made for the purpose. It is more than probable that the plaster was tinted so as to be more amenable to the plate; anyhow, that is the usual method.

C. WADE.—The price charged between plate glass and sheet glass, for the frame for the enlargement, is by no means "extortionate." The price of plate glass is about twelve times that of sheet glass, and as there is ten square feet of it, you can judge for yourself as to the reasonableness of the charge.

W. KERSHAW.—The pictures are a little flat, from the lighting. There is evidently too much front top light. We should advise you to have the side light in the studio made larger. That will enable you to obtain better results. A longer exposure would have been beneficial in the examples forwarded.

P. KELLY.—There is nothing in the picture to indicate that the lens is in any way faulty. But as you say the picture was taken with the smallest stop, it is scarcely a fair criterion, for a lens must be very inferior indeed that will not take a fairly good picture with a very small aperture. What will the instrument do with its full opening?

B. A. THOMAS asks how to ascertain what size condenser is required for enlarging from a given size negative, whether there is any set rule in the matter?—Measure the diagonal of the negative, and whatever that may be is the diameter of the condenser that is necessary for the work. It is always well to have it a quarter or half an inch larger, to allow for any little marginal defects.

D. CAMPBELL asks if it is possible to make a mixture of albumen and gelatine that will keep good so that it can be used as required.—Yes. The best way will be to beat up the albumen as for preparing albumenised paper, then dissolve the gelatine in the desired proportion of water, mix, and afterwards add an antiseptic, such as a little carbolic acid or thymol. When the mixture is again liquefied, it must not be heated beyond the coagulating point of albumen.

WARWICK says: "I have sent to two dealers in photographic chemicals for an ounce of cyanide of potassium, and they refuse to supply it, as they, so they say, would incur a heavy penalty by so doing, and refer me to the chemists. On applying to no less than four of them they said they did not keep it. Surely there should be some means of obtaining the material?"—Cyanide of potassium is prohibited under the Pharmacy Act to be sold by other than duly qualified pharmaceutical chemists; but, as the salt is not contained in the pharmacopœia, very few keep it in stock. It may be procured from any pharmaceutical chemist who makes a speciality of photographic chemicals, and there are many about London and the large provincial towns.

P. E. C. says: "1. I should be greatly obliged if you could answer the following:—I have found, almost immediately after sensitising, my paper is covered with metallic spots, as piece enclosed. Cannot solve the difficulty. 2. Also would you oblige by answering the following:—I work with the chloride of lime toning bath. What is the cause of it not toning rightly after addition of gold? I make every precaution not to get the bath in any way mixed up with any chemicals whatever."—1. The spots are caused by particles of foreign matter floating on the surface of the bath or settling on the paper while it is drying. 2. If the bath is rightly prepared, it will tone properly. Probably some injurious substance has contaminated it as in the case of the paper.

A. E. & Co. write: "We are desirous of building another glass house to print in, &c., during wet weather, but we wish to erect it in a way so as to be free from all risks of having to pull it down again by order of the Council. Neither do we want to submit plans, with the accompanying expense, delay, &c., to the district surveyor. Can you help us out of our difficulty? We are told, by making it a movable one, we are within the limits. Is this so?"—No. On the whole, we are inclined to think the best plan will be to consult the district surveyor. The County Council are very particular as to all buildings that are not "fireproof" under the meaning of the Metropolitan Building Act. If the work is done without the offices of the surveyor, the Building Acts had better be obtained, and their conditions duly considered before commencing operations.

H. W. L. writes: "Could you give me the cause of the spots on the enclosed print? This is only one of a number I have had like this the last few days. If I had not fixed them myself, I should have put it down to their not being moved about sufficiently; but I fixed them myself, and kept them moving the whole time, and fixed for about twelve to fifteen minutes, time that I always have given my prints, but have never had this sort of thing before. The only thing I feel it can be put to is this. On the first occasion that they appeared I opened a fresh tub of hypo, and I think that some inferior article has been sent me and charged at full price. Do you think it could be caused by the hypo? I am going to use a fresh sample to-night, when I may be able to draw a better conclusion; but perhaps you will give me your opinion on the matter."—We have seen very similar effects caused by the use of inferior hyposulphite of soda, but it is impossible to say if that is the case in the present instance. Of course, as a fresh sample is obtained the results by the two kinds can be compared and an opinion formed.

X. A. Y. writes as follows: "Last week a monument to a late very popular man in our town was erected in the public cemetery. As soon as it was finished, a rival of mine photographed it, and the following day I also took a photograph of it. Now I have received a lawyer's letter, saying that his client, the other photographer, has made his photograph copyright, and threatens me with legal proceedings if I publish my picture. Can he stop me publishing my picture? I have just learnt that the lawyer's letter was not sent from a solicitor, but was written by a friend of his, a solicitor's clerk. I fancy the whole thing is a bit of bounce, but your opinion will be esteemed."—Our correspondent cannot be prevented from publishing his picture to his heart's content. The first man can only secure copyright in his work, not in the monument itself. With regard to the "lawyer's letter," if this is written in such a way that it comes from a duly qualified solicitor, it should be forwarded to the Incorporated Law Society, who will possibly take action against the writer for penalties.

PHOTOGRAPHIC CLUB.—April 12, Members' Open Night. 19, *Cold Bath Platinotype Experiences.*

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—April 11, Mr. William Parry will read a paper on *Retouching.*

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—April 13, Paper by Mr. W. D. Welford, *The Influence of the Hand Camera.* 20, Monthly Lantern Night.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—April 11, Ordinary Meeting, a paper on *The International Congresses of Paris,* 1889, *and of Brussels,* 1891, by Mr. Leon Warnerke.

MESSRS. R. SUTTON & Co., of Ludgate-hill, have in the press a new edition of *The Microscope, and How to Use it,* by Mr. T. Charters White, M.R.C.S., F.R.M.S. It is illustrated with photo-micrographs by the author.

THE FORFARSHIRE PHOTOGRAPHIC EXHIBITION.—At the request of English exhibitors, the time for entry forms for this Exhibition to be returned has been extended to Tuesday, April 11. The Judges are Messrs. Marshall Wane, Adam Diston, and W. D. Welford.

STATUARY PORTRAITS.—Mr. C. C. Bradshaw, of 57, Market-street, Manchester, has been appointed agent for Messrs. G. B. Bradshaw & Co. of Altrincham's method of producing statuary portraits, and is prepared to grant licences to photographers desiring to adopt it.

WE are informed that Messrs. Mawson & Swan's largely increased trade has rendered it necessary for them to enlarge the size of their factory. The new buildings are now complete, and in full working order, and have doubled the size of the factory as compared with this time last year. The firm have put down new engines, electrical and other machinery.

THE SANDELL EXHIBITION.—During the week April 17 to 22 an Exhibition of photographs, chiefly those taken by Mr. Sandell (on "Sandell" plates) during a recent visit to Italy and Switzerland will be on view at 24, Regent-street, S.W. The proceeds are to be handed over by Messrs. R. W. Thomas & Co. to the Photographers' Benevolent Association, a body which, we are pleased to notice, has lately been doing such a large amount of good among needy members of the profession that it deserves on this occasion to be widely supported. Admission is by ticket only—Monday, Tuesday, and Thursday, 1*s.*; Wednesday (special ticket), 2*s.* 6*d.*; Friday and Saturday, 6*d.* Tickets may be obtained of the Hon. Secretary to the Benevolent Association, Mr. H. Snowden Ward, Memorial Buildings, E.C., or at the offices of THE BRITISH JOURNAL OF PHOTOGRAPHY, 2, York-street, Covent-garden, W.C.

THE FREE PORTRAIT SCHEME.—At Folkestone Quarter Sessions on Wednesday, George Gould was to have surrendered to bail to answer an indictment charging him with conspiracy with others to defraud a large number of persons of various sums of money by means of the free portrait scheme. There were over seventy witnesses in attendance, many having come from Ireland and Scotland, and the Treasury had retained Mr. Crump, Q.C., to conduct the prosecution. On Gould's name being called, no answer was made, and it was eventually decided to treat the defendant as an absconder. The recognisances of his sureties, two in 200*l.* each, were ordered to be estreated, and a bench warrant was issued for the arrest of Gould. The sureties stated that the defendant left the town about three weeks ago, and as soon as they learnt of his absence they followed him to London, but failed to discover his whereabouts.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—Meeting of Committee, held in the rooms of the Photographic Society of Great Britain, on Monday, March 27, Mr. A. Mackie in the chair.—The Secretary reported that he had just secured a permanent situation for an assistant who had received help from the Association at intervals all through the winter. There were five applications for assistance, and three of the applicants attended. In one case a loan amounting to 5*l.*, and in another case 3*l.*, was granted. In the third case, which was a particularly difficult one, owing to the applicant's inability to speak much English, a temporary grant of 10*s.* was made, and applicant was referred to a gentleman of his own nationality. The two cases in which the applicants did not appear personally were referred back to the Secretary, with instructions to make further inquiries, and to grant assistance in certain contingencies. Messrs. H. D. Miles and G. Fowler Jones were accepted as subscribers, and the Secretary acknowledged special donations from the *Photographic Review of Reviews* charitable fund, 2*l.* 2*s.*; anonymous, 5*s.*; two prize winners in photography competitions, 12*s.*

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1719. Vol. XL.—APRIL 14, 1893.

LENS STANDARDS.

The chaotic state in which the spring of 1893 finds our lens standards is far from being creditable to any one concerned. Reasoning from analogy, it would be surely possible, by concentrated action, to confer an inestimable boon upon a long-suffering photographic public. The analogue is one to which we have on a previous occasion directed attention, and held up as an example—the microscope.

Many years have not yet elapsed since, when visiting an ex-President of the Royal Microscopical Society, he showed us an instrument of great excellence in his possession, and we were specially struck by the array of adapters for object-glasses which formed a part of the outfit. It appeared that only a short time previous to this each maker of microscopes was a law unto himself, and the objectives of one manufacturer would by no means fit any but the one instrument for which they were made; hence the multitude of adapters required. This evil was terminated when, by a *pronunciamento* of the Society, one standard screw was adopted by every maker, in virtue of which the objectives of A or B fit the microscope stand of C with equal facility as those sent out with it. This is the kind of thing we desire to see universally adopted in regard to the lens fittings and flanges in use by photographers.

So long a time has elapsed since a Committee appointed by the Photographic Society of Great Britain delivered their report and recommendations, that it is a matter of surprise their standards have not long ere now been adopted, and yet the number of those manufacturers who have done so is still limited.

This subject is being brought by Mr. William Taylor, of Taylor, Taylor, & Hobson, before the notice of the Camera Club Conference which opens on the Wednesday of the present week, for we write this before the meeting has yet been held. We are as yet unaware of how the subject will be treated by Mr. William Taylor, who by the way, we know to be an exceedingly expert and cultured mechanic, and one whose firm has received high medal recognition in connexion with their photo-optico-mechanical exhibits at the last Exhibition of the Photographic Society of Great Britain, but we cannot doubt that from his mechanical training he will recognise and urge the importance of absolute uniformity in lens flanges being a *sine-quâ-non*. His is one of the firms that have adopted the standards of the Photographic Society of Great Britain, which were not suggested without much care and deliberation, and, doubtless, we shall hear much concerning these standards that will interest and instruct.

For ourselves, we do not care so much about the adoption of any one species of standard over another, whether the final suggestion emanates from France, Germany, or England, as for the ensurance of uniformity that will be of an international character. That the following scene should be capable of being enacted is nothing more nor less than a disgrace. A few days ago we took to the country a whole-plate camera with three lenses of somewhat differing foci but of nearly equal flange screw apertures. But not one would precisely fit the other, and in consequence we had to take three camera fronts, with their respective flanges screwed on, these flanges differing in aperture from each other only to the extent of a sixteenth of an inch. That such could be the case is not creditable to the state of mechanical photographic art at the present day.

We can perfectly sympathise with old-established firms who, having long ago adopted certain flange standards, have stuck to them, and feel loth to make a departure; still, we consider that, in the interests of those who use lenses, a sacrifice ought to be made in the cause of uniformity.

This uniformity in apertures of diaphragms is a matter of quite subsidiary interest, because, although these apertures might be ever so antagonistic one to the other, it is a matter of trumpery moment, for one can always fall back upon the "F" or area system and name the intensity ratio for himself by a simple measurement of aperture to focus; but, in the case of flanges, it is a totally different thing. If this were once established, then could dealers all the world over keep adapters in stock in readiness to sell to any one who, on the spur of the moment, desired to adapt a small lens to the large flange screwed on his camera front.

THE CITY AND GUILDS INSTITUTE AND PHOTO-MECHANICAL WORK.

We are pleased to observe that increasing efforts are being made to place within popular reach practical instruction in photo-mechanical work, the need of which has recently been freely expressed, coupled with something like a general belief that not only are our Continental friends superior to ourselves in the quality of the results they produce, but also in the facilities they enjoy for obtaining the requisite technical and practical knowledge at comparatively low fees. A study of the advantages possessed by the magnificent photographic educational establishments at Berlin and Vienna under Vogel and Eder will demonstrate the superior position in which young photographers of Germany and Austria are placed in respect of studying photo-mechanical processes compared to those of this country.

The recent lectures and demonstrations on photogravure, organized by the Photographic Society of Great Britain, were a

step in the right direction, and, from the general interest evinced in them, we have every confidence that—at least, indirectly—they will bear good fruit by promoting increased attention to the preparation of intaglio plates for photographic reproduction.

The subject has evidently attracted the notice of the City and Guilds of London Institute, which, as our readers are aware, holds periodical examinations in photography; for we have received a notice stating that "the Council of the Institute, recognising the increasing importance in the mechanical reproduction of pictures, will, in the forthcoming examinations to be held on the 3rd and 13th of May next, give special importance to this branch, by dividing the examination in the Honours Grade into two classes—one for pure photography, and the other for photo-mechanical photography. Special examiners have been appointed for each branch, and candidates have the option of declaring in which branch it is their intention of entering. They will not, however, be allowed to compete in both branches. The certificates granted will show in which of the two divisions the candidate has passed."

We join with the Council of the Institute in the hope that the encouragement thus given to the photo-mechanical division will tend to form in this country a school of competent craftsmen in this branch of photographic work.

A Sunday Show.—Most are now familiar with the work of Mr. Burne Jones through the excellent platinotypes of Mr. Fred. Hollyer. It is interesting to know that, while the Burne-Jones Exhibition at the New Gallery was open for three hours on Sunday last, it was visited by nearly 2400 persons, who were admitted by tickets. Evidently Mr. Burne Jones's work is appreciated, and so are Sunday exhibitions of paintings.

A Gift to the City.—The Art Gallery of the Corporation of London, Guildhall, is to be further enriched. Sir John Gilbert, R.A., has intimated to the Lord Mayor his desire to present to the Gallery a selection of his works, both oil and water-colour, which have figured in recent years at Burlington House and Pall Mall. Of course, the valuable gift will be accepted. It is not generally known to many that the City Corporations possess, though not an extensive collection, some very fine works of art that will repay a visit.

Death of Mr. Vicat Cole.—Landscape painting has met with a great loss by the death of Mr. Vicat Cole, R.A. One of Mr. Cole's finest works is the *Pool of London*, which was exhibited a few years, and was purchased out of the Chantrey Fund. It is now at South Kensington. The works of this artist might well be studied by photographers, as the majority of the subjects are such as are generally dealt with by landscape photographers. We understand that the late artist's last work is to be exhibited at the Academy next month.

Recent Sunlight.—It requires no argument to prove that we have had sunlight far above the average in amount during the last month. Mr. Sowerby, of the Botanic Gardens, Regent's Park, has published the exact proportions in which we have been favoured. March 1887 had 62·55 hours; 1888, 33·4 hours; 1889, 48·3 hours; 1890, 65·5 hours; 1891, 76·35 hours; 1892, 69·5 hours; the present year, 116·16 hours! Such an amount is almost phenomenal, for this record is not the mere total of the sun's appearance, but of the hours it was powerful enough to stamp its mark on the cards of the instrument for recording sunshine used in these Gardens.

Animal Charcoal.—Few of our readers but have at one time or another attempted to use charcoal for decolourising, as, for example, with shellac varnish. It is not, however, always understood that vegetable charcoal, the kind usually purchaseable in the chemists' shops, is of no use for this purpose: animal charcoal must be used. The form in which it is usually called for varies in different countries where the main demand is for purifying sugar. Thus, in Austria, pieces the size of a walnut were used. In Germany the maximum size is a filbert. In France the size varies from that of grains of linseed up to that of a filbert. In England and America it is required almost wholly of the size of millet seed. The decolourising action is explained by one set of authorities as chemical, and by others as purely physical.

Another New Process.—It was announced some time ago that the Messrs. Lumière were experimenting with manganic salts as photographic agents. In our last issue will be found the specification of a patent they have applied for in this country for their process. From that it will be seen that it is not difficult to work, neither ought it to be costly in practice, and it is said that a variety of tones can be obtained. MM. Lumière's process will, doubtless, quickly receive attention at the hands of experimentalists. Whether silver will ever meet with a formidable rival in manganese or not remains to be seen. Anyhow, the subject is an interesting one, just now that silver printing is apparently entering somewhat on a new phase as regards commercial work, and it should receive consideration. There is one point in connexion with the manganic method that does not add to its simplicity in working, namely, that the prints are not made direct from the negative, but, as in the primuline process, from a transparency. This rather handicaps a printing process, however otherwise excellent.

Fading "Permanent" Prints.—It may seem an anomaly to speak of permanent prints as fading, yet the thing is, in a sense, of every-day occurrence. Collotypes and prints by other photo-mechanical processes may be classed as permanent, yet a considerable proportion of them undergo a very marked change with even a comparatively short exposure to light. This is not due to the processes themselves, but to the employment of fugitive pigments in the ink, and also to the frequent use of paper tinted with evanescent dyes. We have before us now some enamelled paper supplied by a Continental house for collotype work, which is as deeply coloured, and apparently with the same dye, as the rose-tinted albumen paper, and the colour is equally as fugitive by exposure to light. If these roseate pigments were simply entirely discharged, the prints would often not suffer materially; but unfortunately they usually leave an unpleasant, dirty, yellow effect behind. The marked effect of the light on this class of picture is frequently to be seen after a few days' exposure in the shop windows or at railway book-stalls.

Measuring Flasks.—Every one accustomed to exact work is acquainted with the value of flasks rather than graduated glass measures for accurately measuring liquids. For making pyroxylin, for example, it is not possible to obtain sufficient uniformity in successive products when the required quantity of water is measured with an ordinary graduate; a flask should always be used, where the liquids are not indeed weighed. In using flasks, there is some time wasted in obtaining the liquid exactly up to the graduation line, and Mr. Alex. F. Reid, in the *Chemical News* last week, has described a simple and efficient mode of facilitating the operation. It consists of a wooden or indiarubber plug, with a flange to support it, and fitting loosely into the neck of the flask, and of such size that the part of it that goes in the flask has the same volume as the part of the flask above the mark. To use it the flask is filled with water, say, past the graduation mark, and then the stopper dropped in and withdrawn. The surplus water runs out and the right quantity remains. The stopper has a tapered point, to admit of quick insertion and facilitate the running off of the water upon withdrawal.

Lens-exposing in the Studio.—We have just spoken of, as a common studio expedient, the use of an internal shutter for portrait work. It is true that it is common, but it is very far from being universal. We have been in very many studios where this primitive method—by no other less unflattering name can it be called—of exposing the plate by uncapping the lens is still employed. Yet this is very remarkable, the advantages of a shutter with pneumatic action are so patent. Take, for example, the exposing of a group. The eye of the photographer ought never to leave his subject's, yet it is most difficult to avoid doing so unless the exposure is made mechanically. The same in taking photographs of young children; ten minutes may elapse before a single favourable moment arrives, and the mere action of raising or moving the hand sufficiently to uncap the lens is enough to upset the child's face. The verdict of experienced workers with whom we have discussed this matter is, that a shutter self-setting is the best—one that is always ready for use, and merely requiring a squeeze of the pneumatic ball and a release—to expose and leave set for the next exposure; also that it is far better for it to work inside the camera, thus leaving nothing whatever that can draw the sitter's attention, be he child or adult, while the exposure is proceeding.

Photographs on Textile Fabrics.—Seeing that so many photographers are now seeking for some new or novel style or description of picture, one cannot but feel some little degree of surprise that the production of photographs on textile fabrics is so much neglected. The thing is by no means new, as we saw silver prints on silk, and really good ones too, some five-and-twenty or thirty years ago. Photographs on fabrics could be utilised in many ways, especially for decorative purposes. They can be made on a great variety of materials, and by several different processes. A few years ago we were shown a collection of photographs of fans printed on satin by the collotype process that were of very *recherché* character. Of course, instead of satin, any other fabric could have been employed, and, in place of collotype, any of the other methods of mechanical printing might have been used. Direct prints on fabrics are easily obtained either by silver printing or by the platinotype process. Fabrics ready prepared for both processes were—and, we believe, still are—regular articles of commerce. Then, again, there is the primuline process of Messrs. Green, Cross, & Bevan, which enables pictures, in a great variety of colours and almost any kind of fabric, to be obtained in a very simple manner. With so many methods of production at disposal, there is no reason why this phase of photography should have been so much neglected.

A Precaution for Continental Tourists.—The season is now coming on when tourists will be considering their holiday arrangements. Those who propose to travel on the borders of France and Germany will do well to provide themselves with passports; more particularly is this the case if they are accompanied with photographic *impedimenta*. Passports are not really necessary for either France or Germany, but we were told at the Foreign Office a short time back that it was advisable for British subjects to be provided with them when travelling on the frontiers of the two countries. Photographing in the neighbourhood of fortifications on the frontier is strictly forbidden, even though they are not included in the view, or cannot even be seen from the print. Through ignorance of this rule, foreign visitors have sometimes innocently been subjected to great inconvenience, not to say indignities. It is in such cases as this that the passport is of advantage. The holder of an English Foreign Office passport, duly *viséd*, would at once be acquitted of being a spy by either country. A passport can be obtained for two shillings by application to the Foreign Office on the proper form. When the document is obtained, it is well to get it countersigned at the Consulates of the two countries. Passports, like revolvers, are rarely required when travelling now, but when they are they are generally of great service.

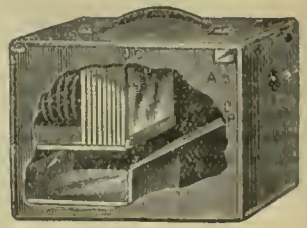
The Camera in Anthropology.—Mr. E. F. im Thurm recently gave a paper on this topic before the Anthropological Society of Great Britain. He points out that, in taking photographs of savages, special care has to be taken to avoid getting them in that "non-natural" state so often characteristic of such pictures. For example, he has seen the same savage native in a town and in the country, and he looked like two different individuals, though his costume was little more in each case than a yard of tape—literally, a single strip of cloth about a yard long and two or three inches wide. It cannot but be remarked that the lecturer himself did not go about his work in a very workmanlike manner for the end in view. Thus, instead of working a camera with an internal concealed shutter, he, in a description of a very amusing experience, tells us he simply caps and uncaps his lens. "The first time I tried to photograph a red man was among the mangrove trees. My red-skinned subject was carefully posed high up on a mangrove root. He sat quite still while I focussed and drew the shutter. Then, as I took off the cap, with a moan he fell backward off his perch on to the soft sand below him, nor could he by any means be persuaded to prepare himself once more to face the unknown terrors of the camera. A very common thing to happen to foil the efforts of the photographer at the very moment when he has but to withdraw and to replace the cap is for the timid subject suddenly to put up his hand to conceal his face," &c. It is surprising that it never occurred to Mr. im Thurm to adopt a studio expedient now common enough.

CRYSTAL PALACE PHOTOGRAPHIC EXHIBITION.

The "National" Photographic Exhibition at the Crystal Palace opened on Monday last, April 10, and is advertised to remain on view until the 29th inst. It is to be regretted that in neither the apparatus section nor that devoted to photographs does the Exhibition redeem the character of "National" that has been assigned to it, a result that must undoubtedly create an unfavourable impression in the photographic world, and at least a feeling of surprise among the general public. Taking the photographs first: the responses of exhibitors, although producing on the whole a passable display, cannot be considered at all representative of the present state of photographic art, while as regards the apparatus the exhibits scarcely exceed ten in number, and these betray an unfortunate paucity of novelties, and are, besides, of such meagre extent that the entire contents of the stalls might comfortably be placed in a shop of moderate size.

The Apparatus Section.

At four o'clock on Monday afternoon the following was the state of the Apparatus Section:—Messrs. R. & J. Beck, of Cornhill, had a handsome stand showing a series of fine enlargements from negatives taken in the "Frena" hand camera; Messrs. J. Theobald & Co., of 43, Farringdon-road, an extensive display of optical lanterns, coloured slides, limes, condensers, stand cameras and stands, hand cameras, and photographic sundries generally. Included among Messrs. Theobald's exhibit is a cheap and ingenious hand camera, the "Meteor," in which sheathed films or plates are used, the sheath with the exposed plate being released by a single turn of a screw at the side of the camera, and sliding down an incline into the back of the camera as shown in the cut. The "Meteor" has but two little brass knobs, and the handle to carry it by, projecting, and two view finders (which are let in flush with the body); is cloth-covered, has twelve sheaths carrying twelve plates or films, the special lens working with a time and instantaneous shutter inside the camera, and again worked by turning a little brass catch. It can be used for taking views or portraits both vertical and horizontal, and all for 12*s.* 6*d.*



Messrs. D. Noakes & Sons show several serviceable lanterns, cameras, with lathes at work; Messrs. T. W. Couch & Co., of 11, Bow-lane, a selection of pictures set in a variety of choice frames; Messrs. Platt & Witte, of Kingsland, cameras and camera fittings; Mr. J. D. England, film negatives and prints from them, as well as lantern slides; the Sciopticon Company, of Colebrooke-row, lantern slides of their well-known quality. The Cresco-fylma Company, of Surbiton, have a display of excellent cresco-fylma enlargements from transparencies on opal supports of various elegant shapes other than the purely rectangular, with matt and glazed surfaces. The Company are to demonstrate the process during the Exhibition.

The Welsbach light as arranged for studio portraiture, which we recently described, is to be shown in action by Mr. C. F. Treble, of Clapham Junction. The only other exhibit we observed was a mechanical contrivance for showing a number of photographs in rotation by Mr. Southward. In this a wound spring drives an exterior fan, which rotates a series of cog-wheels that actuate a series of holders upon which the photographs can be placed and inspected as they rotate. When wound, the apparatus keeps in motion for ten hours.

THE PICTURES.

In the absence of a catalogue or of any information with regard to the classification of the photographs or the competitions for which they are entered, it becomes rather difficult for us to criticise them with special reference to those conditions, and we must therefore take them *seriatim*. Inasmuch, however, as most of the pictures on view have already run through numerous competitions, and are consequently familiar to our readers either by reputation or from closer acquaintance, we are hardly called upon, in most cases, to devote a minute attention to their particular merits or demerits. There is, nevertheless, one feature in connexion with this part of the Exhibition to which we ungrudgingly accord a favourable notice, and that is the arrangement of the photographs in separate alcoves, and the capital light by which, happily, they can be inspected. In this respect exhibitions of photographs at the Crystal Palace always stand out pleasantly, as compared with the indifferently hung and poorly lighted displays it is our misfortune so often to encounter in exhibition halls of the usual type.

The "National Challenge Cup," for the best collective exhibit by a recognised photographic society, has, so far as we could discover, attracted entries from the following societies:—Birmingham, Hackney, South London, West London, Tunbridge Wells, Hove Camera Club, Brixton and Clapham Camera Club. If any other alcoves devoted to society work have been omitted from this list, the fault is not ours.

The Birmingham Society send up about eighty frames, most of them of very great excellence, and including some fine portraits. The names of the various members are not attached to the frames, so that it is impossible for us to write in detail of the pictures, but of their general good quality there is no doubt.

The Hackney Society play a strong hand with Mr. S. J. Beckett's Norwegian series, Mr. G. Hankins's hand-camera work, Mr. J. Carpenter's exquisite study of flowers, Dr. Roland Smith's technically good interiors, Mr. J. O. Grant's *Sheep Shearing* and *Adjutant*. Mr. R. Beckett shows a forcible study of a head, and Mr. W. F. Jones a clever flashlight picture entitled *A Poser*, two gentlemen seated at chess. The alcove, on the whole, is an extremely good one.

Mr. F. W. Edwards is a tower of strength to the South London, that gentleman's architectural and Tinworth work, beautifully printed in platinum, being unexcelled in the Exhibition. Other members who are particularly prominent are Mr. Oakden (with good interiors of Ely Cathedral, and a cleverly composed view of Norwich), Mr. W. Howell, Mr. H. E. Farmer (architecture, and a successful *Study of Beeches in Epping Forest*), Messrs. J. W. and W. F. Slater.

In the West London Society's alcove the eye is arrested by the President's (Mr. Hodges) very impressionistic *Drear December*, Mr. W. S. Rogers's *Coaling—Tyneside* (a small study full of life), Mr. W. L. Coll's pretty view of *Basingstoke*, Mr. L. C. Bennett's familiar *Pool* and *Rubbish Burners*, Mr. L. Selby's reposeful *Evening Calm*, Mr. Adam's *Frozen Swamp*, and Mr. W. H. Whitear's tiny, but clever, study of moon and sea, *The Moonpath;* Mr. Charles Whiting, Mr. Charles Winter, and other members, also combine to make the West London exhibit a particularly fine one.

The Tunbridge Wells Society's exhibit comprises some good cloud studies and views in Cairo by Mr. J. Chamberlain; while Mr. F. G. Smart, with a fine snow scene and an attractive view of Aberdeen Harbour, renders material support. The rich warm tones, the careful selection and exceptionally good technique of Mr. E. R. Ashton's *Monastery*,—*El Ghariani*, and a series of similar subjects, impart a distinctive charm to the Society's alcove, in which Messrs. Cassingham, Wood, and others are advantageously represented.

Mr. A. H. Webling has ably managed the lighting of a charming view, *Across the Lake at Arundel*, and also shows another clever effect in *Sunset—Shoreham Harbour*, and these, with Mr. Charles Job's hand-camera work, and Mr. J. Williamson's unforced picture, *Easy Times* (a group of fishermen gossiping), are perhaps the most noticeable exhibits of the Hove Camera Club.

Dr. Reynolds, the President of the Brixton and Clapham Camera Club, in the Club's alcove, shows a realistic tea-tinted platinum copy of an old print, *Smoaking*, and several evenly rendered interiors obtained by exposures of five, six, and seven hours on asphaltum-backed plates. Mr. C. F. Archer's delicate and well-lighted study, *Grandpa*, Mr. W. Thomas's small sheep studies, Mr. J. A. Butler's well-chosen, bustling *View in Amsterdam*, the charming lady in Mr. Archer's harmoniously lighted *Interested*, and excellent pictures by Mr. Bartrop, Mr. Kent, and Mr. Golby, are conspicuous in the Club's exhibit.

On the whole, the competition for the challenge cup among the competing societies is so keen that we do not envy the Judges the task of coming to a decision.

Coming now to the other exhibits, Mr. W. M. Warneuke, of Glasgow, has a series of masterly direct portraits of Toole, Miss Kingsley, Wilson Barrett, Miss Johnson as Desdemona, Vezin as Shylock, together with half a dozen comparatively small landscapes. We have so often complimented Mr. Warneuke upon the excellence of his large work that criticism becomes superfluous; but, if there is one picture more than another in his present exhibit that we prefer, it is the Vezin picture, which is full of the freest, boldest handling, and conveys an effect of massiveness not often seen in character portraits. Mr. H. Hallier, of High-street, Upper Sydenham, shows about forty frames of portraits and interiors, his pictures of children betraying great skill in juvenile portraiture. In Messrs. Morgan & Kidd's alcove are some very refined examples of carbon, platinum, and collotype, but interest must undoubtedly centre in the fine big bromide enlargement (from a negative by Mr. Van der Weyde) of Miss Mary Anderson, in which the softness and gradation are perfect. A scene from *Hypatia* (from a negative by Alfred Ellis), enlarged to 8 × 4 feet, and another enlarged portrait, are of equal excellence. They are splendid examples of bromide enlarging.

Messrs. James Robinson & Sons have some very fine portraits, notably one, *An Irish Beauty*, which has a character and vigour not always to be discerned in ladies' portraits. *Miss K. Oram*, *The Earl of Aberdeen*, and *Marie Roze* give Messrs. Robinson an opportunity of showing the possession of high artistic skill. The beauty of the sitters in *An Irish Lady* and *The Countess Annesley* make us almost forgive Messrs. Robinson the slight unevenness of tone apparent in the gelatino-chloride pictures; but otherwise they are of high merit. In another alcove Mr. P. Lange is represented by some capital hand-camera work, and, passing by some clever pictures of turkeys and pigeons by Mr. P. Parsons, we come to a number of pictures of ironclads and kindred subjects by Mr. J. E. Goold, with which, technically, no fault can be found. One of them represents an instantaneous photograph of a torpedo leaving the ship's side at a speed of forty feet a second, and showing the angle at which it strikes the water. As a photograph it is a marvel of sharpness.

Mr. F. T. Palmer has a numerous collection of portraits, and Mr. F. Fitzpayne shows a capitally exposed *Nave of Wells Cathedral*. Hereabouts, too, are Sir Henry Roscoe and Mr. Lunt's *Bacteria from Sewage;* a series of views by Mr. P. Welch illustrating the North of Ireland tourist district; Diston's humorous *Rehearsal*, *Soldier's Return*, and *Highland Smugglers;* Mr. Lord's *How's that!* some animated illustrations of *Golfing* by Mr. Lange; and a selection from Mr. Sandland's lion, tiger, and buffalo pictures, and his excellent horse picture *Unyoking*. May we suggest to Mr. Sandland that he is less successful with his composition subjects including the human species than with his animals? Messrs. S. B. Bolas have some good examples of collotype; Messrs. Poulton, a selection from their well-known series; Messrs. Gregory, of the Strand, coloured types of the British army.

Mr. W. P. Marsh, of Bognor, has rarely shown better seascapes than those he has here, both small and large. He seems to have studied the sea in nearly all its moods, and the result is a fine collection of wave pieces, all cleverly caught. A blue carbon print, *After a Sou'-Wester*, is especially good in its realism, and a study of *A Breaker* not less so.

What soft, evenly lighted work can be produced by flashlight, Mr. R. Slingsby, of Lincoln, shows by several very fine examples. Mr. Douglas Pym's touched and untouched portraiture are both noticeable for their good qualities, and in *Dad's Pipe*, a boy in three stages of a bout with the paternal calumet, there is considerable quiet humour as well as great photographic merit. We do not like Mr. Pym's *Repose*, however. This shows a very lightly clad, finely limbed young lady, simulating sleep in a recumbent position, with so little relief in the face that the result is not convincing. Mr. Dresser has a screen filled with his well-known works. Mr. E. M. Stone shows three small views, *A Yorkshire Coble*, *Filey*, and *On the Thames*, with nice sepia tones, sharp, crisp, and well printed, which are certainly amongst the finest things of the kind in the Exhibition. Mr. Court Coles's interiors, the Hon. S. Bethel's *Shipping at Guernsey* (a freely handled picture), and the same gentleman's *Clouds*, with Mr. T. Scotton's *Musselburgh Fishwives* and cathedral studies, are safe to hold the attention of even the non-photographic visitor to this part of the display.

Examples of statuesque portraits of a high degree of skill are shown

by Mrs. Frank Holmes, of Bristol. We would recommend professional photographers to study them. *Steady*, two men fishing, and in the act of getting a bite, is a clever bit of work by Mr. H. Young, the effect being perfect.

Mr. T. M. Brownrigg's *Winter Sunset, Derwentwater*, and *Morning on the Wey* are especially evident in an Exhibition singularly free of impressionistic pictures. Messrs. Alfred Werner & Son show a few large portraits of a superior quality, pose and lighting being exceptionally fine. Finally, Mr. Goodwin, of Anerley-road, makes a highly meritorious display of portrait work—indeed, the Exhibition is commendably strong in professional portraiture—and Mr. C. F. Treble, of Clapham Junction, besides exhibiting some examples of portraiture by the Welsbach light, which show perfect tone rendering and freedom from harshness, includes a varied collection of large and small portraits of great beauty in his alcove. Mr. Treble's examples in sepia platinotype are remarkably engaging in their compromise between critical sharpness and diffusion; and, indeed, the exhibit as a whole is a fine one.

It should be mentioned that the Judges only met for the purpose of making awards on Thursday (yesterday), and that while the Exhibition is open there will be nightly lantern entertainments.

AMERICAN NOTES AND NEWS.

The Smartness of the "Heathen Chinee."—It is pretty evident that the mental or, rather, the moral characteristics of the Celestials in America have not suffered any change since those days when Ah Sin, the gentleman whose "smile was so childlike and bland," engaged in the ever-celebrated game of euchre with truthful James and Bill Nye. In May next the Chinese Registration Act comes into force. This necessitates each Chinese labourer in the country presenting himself at the office of the Collector of Inland Revenue with proper vouchers from the Chinese Consul, on which certificates are to be pasted a photograph of the bearer, a duplicate of this being returned to him, which he is compelled to show on demand to any United States official as his authority. Here, now, comes the smart part of it, for which information we are indebted to Mr. Julius F. Sachse, Editor of the *American Journal of Photography*. The photographic part of this certificate is in reality the only means by which it can be determined whether the holder is the same individual to whom it was granted, as the description given would in most cases fit ninety-five out of a hundred Chinamen. But a photographic chemist in Philadelphia has been teaching the Celestials how to produce photographs which, within a few months, would so fade as to fail in the identification of the individual, while the written description would still remain. The authorities are taking steps to circumvent and punish the conspirators.

Cleaning and Photographing Old Oil Paintings.—A writer in the same journal, who has had experience in copying oil paintings, gives the following as his mode of cleaning old paintings previous to their being photographed:—After dusting, wash the painting by a sponge and rain water, and then sponge over the surface the following:—The white of two eggs, beaten up and cleared, a tablespoonful of glycerine, and half a litre of water. The object of adding the glycerine is to prevent the albumen from drying in spots, which would appear dull, and prove of injury to the reproduction.

Focal Plane Shutter.—The employment of this class of shutter is strongly advocated in our Philadelphia contemporary. It is constructed in the same way as the Thornton-Pickard shutter, but its position, instead of being close to the lens, is situated in front of, and as close as practicable to, the sensitive plate. The roller blind composing the shutter has a narrow slot in it, and travels rapidly across the plate. We are personally aware that some bicycle scenes, of exquisite sharpness and well lighted, were taken by Mr. James Inglis, formerly of Montreal, by a metal shutter constructed on this principle, and working at the focal plane. These were exhibited six years ago at one of the London societies. It was estimated that the exposure was about the thousandth of a second.

Requirements for Success.—Mr. Xanthus Smith lays down as conditions of success in the studio or portrait branch of photography, perseverance, good business ability, a large amount of good address and tact, and, highest of all, artistic taste or good judgment in matters of art. The special qualifications for outdoor photography are, in his estimation, good general artistic sense, quickness of perception, rapid and sound judgment in selection and timing, this last being necessary to cope with the changes in the conditions of lighting, of subject, and of exposure.

Animal Life.—In the portrayal of animal life, Mr. Smith holds the utmost pains should be taken; in the first place to acquire a knowledge of the poses in which different animals show their good points to the best advantage, the best lighting and accompaniments, chiefly as to background, for the success of a great part of animal photography is marred by carelessness about the backgrounnd. In addition, great patience and perseverance are required in the management of animals in photography; but, when success is attained, we have in refined pictures of handsome animals one of the most interesting phases of the photographic art.

Miss Barnes's English Trip.—In the *American Amateur Photographer* Miss Barnes continues the account of her camera trip in Great Britain, illustrating her paper with several views, mainly of archæological subjects in Yorkshire, such as *Fountain's Abbey* and *Old Remains in the City of York*, very nicely phototyped on stout calendered paper.

Coincidence or Plagiarism?—Knowing the honesty of the American journalists, and their promptness in acknowledging the sources from which their reprint articles are taken, we are the more surprised at Dr. John H. Janeway making himself, in his *Index Rerum Photographie*, an exception to this well-recognised rule of courtesy. Interested in seeing what he had to say on the flare-spot or ghost, we read his (?) article on that subject in the last-named serial, and found it to be a reproduction, *verb. et lit.*, of what we published a few years since, without the slightest acknowledgment. While we feel it a compliment to have articles from this journal reproduced by American friends, we must certainly draw the line at such appropriation as that just indicated.

DETERMINATION OF PLATE SPEEDS.

[London and Provincial Photographic Association.]

Before commencing my paper, a few words are necessary to explain the reason of my appearance before you this evening. Those of you who read The British Journal of Photography may have noticed that, on January 27 and February 3, there appeared two articles over my signature, headed, "Determination of Plate Speeds." Immediately following publication, there also appeared a mass of correspondence, some of it of a very violent tone, and most of it irrelevant to the question at issue. To this correspondence I replied briefly, to the effect that I should abide by my experiments; and such was my courage of my own opinions that I offered to submit *everything* to a disinterested jury, and I further offered to repeat any individual experiment such jury might select. To this challenge none of my dissentients have responded. It might be thought that, in making such offers, I would be pretty safe, by reason of the disinclination of any of these parties to try conclusions with me, especially when so wide a chasm separates us in the views we hold of the theory involved in the matter; but, as I was not disposed to allow this subject to rest where it was, it is with full belief that I shall be fairly dealt with at your hands that has prompted me to lay before you an account of *my* "investigations," accompanied by examples. I thereby constitute the London and Provincial Photographic Association my jury, and I shall be glad if you will accord me a patient hearing.

In bringing this subject before you, I am assuming that most present will have read my previous remarks in The British Journal of Photography of January 27 and February 3. In case any have not, I will endeavour shortly to outline them.

Messrs. Hurter & Driffield's Investigations and the Speeds of Plates.

You may be aware that some three years ago Messrs. Hurter & Driffield published their "Investigations." Beyond creating some

surprise in photographic circles, I am not aware that their remarks produced any further effect than what might have been expected from the publication of matter of so distinctly controversial a character. Many of their conclusions were so totally at variance with the preconceived notions of most photographers, including myself, that, like other things, one might have expected the subject would be a nine days' wonder, and then fall into oblivion; but, for reasons best known to themselves, certain manufacturers of dry plates have thought fit to adopt the system introduced by these gentlemen, and have issued boxes of plates marked on the outside with speed numbers in accordance with the method of Messrs. Hurter & Driffield. I, like others, have been a purchaser of these plates. Without recapitulating much that has already been published in my previous articles, suffice it, perhaps, to say I think it is beyond controversy that, if we purchase plates bearing speed numbers according to *any* method or system, we have a right to demand that the goods so sold shall be what they are represented. From the dealers and from the makers direct I purchased many boxes of plates, bearing speed numbers of 37, 80, 95, 100, 135, and 140. I tried a variety of experiments in different ways, to ascertain whether the relative speeds, as indicated on the boxes, were borne out in actual practice, and I finally adopted the method of exposing two competing plates side by side in a stereoscopic camera. I need not dilate upon the accuracy of this method beyond any other known method of competitive camera comparisons of the sensitiveness of different plates. Supposing the possibility of error, the method I adopted of making duplicate, and even triplicate, tests, and thereby reversing the positions of the plates, at once serves to expose any error, and enables one to judge with accuracy any difference in results.

As you will see by the examples I will hand round, the subject was one well calculated to test the rapidity of plates against one another, and very fine shades of extra sensitiveness in one or the other of any given pair of competing plates could be readily observed. I must point out to you where the variations in sensitiveness are chiefly to be detected. The stove you see in the negatives is dead black, and stands within the recess of a dead black grate. You will detect differences, where it exists, in the sensitiveness by closely examining all around these dark parts, and in the relief ornament of the grate, the horse-shoe form of which is visible in some plates and not in others. Another point for the detection of sensitiveness will be found in the detail, or the absence of it, in the clothing hanging in the corner in the shade of the chimney-breast. When examining each pair of negatives, I must ask you to read the explanations written at the foot of each, and also to bear in mind the conditions involved in producing each pair. Since I mounted these examples, I have gone over them and marked in red ink my estimates of the percentage differences in their sensitiveness, together with other remarks, in accordance with my published list of experiments on pages 69 and 79 of THE BRITISH JOURNAL OF PHOTOGRAPHY, copies of which are on the table.

Messrs. Hurter & Driffield have said that I cannot estimate differences of ten per cent. If I tell you that in several instances, in order to check my estimates, I gave the additional exposure to the slower plate, and thereby obtained identical negatives, as far as two different emulsions will yield two similarly exposed negatives, I think you must give me credit for knowing what I am talking about; and I shall leave you to judge of the general accuracy of my estimates, of which a large number are submitted to your inspection.

THE METHOD OF DEVELOPMENT EMPLOYED.

Now let me add a few words of explanation of the method of development employed. I have previously stated that the plan on which I proceeded was to give such exposures as would leave me the shadows—even the very deepest shadows round the stove—clear up to the end of prolonged development. The plates were developed by the formulæ of the manufacturers, and development was, in every instance, carried on until no further detail would come. Any attempt to ascertain differences of sensitiveness by developing for any arbitrary length of time must, in my opinion, result in unfairness to one or other of the plates under trial, and especially so if they are of different makes. I maintain that by the treatment I adopted can we alone discriminate differences of sensitiveness between competitive plates without favouring or prejudicing either one or another. If, with a given exposure of identical duration for a pair, one plate shows, under prolonged development, greater detail in deep shadow, I should certainly say that plate is the more rapid of the two. If I verify this result by making a repeat, or yet a third test, no room for doubt exists. I must point out in connexion with this, that if we expose so as to get a pair of *fully* exposed plates, on development the pair, even if of different makes and sensitiveness, will frequently appear almost identical, and I must insist that full exposures or over-exposures are no tests whatever of the rapidities of plates. In all experiments of this class some little heed must be given to the thickness or thinness of the coating, which does influence the result, but least of all in those parts the least exposed, viz., in the deepest shadows.

NO GRUDGE AGAINST HURTER & DRIFFIELD'S METHOD.

Judging from the tone of the correspondence I have alluded to as following my original articles, one might imagine that when I wrote them I had sat down with the deliberate intention of demolishing the Hurter-Driffield theory, or that I had some especial grudge against plates "speeded" in accordance with that method. As a matter of fact, I had no such idea, and I disclaim any intention other than that of putting to the test of actual use the plates so marked, to ascertain whether they bore out the theory. This they failed to do; and I am left to adopt either of two conclusions:—

(*a*.) If these plates had ever been submitted to examination in an instrument of precision, such as we are led to believe the Hurter-Driffield modification of Bunsen's photometer is, then I say, if the system is right, the plates are wrong, and the examiners either do not understand the system or they have blundered.

(*b*) If, on the other hand, these plates have been accurately examined and "speeded" by the system, then the system is wrong, for the plates most certainly are incorrectly marked, and do not carry out the system.

I have already alluded to the tone of the correspondence, I don't know that I should have noticed it but that the damning admissions made by one of the writers affords me the opportunity to expose what is either gross ignorance or a wilful perversion of facts. This brings me to another branch of my subject not previously dealt with.

Just let me read you two extracts from letters already published. The first is from a letter in *Photography*, 26th January last, page 63, and is signed "Platemaker." He says:—

"So little does the question of daylight *versus* candle-light come into practical effect that Mr. Driffield tells me that even ortho plates, as far as he is able to observe, are correctly read by the candle for ordinary daylight exposures."

The next is from a letter in THE BRITISH JOURNAL OF PHOTOGRAPHY, February 10 last, page 94, and is signed by James Cadett. He says:—

"I now come to the candle question. It is manifest that, provided that all makes of plates obey the same constant in the relative sensitiveness to candle-light and daylight, it does not matter a fig what that constant may be. Do plates obey that constant, generally speaking? All that I can say is this, that, after hundreds of tests, neither Messrs. Hurter & Driffield, Mr. A. Cowan, nor myself, are able to say that plates vary in this respect. Even orthochromatic plates for ordinary landscape work obey the same constant very well, though, of course, it is easy to see that under certain conditions of screen and light such plates would require a different constant."

Now, gentlemen, I am not quite so intent upon pointing out to you the strong family likeness that exists in these two letters (which may possibly be the result of accident) as I am anxious to inform you that the statements there made are absolutely incorrect and untrue so far as orthochromatic plates are concerned. Whilst I am sorry that such erroneous dogma should get publicity, I feel compelled to adopt the only course open to me, which is that of giving it a deliberate contradiction, and now I am going to prove it to you.

PROOF TO THE CONTRARY.

The pair of specimens (mounted on opal glass to make them very easily judged) which I shall place in the Chairman's hands were produced in the following manner. Taking a box of "Ordinary" plates and another of "isochromatic medium" plates, we shall find their rapidities to daylight very nearly equal, and these will enable us to make a most conclusive experiment. I cut two plates down the centre, and take half of each to an experiment. I place a simple graded screen in an ordinary printing frame, and put half an "ordinary" plate and half an "isochromatic" plate thereon, and expose briefly to usual daylight at midday. The result of this exposure, developed to completion, will be found on the right hand of the specimen, and is marked "*daylight*." You will probably agree with me that their sensitiveness to daylight as read by this means will be about two points in favour of the isochromatic plate, viewing the densities as transparencies.

I then take the other two halves of these plates, and place them just as before, but instead of daylight I submit them to candle-light. As a matter of fact, the pair at the left hand had ten C.M. seconds. You will see that even ten C.M.S. impress the "iso" plate to such an extent as to reveal the last grade of the screen (16) with great force, whilst the "ordinary" plate responds in a remarkably feeble manner. A longer exposure, such as fifteen C.M.S. or twenty C.M.S.,

will give you a better reading on the "ordinary" plate; but so sensitive are the "iso" plates to candle-light that great density results up to the full scale of the screen, and the comparative readings are valueless. As it is, and viewing these results by transmitted light, I think you will allow that there are from ten to twelve points in favour of the "iso" plate, and to verify this the Chairman shall be at liberty to cut the specimens off the opal glass after they have been all round, and then compare the relative gradations. Viewed by reflected light, the difference is even greater.

Now, gentlemen, how do you find it? On the one hand look at the two letters of "Platemaker" and Jas. Cadett, and, on the other hand, weigh these experiments! Please accept my assurances that these experiments have been repeated over and over again, and always with a like result. Do you find that ordinary and isochromatic plates obey the same constant—the candle, or do you think with me that any one who could be rash enough to make such an assertion must surely have forgotten the very *raison-d'être* of isochromatic plates?

If I needed confirmation of the results I place before you, I need but refer you to an article bearing strongly on this very subject, by Mr. Debenham, and you will find his experiments recorded on the very same page of THE BRITISH JOURNAL OF PHOTOGRAPHY (page 69) as my own. As this page is before you, please refer to Mr. Debenham's figures. He gives you for camera exposures with daylight, "ordinary" and "isochromatic instantaneous," equal periods; but for lamp-light you will see he fixes the rapidity of the "isochromatic" plate at no less than *eight times* that of the ordinary!

With no intention of either attacking the system nor yet of interfering with any man's trade, I repeat that my object has been solely to ascertain whether and how far the theory and the practice of determining the speed of plates would accord, and in the alternative as to whether the theory could be of any assistance (or otherwise) to practical photography. If time permitted, I should like to have read to you a leader from *Photography*, signed "A. P.," and dated March 2. As it is, I must content myself with a short excerpt therefrom. Alluding to Messrs. Hurter & Driffield, the writer says:—

". . . . If they mean that, after all, we can materially control our practical results by controlling the developer and the following operations, then no more need be said; but, with their writings before us, we must say that it is by no means clear what they do mean in the matter."

As I have not found that the theory of these gentlemen has been borne out by the plates issued in conformity with their system, I decided to place my findings on record; hence all this storm, and hence, also, my appearance before you this evening, which I determined upon even if it involved further encounter with my cavillers, or entailed a recital of the tenets of my photographic creed.

I trust that the subject may have interested you sufficiently to induce discussion whereby we may gain photographic knowledge, and endeavour to arrive at perfection and the truth.

G. F. WILLIAMS.

NATURALISTIC PHOTOGRAPHY.*

AND now we will return to the main subject, which I shall lay before you in a series of *propositions only*, for psychology has not yet become a science in the *true sense:* psychological work is merely in the working hypothesis stage, though by no means at the worked-out hypothesis end.

Proposition I.—That the material universe may be regarded by us as eternal (though varying in aspects), and the fountain-head of all our *sensuous* impressions.

Proposition II.—That accepting the doctrine of evolution the mind has evolved from the merest crude sensations of the amœba to the complex and subtle sensations of the master artists of to-day.

Proposition III.—That in the course of this evolution there arose the sensation and perception of the beautiful,† and this emotion was followed by acts intended for ornamentation of their persons or homes.

Proposition IV.—That from this germ developed the sense of the beautiful, until in civilised man this appreciation of the beautiful may be divided into three steps:—

1. That of sensation. 2. That of perception (intellectual). 3. That of emotion.

That these three be three distinct processes, yet they are one—indissoluble.

Proposition V.—That the appreciation of the beautiful is thus *subjective*, an ideal existing in the minds of men in varying degrees of development; and that, though Nature (by which the objective world is meant) has probably produced at various times exquisite harmonies, it took man to recognise these as beautiful, and so it has been said the artist is the master of Nature.

Proposition VI.—That, as the NERVOUS system developed, these appreciations became more delicate and subtle, and so a man with a naturally delicate sense of vision gradually purges himself of the coarser emotions, and his perceptions are more purely cerebral acts. A master artist regards first of all by mere *acquaintance* the decorative harmony of a picture or natural scene, *then* by previously acquired knowledge he *knows* why it is lovely, fit, true in sentiment, and *distingué*, and that knowledge gives way to the emotion of joy, which is expressed physically by his smiling face.

That the *reverse* is the process with the Philistine; the crude and tawdry appeals first to his emotion, hence the popularity of the sentimental subject; of the anecdote; of "literature in the flat."

Proposition VII.—That we have physiological proof that men's sensitiveness varies in degrees of fineness; thus a *virtuoso* in flour knows samples grown in different countries by their feel, a *virtuoso* in wine knows a glass of port taken from near the bottom from one taken from the top of the bottle, and the blind Laura Bridgeman knew purely *by touch* the clothes of all the inmates of a workhouse. From which it is self-evident that in all persons the boundary of their appreciation is hard drawn; in some cases, therefore, fatally limited by their very organization. A man whose vision is not delicate can *never see* the delicacies of line, colour, and tone patent to a more delicate nervous organization. Such a limited person is for ever doomed to be outside the pale of the pictorial art world, as the man with no ear for music is for ever doomed to be an "outsider" in the musical world.

Proposition VIII.—That, as the sense of beauty is a human ideal, this ideal will vary with individuals and *in* the individual from day to day, nay, from hour to hour. Indeed, so complex are the brain processes, and so dependent upon each other, that an artist may begin a picture with one ideal and finish it with quite a different ideal. Indeed, it is one of the great difficulties of the artist to keep steadily to his original ideal throughout the work. A glass of wine, a santonine powder, may completely change his ideal or power of execution. From which it is plain how delicate a thing is a work of art, how thoroughly *personal* is every touch in a work worthy the name of art, what a perfect index of the creator's mind.

Proposition IX.—That the ideal existing in any given brain at any moment is a complex and refined essence, the result of the man's whole previous life up to date; wherefore this ideal is no mere reflection of Nature, but a result of imagination, or the selection from various ideals or parts of ideals; and thus man may go beyond Nature and conceive things that do not exist in the world—such as the vase, the phonograph.

That fine art is the artistic expression of this ideal by a *personal* method, and that no man is an *artist* who has the ideal and can see the beautiful if he have not the power of execution as well. Art is therefore achievement. By their *results* alone are artists to be judged; as thus a very inferior *technician* may be a very delicate seer of the beautiful, but the world rightly only gives him credit for his picture—*his result*—and if that be poor, if his hand cannot express his ideal, he does not rank highly, nor often does he get credit as a seer. "Art is therefore with the man," as Mr. Whistler has said.

Proposition X.—That Nature sometimes sings in tune, or succeeds in producing glorious and exquisite harmonies, harmonies fully appreciated by the seers of the beautiful, for many more may appreciate than can depict; hence the rarity of real artists. Whence also a layman may be a far keener seer than most painters; but seer *and* masterly executant is genius itself.

Again, that the harmonies of Nature are altogether different from the harmonies of art—are dependent on different phenomena, and that Nature and art are different worlds. That Nature sometimes sings in tune Mr. Whistler himself has allowed, but I submit that it is absolutely impossible to reproduce that harmony on a plane surface; it is a thing by itself, a thing apart; though a number of unphilosophical painters *think* they do reproduce Nature, but they do not. Here is a very simple proof suggested to me by my friend Mr. Havard Thomas, a sculptor. Let the observer look at a distant landscape behind some reed-stalks in the foreground. The reed-stalks in Nature, under certain conditions, do not blot out *any* of the background, *we see round them*, and see the *whole* landscape beyond. In art the reed-stalks would always *blot out* part of the background. I think our sense of the third dimension of space or "distance" arose first through this peculiarity of vision. For further and deeper proofs of the utter impossibility of *reproducing* Nature as we see her I must, in a brief paper like the present, refer you to Professor Hemholtz's *Scientific Lectures*, to Mr. Rood's *Chromatics*, and to our *Perspective Drawing and Vision*. A careful study of these publications, aided by a few

* Concluded from page 213.

† According to Darwin this is a fact first noticeable in birds.

experiments made for himself, will convince the veriest neophyte that it is *impossible* to reproduce Nature or make a "mere transcript."

Proposition XI.—That in photography we are confronted with a new phenomenon, in that we find some of the results of a *machine* give true pleasure to master artists which has never hitherto been the case with machine-made works.

Proposition XII.—That photography is not art because a machine comes between the man's ideal and Nature, and the result is *machine-made*, the trapping of a sunbeam. Say the photographer, like the painter, goes to Nature with certain ideals—we will, for illustration's sake, assume that two men have exactly similar ideals of the beautiful (which is, of course, impossible). They go together to Nature, and find a beautiful natural harmony in a lovely stretch of purple sands by the sounding sea. The photographer at once sets up his machine, focusses, and exposes; but in these very processes *his* ideal has *gone*. What results *may* be beautiful, but it is no more the representation of his ideal, the vision he first saw. It is something else, for the machine imposes certain conditions which were never in the photographer's mind at all. How often has the most experienced of us been disappointed with the photograph of what was fine in Nature—fine to our eyes that is, and sometimes *vice versâ?*

The painter, on the other hand, begins, and if he be an expert each touch helps to his desired or ideal end; this wavelet is delicately put in, that breaker strongly and broadly, and so on; everything is done unto one end, and all is certain from the first—whereas the photographer has boxed a maimed and contracted reflection of what he saw. True, it may be a beautiful reflection; but, after all, it is *Nature's drawing*, and not the man's. Still such machine-drawn pictures may in certain cases satisfy, or rather harmonise with, the photographer's ideal of beauty, or, indeed, with the master painter's, as does a beautiful natural landscape; and yet, again, the beautiful photograph is not *art* any more than the natural scene of which it is a reflection.

Proposition XIII.—That, though the machine draws the photograph, yet in the production of a photograph there are a few (very few) very limited *incalculable* elements, as there are in organ-grinding and engine-driving.

These are—(1) Selection of view. (2) Selection of lens. (3) Selection of focus. (4) Selection of developer. (5) Selection of printing method.

These limited incalculable elements give a man a very limited opportunity of blending his materials to his ideal, and though, by taking advantage of these *with knowledge*, he may surpass other photographers in decorative work, still they are too limited for him to express to any degree of certainty or fulness *his ideal;* and, since the drawing is mechanical, these few very limited incalculable elements cannot enable a man to express his ideal in anything like the same degree as does a personal art. Indeed, photography is not nearly so *personal* an art as sailing or rifle shooting, both of which have very little of the mechanical about them and much of the personal.

In photography man puts the machine under certain physical conditions, and the machine will always (under these same conditions) bring about the same result; therefore the process is logically mechanical. On the other hand, a personal art is one in which the results would differ again and again under the same physical conditions, for the *mind* would work differently on each so-called "replica" of the original—*no artist could paint two pictures exactly alike.* A photographer might take fifty views of a subject exactly similar, from which it is self-evident that photographs are not works of art in the sense accepted by artists, though photography may be an art or craft in the old sense of the word art, as surgery is an art; but such a use of the word "art" as applied to photography would not satisfy the *dilettante*, for the word used so would include *every* photographer as an artist, which is not what the ambitious amateur means at all.

Proposition XIV.—That therefore it would be wiser for all photographers to drop the use of the words "art" and "artist" in connexion with photography (photography is a science, or hopes to be some day), and classify exhibition works as—

(1) Decorative or pictorial (when the *intention* is merely and purely to produce a beautiful thing). (2) Scientific (accurate mathematical reflections).

By using the terms "decorative or pictorial photographs" and "scientific photographs" we should, I think, allay all opposition from artists—not to say painters—and critics (who are right in refusing to call photographs works of art), and should be at the same time working in a less pretentious way and in a legitimate pursuit, humble as compared with painting, 'tis true, though the best results surpass all but the masterpieces of art in beauty. And I would suggest that this Society sets the example at their forthcoming Exhibition and describes the works submitted into two classes, scientific and "decorative or pictorial," for works should be classed according to their intention.

Proposition XV.—That decorative photographs are worth doing (if well done) because they give us certain beautiful qualities art cannot give, hence their *raison-d'être.* That the producers of such may prove themselves as keen seers (not artists) of the beautiful as the master artists themselves. They may have art knowledge too; yet, if they be no creators by personal method, I submit they are not "artists." But, then, this does not mean, on the other hand, that mediocre draughtsmen, whose vision is vulgar or obtuse, are to crow over these seeing photographers, for such mediocrities are not "artists" and, indeed, seeing photographers have far more claim to the title, as the masters would allow.

Proposition XVI.—That, though photographs are sometimes more beautiful than art, they never equal Nature when she sings in tune. Indeed, I submit than when Nature "sings in harmony" she is more beautiful than photography or art, unrivalled in her delicacy, fineness, and distinction.

Proposition XVII.—That "idealism" and "impressionism," if used in connexion with photography, are mere contradictions of terms, and used by slovens in thought—or worse.

Gentlemen, let us conspire *not* to be called by any false or vain names such as "artists," but to produce beautiful decorative work, each of us in his own way. Let us in friendly and unselfish spirit band together for the furtherance of this end, and let the too eager or ambitious (I will not say vain) neophyte remember that the proof of his delicacy of vision is in a measure what he shows us *of his own*, and that, as there are few Laura Bridgemans with perfect touch, so there are few seers of the most delicate beauties, because few organisms have delicate vision. Let the neophyte and others remember that the seers of the beautiful are as rare as the limners of beautiful scenes; that physiology proves that most are for ever fatally limited to remain *without*, and no disgrace either, if such have but the honesty and pluck to own it; the disgrace is pretentiousness and imposture—in *pretending* to see.

Amongst these blind have been the vast body of persons who have ridiculed Mr. Whistler; indeed, nearly the whole press has ridiculed him, and yet, gentlemen, to-day his pictures hang in the most honourable position in Paris, the city at present the Queen of the Arts, and so it will always be, for I for one believe that truth is great, and will in the end prevail over obtuseness and dishonesty, for I am optimist enough to think the majority of men are fair-minded, honest, and manly, and that, though they may for a time let the rogue and the cad live their little days, they will in the end arise and put their houses in order and turn the unclean from their temples.

As for these propositions, gentlemen, I do not intend to fight over them, for they are *propositions*, and therefore no fighting matter, but provisional until psychology shall either prove or disprove them.

I offer them to you frankly and trust you will deem them worthy your consideration, after which I leave you to accept or reject them, as your honest judgment dictates. At any rate, they may prove interesting to some of you, at least I hope so, for they are an attempt on my part to solve what has long been a vexed question, a problem to which no satisfactory or *rational* solution has hitherto been offered.

P. H. Emerson, B.A., M.B. (Cantab.)

PHOTOGRAPHIC INDUSTRIES—THE OPTICAL WORKS OF W. WRAY, HIGHGATE, LONDON.

For many years has the name of Wray been associated with the construction of astronomical, microscopic, and similar achromatic object-glasses for high-class instruments of precision. It is only within the past six or eight years that the firm has been indnced to add to the above departments the sister branch of photographic lenses, which has already developed into one of great magnitude and importance. In the belief that our readers would like to know something, however little, of the inner life of a recognisedly high-class lens-making establishment, we visited the place one afternoon, note-book in hand.

The premises are situated on that suburban slope known as North Hill, Highgate. This locality was originally selected as being on an elevation considerably above the lower parts of London, in which smoke and fogs find a congenial resting-place not conducive to the testing of object-glasses for large astronomical telescopes. There is no shop or anything else visible from the adjoining public road which would lead any one to the belief that just inside of the gate, and within a hundred feet or so of it, were quite a number of workshops, forming the elementary parts of a great factory, the lathes and other mechanical forces in which were in direct communication with a Crossley gas engine, which the Messrs. Wray find more convenient than steam as the motive power.

Entering the first of these workshops, we observe four rows of turning

lathes extending from end to end. Some of these are elaborately fitted with slide rests, face plates, and similar belongings incident to such machines. At one end we observed an elaborate mechanical appliance which we could not relegate to the department of either lathe, planing, or shaping machine, being unlike anything we had previously seen made use of in connexion either with the construction of lenses, telescopes, or microscopes. This, Mr. Wray informed us—demonstrating its *modus operandi*—was an entirely new machine they had made for the production of Iris diaphragms, it being used for cutting and drilling the slots and holes which form a portion of their internal mechanism. This machine, when once set for any special size of tube, did its work with a degree of perfection quite impossible to be attained by the most careful and skilled hand-work. The mechanical resources of the establishment are such as to have enabled them to construct this useful machine on the premises. The blades used range from twenty-four in number downwards, according to size of tube, and are made of steel about one two-hundredth of an inch in thickness. These are cut out in a screw press, and we saw a large rack full of the steel-cutting tools, one pair of each being used for each size of diaphragm. The blanks for the Waterhouse diaphragms are also cut out in the same way, the apertures being turned in special chucks in the lathe, hard steel gauges being used for the purpose. Close by is the riveting machine for fixing the pivots into the blades of the Iris. It is driven by a strap from the shaft overhead, and delivers something like sixty blows a minute, each one, of course, with absolute precision, and is under perfect control, instantly stopping or starting with a slight pressure of the foot. By an ingenious device the pivot is withdrawn from the bed plate after the operation of riveting is completed. So perfect is the working of this machine that Mr. Wray informs us that he has never heard of one of the pivots becoming loose.

In the lens-grinding department we saw much to interest us. Commencing with the raw material, the glass: this, we learnt, is obtained from Chance, of Birmingham, and Mantois, of Paris, and, in order not to waste any time in grinding any piece containing an imperfection, each was critically examined previous to being placed in the hands of the roughers, who, with coarse emery and iron curve tools, ground it to the semblance of a lens. The way we saw one disc examined will serve as a general description of all of them. This was to form the "flint" element of a rectilinear of four and a half inches diameter, thirty-two inches focus, and to work with an aperture of *f*-8. It was a disc of considerable thickness, and had been polished not only at repeated intervals on the edge, but also on both sides, all this being done solely for the purpose of enabling the internal structure of the glass to be critically examined. The indices of refraction and dispersion having been ascertained and noted, the body of the glass is then examined through the edges and sides by a magnifying-glass for the discovery of such defects as tears, striæ, or mechanical disturbances of like nature. But an examination extending only so far would not be complete, for there is a powerful factor still to be determined, which is the homogeneity of the glass. Owing to some imperfect carrying out of the annealing process in the glass works, there might be present strata or patches of unequal density. This is tested for by polarised light, which instantly reveals the slightest departure from perfect homogeneity. Not until the glass satisfies all the conditions implied by the tests mentioned is it sent down to the roughing shop to be ground approximately to such curves as have been determined by the circumstances of each case. Such an examination as we have described is, we are aware, practised by all high-class opticians, and here comes in one point of difference between what we have termed "high-class" lenses and those pretty, low-priced productions redolent of polish and lacquer, which come to this market in such shoals from abroad. Such makers could not possibly afford, even if they possessed the knowledge, to make a selection or examination of the glass, but take it as it comes from the glass works, soften it by heat, and, by discs, press it into the curves required, finally grinding and polishing the surfaces. When done and placed in their mounts, some by a fluke may be passable, while others are —well, not so. With our *best* opticians, both at home and abroad, each lens forms a matter of individual study from beginning to end.

But we must follow the fortunes of the particular lens which we left in the hands of the roughers. When it has been brought into shape, it goes into the grinding and polishing shop, where it is ground and smoothed on a tool of the exact radius of curvature necessary, emery of various grades of fineness being used in succession. With each change of emery the workman washes the surface of the glass, and examines it through a magnifier to see that no grits from the penultimate grinding have been left unground out, and that the surface is that due to the grade of emery last employed. The final grinding leaves the surface in a state of extreme smoothness, although still grey. The lustrous polish is imparted by a tool from which every trace of emery has been removed, and a fresh surface of pitch or some unyielding cement of a similar nature has been given. To this, while still warm, a tool the exact counterpart of the other is applied, by which the true curve is imparted to the cement surface, to which is now applied the rouge or putty powder requisite in the imparting of the highest polish capable of being attained by the glass. This being the way in which the astronomical lenses for which this firm is celebrated, are polished, its use has been continued in the construction of their photographic objectives. In the olden times, and even still yet in some cheap factories, the lenses were polished on felt or textile fabrics; but this causes a rounding of the margins, and is apt to change the figure of the lens. But the lens is not yet finished. It has next to be centered. To this end it is cemented on the face of a chuck in a lathe of special construction, and, before the pitch or other cement has set, the lens is moved by little and little from one side to the other until the reflection of a gas flame in front is seen to be stationary and free from wobbling when rotating the lens in the lathe. When this has been done, and the cement is quite cold, a plate of metal charged with emery is by slow degrees and by screw adjustment brought to bear upon the edge, and continued until the lens is ground circular and is of such a diameter as is required.

After cementing with Canada balsam the component parts of an achromatic lens, blackening the edges to prevent light from being reflected, and placing the lenses in the cells of the mount, the combination is ready for being tested. Several tests are employed in Wray's establishment, one being the examination of an artificial star formed by a thermometer bulb filled with mercury. Several of these bulbs are used, the nearest being fixed at a distance of probably 150 feet from the lens to be tested, and it was astonishing to note the rapidity with which the trained eye of Mr. Wray could almost in an instant note anything connected with the correction of the objective and give directions for alteration, should such prove necessary. Flatness of field and covering power were ascertained by attaching the lens to a camera much larger than the effective covering power of the lens demanded, and to this end trees and the general scenery at a distance, not omitting to mention houses at no great distance, the black windows of which bore small white enamel letters, lent invaluable aid, especially to any one unversed in the values of the higher optical tests and who desired to see how a lens would perform on an average landscape subject.

One of the sons of the founder of the establishment ensconces himself in a quiet corner, surrounded by the other members of the working staff, who devote themselves to the microscopic object-glass department. Another son is at the head of the photographic lens department, while still another member of the family takes cognisance of the astronomical object-glasses, and all that appertains to them, yet is the training of these chiefs of departments so complete that any one can interchange with another. Incidentally, we noticed that the smallest of the photographic objectives—those of the wide-angle class—were being made by workmen engaged in the department devoted to microscopic lenses.

An inquiry as to the relative demand for lenses with Iris diaphragms contrasted with Waterhouse and others, revealed that the Iris is preferred in the ratio of three to one. There is a fully equipped dark room on the premises, and the actual working of any lens can be practically demonstrated in a camera which always stands ready for use. In the brass-turning shop we observed what seemed to us some hundreds of mounts of various dimensions in every stage of progress, there being a preponderance of small ones intended for hand cameras.

Standing in the grounds, and at a little distance clear of the workshops, are two equatorial telescope stands, having all the fittings for the testing of astronomical object-glasses. One of these receives all objectives up to five inches in diameter; in the other, and larger, objectives from six to twelve inches diameter are finally tested on celestial objects, after having passed the preliminary optical tests.

Apropos of charges we and others have occasionally brought against artists for the untruthful drawings often indulged in by them, more especially in the case of the sun or moon, we were shown, by Mr. Harry Wray, a couple of photographs that demonstrated the truth of this charge in an effective manner. Placing a lens of fifteen inches focus in a camera, and selecting a time when he knew that the full moon would that evening be within the field of view, he exposed a plate during the day, and left the camera undisturbed till evening, when the moon was in the scene, when he exposed a second plate, on which he got an instantaneous view of our satellite. On carefully comparing the relative angles subtended by the objects in these two negatives (now in our possession), and contrasting these with a picture of a similar scene drawn by an artist, we find that we understated the case when we said that some artists made the moon four or five times larger than it appeared in nature.

This business was established in 1850 in Windmill-street, Tottenham-

court-road, and was removed from thence to Highgate for reasons already hinted at. Beginning in a small way, it has grown, until it now gives employment to about two dozen hands—all expert workmen.

CENTRAL PHOTOGRAPHIC CLUB.

As already announced, a meeting of intending members and those interested in the Central Photographic Club will be held on Monday evening next, April 17, at the Memorial Hall, Farringdon-atreet, when the chair will be taken at eight o'clock precisely.

The principal object of the meeting will be to receive the report of the Executive Committee appointed on March 6 to

(1) Select suitable premises.

(2) Decide upon what financial basis the Club should be conducted.

(3) Draw up a set of rules for the government of the Club.

In regard to the first, the Executive Committee immediately appointed a Premises Sub-committee to seek for suitable premises within a limited area which might fairly be considered central, and, after considerable trouble and investigation, the Sub-committee recommended the Executive Committee to decide on premises in Fleet-lane, Farringdon-street, as being in every way suitable for the purposes of the Club. The Executive Committee have endorsed the recommendation, and the meeting on Monday next will be asked to adopt it.

As to finance, the Executive Committee unanimously agreed that the Club should be administered and carried on by a limited company, so that the liabilities of members might be restricted to the amount of their annual subscription, the profits, if any, after five per cent. has been paid to the shareholders, being devoted to the benefit of the Club. A considerable proportion of the capital haa already been subscribed by the members of the Committee and friends.

After careful consideration, the Committee hava adopted the following rules for the government of the Club :—

Rules of the Central Photographic Club.

1. The title of the Club shall be the Central Photographic Club.

2. The object of the Club is to provide a central meeting-place for those interested in photography where they may enjoy social and technical advantages.

3. All gentlemen interested in photography shall be eligible for membership.

4. The annual subscription for town members shall be 1*l.* 1*s.*, and for country members 10*s.* 6*d.* For life membership a payment of 10*l.* 10*s.* shall be required. The first 500 members will be admitted without entrance fee. Those joining after that number haa been reached shall pay an entrance fee of 1*l.* 1*s.* for town members, and 10*s.* 6*d.* for country. Gentlemen residing within a radius of twenty milea of Charing Cross shall be deemed town members.

5. The management of the Club shall be veated in a Committee of twelve, six to form a quorum, consisting of an equal number of shareholders and ordinary members, to be elected by the members in general meeting annually. The Committee shall have power to fill up vacancies during the current year.

6. An Hon. Treasurer and Hon. Secretaries and an Hon. Librarian shall be elected by the members annually in general meeting, and shall be *ex-officio* members of the Committee.

7. Candidates for membership must be proposed and seconded by two members of the Club. The name and address of the candidate, and the names of the proposer and seconder must be aent to the Hon. Secretaries at or before the stated meeting previous to the one at which it is proposed to snbmit such candidates for election. Snch names shall be read by one of the Secretaries to the meeting, and posted on board till the next meeting.

8. The election of members shall be by ballot at any stated meeting of the Club, and a vote of fonr-fifths of the members present and voting shall be necessary to elect a new member.

9. Every candidate on his election shall be notified in writing with a request for payment of his subscription and entrance fee.

10. No member ahall be entitled to use the Club until his aubscription for the current year has been paid.

11. The annual subscription shall be payable in advance on the first day of July in each year. Subscriptions to be paid to the Club Company.

12. Members joining the Club before September 30 shall pay the full subscription. After the end of September and before January 31 the payment shall be two-thirds; after the end of January and before May 31, one-third; the subscription of any member elected after May 31 ahall be considered payment for the following year.

13. Any person who shall by any means cease to be a member of the Club shall, nevertheless, remain liable for and shall pay to the Club Company all moneys which at the time may be due from him to the Club.

14. Any member making himself obnoxious to the members of the Club shall be reported to the Committee, who shall investigate, and, if necessary, call a special meeting of the Club to discuss the matter; then, if the majority so decide, the offending member shall be expelled the Club, and lose all interest and benefit in it, auch decision to be taken by ballot.

15. An annual general meeting of the members shall be held in the first week in July to receive the report of the Committee, to pass the accounts, to appoint officers for the ensuing twelve months, and to elect members of the Committee to supply the places of those retiring. The newly elected officers and members of the Committee shall come into office at the conclusion of such meeting.

16. Ordinary meetings of the members shall be held weekly.

17. The Committee may, whenever they think fit, and they shall on a requisition made in writing by ten members, convene an extraordinary general meeting. Any such requisition ahall specify the object of the meeting required, and ahall be aigned by the members making the same, and shall be delivered to the Secretaries.

18. Every member of the Club shall be entitled to one vote only. The Chairman shall have a casting vote in addition to the vote to which he may be entitled as a member.

Bye-laws for the Club House, and such other rules and regulations as may be found necessary when the Club premises are opened, will be drawn up by the Committee, and submitted to the first general meeting of members for approval.

It is hoped that as many as possible intending members of the Club will attend the meeting on Monday next. The Hon. Secretary *pro tem.* (Mr. Thomas Bedding, 2, York-street, Covent Garden, W.C.) has already received a very large number of applications for membership from all parts of the country, and from both professional and amateur photographers, and the Executive Committee anticipate that the adoption of the above and other recommendations to be made will enable them to approach all classes of photographers in London and country with the certainty of obtaining such a numerical support as will result in the formation of the largest photographic club in the world—a club that shall be at once a home, a rendezvous, and resort for all those interested in photography, whether residing in London or the country—a powerful agency in furthering photographic progress, and a representative force in each of the many branches of modern photography.

CROYDON CAMERA CLUB EXHIBITION.

This Exhibition was held on the Wednesday, Thursday, Friday, and Saturday of last week, when, besides the pictures on the walls, the now customary evening attractions of music, lantern displays, and technica demonstrations were included in the programme. A display of some sixty or more of the most successful photographs of recent years, by such men as Ralph Robinson (whose loan collection included his fine *Sir Frederick Leighton*), Brownrigg (*Winter Sunset*, &c.), Byrne (direct portraits and studies of children), Karl Greger, Colonel Gale (*An East Country Quay*, &c.), H. P. Robinson (*Carolling*), Seymour Conway, T. J. Bright, and Adam Diston (about twenty-six examples of this master's work, comprising the ever-delightful *Gloaming*), lifted the Exhibition, as a whole, to a point of excellence which the non-competitive exhibits did little to support.

The Judges were Messrs. J. Gale and Thomas J. Bright, and the mention of their awards in Classes A and F must suffice, inasmuch as the classes were small and poor. In Class C, for outdoor views (members only), however, some really meritorious work was shown, Mr. C. E. Whitaker's picture of *The Gateway, Hever Castle*, catching the eye as a technically well-rendered photograph. Mr. William F. Frost's views on *The Mole*, Mr. G. R. White's series, and *A Study of a Mill Pond* by Mr. A. E. Isaac, as well as the same gentleman's clever bit of realism in the effects of *Winter*, being conspicuously prominent. To our thinking, however, the beautifully crisp definition, relief, and panoramic-like effects of Mr. Hirst's *Deepdene* and *Arundel* constituted the pick of the class. We hope that so manifestly a good and careful worker will be content with effects like these, and turn a deaf ear to the pipings of the foggy school. In Class D (*genre* or figure subjects, members), a group of *Three Fishermen* easily and naturally posed was, perhaps, the best; but the work in the class was not good. In Class F (any subject) Mr. A. J. Sargeant had some capital interior work (*Langton's Chapel*), and Messrs. W. J. Wright, George Corden, H. E. Holland, and G. R. White were represented by excellent landscapes.

In the class for members' exhibits not for competition, Mr. B. G. Wilkinson was a tower of strength with several of his famous studies, and the President (Mr. Maclean) had a good selection, of which we preferred a little picture *The Causeway*, a waterside study, in which the arrangement of land and water was accomplished with the happiest

artistic effects. In the same class, Mr. G. R. White had a series of interiors of dwelling rooms, difficult subjects successfully handled.

Useful exhibits of photographic apparatus, &c., were shown by Messrs. Hurst, & Co., of St. Michael's-road, West Croydon, and D. P. Roberts, 120, North-end, Croydon. The Exhibition must have given great gratification to local photographers. It was small, but well arranged.

The following were the judges' awards:—

Class A (Best prints illustrative of hand-camera work).—No. 9 (first award), George R. White.

Class B (Lantern slides).—No. 22 (first award), H. E. Holland; No. 25 (commended), George Corden.

Class C.—No. 48, to 50, Series (first award), William F. Frost; No. 63 (commended), George R. White. No. 67, 69, 70, Series (commended), A. E. Isaac.

Class D.—No. 79, *Fishermen* (first award), C. E. Whitaker; No. 81 (commended), H. E. Neeves.

Class E.—No. 105 (first award), Miss J. R. Fooks.

Class F.—No. 148 (first award), A. E. Isaac.

WEST SURREY PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The fifth annual Exhibition of this Society was held during the week at the Public Library, Lavender Hill, S.W. The competitions were restricted to members, and about one hundred and sixty photographs were placed on the walls. If we remember aright, the Exhibition of last year had the advantage of including a number of Colonel Gale's and Mr. Davison's pictures which added materially to its average of excellence. This year no such assistance is forthcoming; but, as if by way of compensation, the members' work is undoubtedly superior to that previously shown, although, perhaps, numerically smaller.

Naturally an exhibition of members' work is only of confined interest, and therefore, criticism of it in detail is superfluous. Some of the pictures, however, well deserve commendation by name—notably an enlarged study of the *Waterfall*, Battersea Park, by Mr. E. Pointon, possessing great softness and naturalness; two large platinum views of the choir and nave, *Lincoln Cathedral*, by Mr. F. P. Smith, capital pieces of interior work; a delightful view of *Eynsford*, by Mr. Winsford, and a triptych by Mr. P. Martin, *Seeing the Show*, children all agog with expectation in the street, waiting for a Lord Mayor's procession or something of the sort and held back by a man in blue. Mr. E. Calland showed a portrait, which, in the way of "diffusion of definition," would have been bad to beat, supposing the use of a lens. Two tiny views in carbon, on very large mounts, by Mr. G. H. James, were reminiscent of Mr. Davison, and the same exhibitor's portrait of a lady, a gracefully posed warm-toned picture, was undoubtedly the best picture in the room. We liked Mr. J. S. Bond's well-printed platinotype view of Melrose, and a plough horse piece, *A Surrey Team*, also by Mr. Bond; Mr. E. Swingler's river scene with shipping, *A Still Day*, a refined tender view; and Mr. W. Graham's minute crisp studies of *Caistor Beach* and *On the Bure*. Mr. J. L. Lyell's capital studies of *Indian Architecture* agreeably diversified the Exhibition, which contained much other really meritorious work.

We may note, in conclusion, that the West Surrey Society has its own journal *The Photographic Gazette*, edited by Mr. G. H. James. The April number, containing the catalogue of pictures, includes well-written and practical papers on "Enlarging" by Mr. Agars, "Autotype Printing" by Mr. Calland, "The Dominant Factors of Exposure," by Mr. G. H. Seward, and other instructive photographic matter. The *Gazette* is a credit to its Editor and the Society.

THE INFANTS AND THE PHOTOGRAPHER.

In the Worthing County Court last week, the Judge delivered judgment in the case of Simmons *versus* Edwards, which was an action to recover 10*s.* 6*d.* paid to defendant, a photographer, under circumstances which we referred to a few weeks back. Two sisters, both under age, paid, one the sum of 7*s.* 6*d.*, the other 3*s.*, to defendant to photograph a family group. Defendant expressed himself prepared to fulfil the contract, but the plaintiffs' father forbade the photographing of the family, and, at his instigation, the girls sought to recover the money from Mr. Edwards. His Honour, while pointing out that one action should have been brought, and not two, confessed that he did not pretend to understand the father's reasons for forbidding the photograph. His Honour said that in his opinion the case fell within the Infants Relief Act, 1874, and the contract was void; and, if not so under the Act, still he thought that the plaintiffs, being infants, were entitled to void or rescind the contract. Further, there was the question whether they could get their money back, and whether they had derived any benefit from the contract. Defendant, in his opinion, was in the same position as he was before the contract was entered into, and he could not treat the making of an appointment as work done. There would therefore be judgment for plaintiffs, but without costs. He thought it would have been much better if defendant had been allowed to carry out the contract. Defendant: "Thank you, sir."

Our Editorial Table.

Elementary Photography.

By John A. Hodges.

In this work, which forms No. 7 of the "Amateur Photographer's Library" (Hazel, Watson, & Viney), all the various processes of practical photography are described in such simple language as befits a teacher who is imparting his knowledge to young and inexperienced aspirants after the photographic art. In recommending the selection of a camera, he give preference to one of the half-plate size on the score of comfort and convenience. After describing the special features of some of these, and of some of the lenses in common use, the author describes non-actinic lanterns and the fittings of a dark room, the preparation and uses of the various solutions, and, in short, goes through all the processes of making negatives, printing and enlarging from them. The manual will be useful for beginners—the class for which it is intended.

Photographs by H. Yeo, Plymouth.

A series of photographs of children—or more correctly of a child—attests the skill of this artist. The story is in reality the history of a soap bubble illustrated by a small series, from the cradle to the grave sort of idea, which tells its own tale. But, quite apart from this, the pictures as a whole and the poses of the chief actor—a pretty little girl—are admirable. The prints are in platinum, and as pictures are charming productions, the expressions on the face being natural and in keeping with the stages of progress of the soap bubble, from its birth at the pipe to its collapse in mid air.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 6931.—"An Improved Mask with Border for Photographic Purposes." A. C. Jackson.—*Dated April* 4, 1893.

No. 7051.—"An Improvement in or connected with Hand Frames for holding Photographs, Pictures, and the like." W. S. Simpson.—*Dated April* 5, 1893.

No. 7061.—"Improvements in Photographic Draining Racks, whereby several Sizes of Plates can be Accommodated together or separately." W. Tylar.—*Dated April* 6, 1893.

No. 7231.—"Cheney's Retouching Apparatus or Retouching Machine for Retouching and Stippling Photographic Negatives and other Pictures." J. Cheney.—*Dated April* 8, 1893.

No. 7281.—"Improvements Relating to the Production of Negatives." E. Albert.—*Dated April* 8, 1893.

PATENTS COMPLETED.

Improvements in Photographic Hand Cameras.

No. 8324. John Skynner Baily Bell, 3, Wentworth-place, Newcastle-upon-Tyne.—*March* 4, 1893.

My invention relates to and is for improvements in apparatus for photographic hand cameras, and I carry it out in the following manner:—

The camera case may be of the usual shape or form, or otherwise, and with any additional or necessary adjuncts if required.

Within the camera, and immediately behind the lens, I have the exposure chamber, and behind this chamber, and divided from it by a suitable partition, there are two chambers, one above the other, and divided by a horizontal plate or partition at or near the middle of the height of the camera. The upper one of these chambers is the unexposed chamber for the reception of sensitised plates, and the lower one is the exposed chamber, to receive the sensitised plates after being operated upon in the exposure chamber, the back end of this chamber being the usual light-proof end cover.

In these two latter chambers there is a cage having a horizontal top plate of thin sheet iron or other suitable material. The bottom plate is similar to the upper one, and they are connected together with small rods passing through the horizontal partition and let into grooves in the camera sides or otherwise, the whole being free to slide up and down in the two chambers, the downward motion being actuated by the weight of the cage or otherwise.

The cage being, say, at the top, the upper part is in contact with or contiguous to the upper part of the unexposed chamber.

There is a horizontal slit or opening in the unexposed chamber at the bottom in the vertical partition dividing it from the exposure chamber. This slit or opening is just large enough to allow one sensitised plate with its sheath to slip out into the exposure chamber, and there is another slit in the upper part of the partition of the exposed chamber dividing it from the exposure chamber sufficiently large to allow a plate operated on in the exposure chamber to pass into the exposed chamber.

Immediately in front of these slits there is a shutter kept close by a suitable spring or springs.

In the exposure chamber there is a tumbler or pivoted plate of suitable shape to receive the sensitised plate, having its edges turned up at the two sides and at one end. This plate is pivoted on a horizontal axis at or near its centre, and having spindles or pivot pins let into the sides of the camera case. One of these pins is continued outwards, and on its outer end there is a suitable milled head or other device or contrivance so as to give the tumbler the necessary amount of motion, and having an index finger to show the position inside. There is a stop piece below the slit in the partition of the exposed chamber for the edge of the tumbler plate to rest upon when it is at its lowest position, that is, in a position to deliver a plate into the exposed chamber.

There is also a stop piece at the top of the exposure chamber, so that the tumbler may rest in the vertical position, that is in a plane at right angles to the axis of the camera, when a photograph is being taken. At one side of the exposure chamber there is a thin strip of metal as a spring or other contrivance which the tumbler plate presses against in its rotation which steadies the tumbler and arrests unnecessary motion. This spring has a projection or knob at such a point that the tumbler is arrested in its motion when in a position suitable to receive one of the sensitised plates from the unexposed chamber on to the tumbler plate.

There may be an index and register, actuated by the cage, so that the descending cage, acting on a hinged lever inside the exposed chamber, communicates motion to an axle, which axle is continued to the outside, and an index finger fixed on it there will show the number of plates operated upon—or other form of index and register may be used if desired.

The method of working is as follows :—

The cage in the unexposed chamber is charged with sensitised plates up to its highest point, the top of the cage being above the highest of these plates. The tumbler plate is in the vertical position or plane, at right angles to the camera.

The first operation is to rotate this plate the necessary quadrant of a circle or so by the milled head, until it is in a position to receive the sensitised plate from the unexposed chamber. In its downward motion it has pressed the shutter downward before it, so that there is a clear opening for one sensitised plate. The camera is slightly tilted forward, and the plate slides out on to the tumbler plate in the exposure chamber. Secondly, the tumbler, with the sensitised plate upon it, is now rotated into its proper position to receive the impression. The photograph is taken, and the tumbler, with its plate, is brought down to the lower stop, carrying the shutter before it. The camera is slightly tilted backwards, and the plate slips off the tumbler through the slit on to the bottom plate of the cage in the exposed chamber. The tumbler is now slightly rotated, and is checked by the knob at a position to receive a fresh plate from the unexposed chamber, and so the operations are continued as before until the supply of plates is exhausted, the cage dropping down as each separate plate is removed from the unexposed chamber.

It will thus be seen that the plate is moved into its various positions without violence or risk of breakage.

The various parts may be of any suitable shape or material.

The claims are:—1. Self-acting apparatus for supplying the unexposed plates from the unexposed chamber and returning them again into exposed chamber, and method of retaining unexposed and exposed plates in separate chambers. 2. The method of changing the plates by the revolving tumbler—in bringing unexposed plates into "register," and returning them after exposure into exposed chamber. 3. The whole arrangement substantially as described in specification and drawing, having the whole of the mechanical operations of changing the plates actuated from one finger-piece.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 17	Camera Club	Charing Cross-road, W.C.
,, 17	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 17	Fillebrook Athenæum	Fillebrook Lecture Hall.
,, 17	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 17	Hastings and St. Leonards	
,, 17	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 17	Richmond	Greyhound Hotel, Richmond.
,, 17	South London	Hanover Hall, Hanover-park, S.E.
,, 18	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 18	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 18	Hackney	206, Mare-street, Hackney.
,, 18	North London	Canonbury Tower, Islington, N.
,, 18	Paisley	9, Ganze-street, Paisley.
,, 19	Brechin	14, St. Mary-street, Brechin.
,, 19	Bury	Club Rooms, 13, Agar-street, Bury.
,, 19	Leytonstone	The Assembly Rooms, High-road.
,, 19	Manchester Camera Club	Victoria Hotel, Manchester.
,, 19	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 19	Southport	The Studio, 15, Cambridge-arcade.
,, 19	Southsea	3, King's-road, Southsea
,, 20	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 20	Camera Club	Charing Cross-road, W.C.
,, 20	Glossop Dale	
,, 20	Greenock (Annual)	Museum, Kelly-street, Greenock.
,, 20	Hull	71, Prospect-street, Hull.
,, 20	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 20	Oldham	The Lyceum, Union-street, Oldham.
,, 20	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 21	Cardiff	
,, 21	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 21	Holborn	
,, 21	Leamington	Trinity Church Room, Morton-st.
,, 21	Maidstone	"The Palace," Maidstone.
,, 22	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

April 11,—Ordinary Meeting, Mr. W. E. Debenham in the chair.

The attendance numbered fifteen, which was considerably reduced before Mr. Warnerke had got half way through his paper.

Mr. Hubert J. Elliott and Lieutenant H. Wood, R.E., were elected members.

It was announced that the following presentations of pictures shown at the last Exhibition had been made to the Society: *Aylesford*, by Mr. A. R. Dresser; a series, *Blowing Bubbles*, by Mr. H. Yeo; and *Sunset in Winter*, by Mr. Cembrano.

The South London Photographic Society were admitted to affiliation.

The Chairman stated that Mr. W. England would, in May, demonstrate the Daguerreotype process, upon which occasion there would be an exhibition of specimens, to which members were invited to contribute.

The Paris and Brussels International Congresses, 1889-1891.

Mr. Leon Warnerke read a lengthy paper on this subject, describing the origin and labours of the two Congresses, and concluding with a detailed account of the decisions arrived at with regard to photographic standards and units. He mentioned that the next Congress would be held at Geneva in the ensuing summer. [We shall make extracts from the paper when it is published.] Mr. Warnerke said that Captain Abney wanted him to make a critical report, but all he would then say was that the work was conscientiously done. At the same time the decisions of the Congress were such that they could not be adopted in this country, particularly with regard to the size of plates, screw threads, and flanges.

Mr. Chapman Jones said that photographers had not troubled much about these congresses, but they had not had till now any connected account of them. With regard to a standard light, it seemed to him that they would, after all, have to go back to standard candles; but he would like to ask Mr. Warnerke whether the congresses had got us any nearer a standard light of any other kind.

In the course of his reply, Mr. Warnerke admitted that this question as well as that of the determining of the sensitiveness of plates, was yet unsolved.

Mr. G. Scamell said that, as regards delegates to future conferences, the affiliated societies should be invited to act in the matter.

The Chairman, in closing the discussion and moving a vote of thanks to Mr. Warnerke, said that Mr. Warnerke had gone to very great labour in drawing up the paper, but it was unfortunate that photographers would not trouble about the work of the congresses. One of his (the Chairman's) objections to the decimal system was the difficulty there would be in abolishing it in favour of the duodecimal, which he thought would ultimately be adopted. The inch and the foot were more convenient than the metrical measure, as they were so easily appreciated by people in this country.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

April 6,—Mr. E. J. Wall in the chair.

Determination of Plate Speeds.

After the disposal of other business, Mr. G. F. Williams read a paper on this subject [see page 229].

Mr. A. Cowan said he would like to have the chance of meeting some of the points in Mr. Williams' paper. In his (Mr. Cowan's) opinion Messrs. Hurter & Driffield were not such fools as platemakers seemed to think. It was impossible to judge of exposure by eyesight. Messrs. Hurter & Driffield's test enabled one to obtain the exact rapidity of any plate of unknown rapidity. The exposures could just as well be made to daylight as to candle-light, and he (Mr. Cowan) would undertake to prove that to whichever light an exposure was made the results would be identical.

Mr. W. E. Debenham agreed with Mr. Cowan as to the general similarity of the behaviour of plates to candle-light as well as to daylight, with the exception of orthochromatic plates. The difference in results given by Warnerke's sensitometer to daylight and candle-light was much exaggerated.

Mr. J. Sterry said there were four factors in the Hurter & Driffield system which were estimated separately. These were, relative exposure, relative degree of developer, the character of the plate itself, and the chemical fog, which varied in different plates, and which, if we estimated it simply by the eye, made it necessary that we should eliminate the action of the other three factors. But chemical fog did not affect the matter at all. His chief point, however, was as to the relative amount of developer to use, and in that connexion he would like to ask Mr. Williams how to distinguish between the effects of twenty-five per cent. extra exposure and twenty-five per cent. extra developer, as both increased density, but in a different manner? It was distinguishable by the photometer numbers, the speed showing by the relative position of the curves, and the developer by the angle which the straight lines made with the base lines. Fog was estimated by direct measurement. It was impossible to make two plates which were identical, and thus judging results by the eye was an extremely fallacious plan. To estimate density by this plan it was easy to go utterly wrong, as the surroundings upset the estimation.

Mr. James Cadett observed that Mr. Williams had asked the supporters of the Hurter & Driffield system to go before a jury of practical photographers to judge a question which they knew nothing about. He could hardly expect that system to be accepted by the people who had no practical experience of it. Mr. Williams had called the system a *fiasco*, and plates tested by it utterly worthless, and in that he had shown bias. We had been in the habit of reading the speeds of plates by what we observed in the shadows. The action of light was to produce density on development, and density must therefore hold some relation to speed. It was the object of Messrs. Hurter & Driffield's system to show that relation. He (Mr. Cadett) had given plates which yielded different densities to different photographers to test with various exposures, and errors of about 300 per cent. were obtained by the camera. It was in confusing density with speed that Mr. Williams condemned the system, basing his condemnation on what some platemakers had put on some boxes of

plates. He, however, should have tested his system against the photometer. He admitted that his own plates had been in one instance marked too high; their speed, instead of 130, should have been 108. As regards orthochromatic plates, an enormous difference in their orthochromatic effects to candle-light and daylight had been noticed, but with his own plates, which were not orthochromatic, Mr. Driffield had found that they obeyed the same constant. Mr. Driffield had also found plates tested by candle to give exceedingly good negatives in daylight—he had, in fact, not observed any difference in their qualities in that respect.

Mr. COWAN observed that he had tested plates by the candle, and was able to tell the maker of the plates what amount of exposure he could give.

Mr. CADETT (continuing) put in a plea for the use of the photometer, saying that they were unable to judge of density by the eye, whereas the photometer showed it instantly. Taking the case of two plates which had received identical exposures, the only difference might be that one would have a higher density than the other. One would look under-exposed, and the photometer would indicate a lower curve. The same detail would come out with a slower plate, but measurement of the density with the photometer would at once show the difference. In one case a difference of 300 per cent. had been found. If density was not related to speed, how was it to be made use of? He (Mr. Cadett) thought Messrs. Hurter & Driffield's principles should be attacked. Alluding to Mr. Cowan's experiments, he said that, under the conditions, he was a far better judge of the system than Mr. Williams, who had simply based his experiments on the numbers on makers' plate-boxes. There was another point. Thickness of coating had an enormous influence; but by cutting a plate in halves a mean reading between the two should be obtained.

Mr. W. J. WILSON said that his impression of Hurter & Driffield's system was that, within its own limits, it was perfect—that is, within what was called the period of correct exposure with a certain developer at a certain temperature, and excluding the question of the spectrum altogether. It was a question how far the spectrum question came in. No two makes of plates would act in the same way as regards the spectrum. In most ordinary circumstances we had to deal with white light, and practically the spectrum did not give any. They had heard it stated that two plates of different makes might have the same relative speeds in different lights—that is, they might be equal in speed at one o'clock and different at six. As to the developer question, he believed Messrs. Hurter & Driffield started by asserting that a photographer had no control over gradation by varying his developer, but he (Mr. Wilson) had some reason to believe that Messrs. Hurter & Driffield had since modified their statement. He (Mr. Wilson) had found that rodinal sometimes showed a plate to be three and a half times as quick as one developed with pyro and ammonia, and if that was admitted it needed investigation, and the speeds of plates according to certain developers should be recorded. It came to this, that one developer acted better with one plate than with another. Another point, as to temperature of developer. Messrs. Hurter & Driffield had tried development at a certain temperature, but, had they developed two plates of different makes with the same developer at, say, forty degrees Fahr.? There might be a variation with the same make of plates at different temperatures. In conclusion, he thought that within certain defined limits and conditions the system was a perfect one; but whether, where all the conditions did not come in, the other conditions were vitiated was an open question.

Mr. CADETT thought that Messrs. Hurter & Driffield had corrected their remarks in their original paper as to a plate being found more sensitive to one developer than another, inasmuch as they had stated that they had found no difference worthy their notice. Those who were using Hurter & Driffield's system had learned that the speed of a plate could be altered by a developer. The photometer enabled them to observe the periods of over and under-exposure. Before the Hurter & Driffield system came out, we were content with 100 per cent. errors in the speed of plates; now, ten per cent. was looked upon with horror. The time of development did not alter the speed of plates very materially, but density was widely different.

Mr. P. EVERITT pointed out that, in two of Mr. Williams's results, there was a difference, whereas, according to the speed numbers of the plates, they should have been exactly alike. The difference was possibly due rather to the delicacy of the plates rather than to the opacities. Alluding to the actinograph, he said that, with different speeds of plates, and working strictly according to exposure, he found the speeds practically correct.

After further observations from Mr. Haddon, Mr. Cowan, and the Chairman, Mr. Williams briefly replied to some of the criticisms on his paper, and the discussion was adjourned till Thursday, April 20.

Holborn Camera Club.—April 7, Annual General Meeting, Mr. Fred. Brocas in the chair.—The Secretary read the annual report of the Committee, which was adopted. The Treasurer presented the balance-sheet, showing a balance in favour of the Club of 14*l.* 18*s.* 8½*d.* The following officers were then elected:—*President:* Mr. A. Horsley Hinton.—*Vice-Presidents:* Messrs. Fred. Brocas, S. T. Chang, and R. D. Lowe.—*Committee:* Messrs. J. H. Avery, E. H. Bayston, J. Bush, T. O. Dear, A. T. Ebsworth, A. W. Miller, and J. Stevens.—*Librarian:* J. Brittain.—*Lanternist:* Mr. E. Benest.—*Treasurer:* Mr. Albert Bell.—*Hon. Secretary:* Mr. F. J. Cobb.—*Assistant Hon. Secretary:* Mr. Herbert Thompson. Several alterations in the general arrangements and rules were made, and the meeting separated. The first official outing was held on Saturday last at Hampstead Heath in excellent weather. A copy of Mr. J. A. Hodges' "Elementary Photography" has been presented, by the publishers, to the Club library.

Harringay Photographic Society.—April 6, Mr. C. Watson presided.—A practical demonstration of *The Frena System* was given by Mr. Bynoe, and illustrated with diagrams on the screen. The demonstrator first showed the new and improved system of changing films, the use of the swing back, and, the patent and very ingenious time and instantaneous shutter. Some pictures taken with the "Frena" were shown on the screen, and were much admired.

Hackney Photographic Society.—April 4, Mr. F. W. Gosling presiding.—Members' work shown, Mr. Dean and Mr. Nunn. Question: "Is there a limit to length of time between printing and developing the cold-bath platino paper without deterioration?" Reply: "It is always advisable to develop at once. Paper absorbs moisture; even when under mackintosh, the edges will. Undeveloped prints were put away for six, four, and two months, and recently, and, although all care was taken, the last only were good. When the paper is dry, it curls film side outwards, and, when damp, the opposite. It is not generally known that, if the negative be very thin indeed, a good print can be obtained by printing under light blue glass; also, if a print be very much over-exposed, so that all the details are out, a good result comes by fixing in the acid bath without developing." Question: "What is the relative exposure between limelight and daylight portraiture?" Reply: "For portraiture the light must be diffused, either by several lights or white paper reflectors, hence limelight is not satisfactory. Magnesium ribbon for high lights and gas for shades recommended." Mr. Dean then read Mr. Dawson's paper on *Photogravure.*

South London Photographic Society.—April 5, Dr. T. G. Munyard in the chair.—The Committee presented their fourth annual report, which showed that the Society was continuing to progress, and that the number of paid-up members was 105. The proportion of working members had, during the year, largely increased. At the bi-monthly meetings demonstrations and papers of great interest had been given and read. The Club camera (12×10), lantern, and slides had been in much request. Several valuable contributions to the library were made during the year, and the demand for the loan of the various works had been good. The Committee tendered their thanks to the editors of the photographic papers for copies of their papers. An excursion secretary was appointed at the beginning of the year, and endeavours were made to put the outings on a better footing, which had met with much success. An exhibition on more extended lines was held in November last, and favourably commented upon by the photographic press. The Treasurer's report showed that the members had obtained the maximum benefits for their subscriptions, a considerable amount having been expended in apparatus, which left the accounts just balancing. The report and balance-sheet were adopted, and the election of officers proceeded with, which resulted as follows:—*President:* F. W. Edwards, Esq.—*Vice-Presidents:* Messrs. Maurice Howell, Dr. T. G. Munyard, W. Rice, and H. G. Banks.—*Committee:* Messrs. Boxall, Buckle, Claridge, Esler, Fellows, Greaves, Lester, Lyon, and Miller.—*Curator:* Mr. G. H. Moss.—*Treasurer:* Mr. E. A. Whitby.—*Hon. Secretary:* Mr. Charles H. Oakden, 51, Melbourne-grove, East Dulwich, S.E.—*Hon. Assistant and Excursion Secretary:* Mr. W. F. Slater, 169, Southampton-street, Camberwell, S.E. The Affiliation scheme was discussed, and it was decided to join the Affiliation Committee.

Lewisham High-road Camera Club.—April 7, Annual General Meeting.—The following gentlemen were elected:—*Vice-President:* Mr. A. H. Miles.—*Committee:* Messrs. M. Stodart, B. Davidson, E. Eastwood, R. W. James, M.I.C.E., C. Churchill, W. C. Chaffey, Professor Lambert, M.A.—*Hon. Treasurer:* Mr. E. B. Eastwood, 26, Breakspears-road, Brockley.—*Hon. Secretary:* Mr. H. M. C. Sprunt, 192, New Cross-road, S.E.—*Hon. Assistant Secretary:* Mr. H. L. Davis, 95, Cranfield-road Brockley.

Croydon Microscopical and Natural History Club (Photographic Section).—April 7, Mr. J. H. Baldock in the chair.—Mr. S. H. FRY discoursed on the "Sandell" plate. These, he explained, differed from the ordinary plates in being coated with two or three emulsions of different degrees of sensitiveness, the most rapid being on the top, and resulted in several great advantages, enormous latitude in exposure, freedom from halation, &c. Proceeding to the development, he laid special stress on the adoption of a tentative system, using a weak developer when the exposure given was longer than the normal for the top film, and he attributed the want of success experienced by some to their not having so treated them. The stripping of the top film was strongly deprecated; if veiled, it should be cleared. A series of very fine 15×12 prints, taken by Mr. Sandell, showed the great success with which Alpine scenes, irregularly lit interiors, and other strongly contrasted subjects could be photographed on these plates. A number of snap-shots, taken by the lecturer, were also shown.

Leeds Photographic Society.—April 6, Mr. J. H. Walker (President) in the chair, Lantern Night.—Many lady friends were present. The Indian and Colonial set of slides belonging to the Photographic Society of Great Britain and affiliated societies and a set of prize slides were exhibited. Both sets were much admired, many of them receiving hearty applause, and the Society feels deeply indebted to the Photographic Society of Great Britain and affiliated societies, the slides being only one amongst other sets they distribute amongst their affiliated societies. Such, amongst other benefits, only requires to be known to induce other societies to join.

Photographic Society of Japan.—March 3.—Some very fine photographs were exhibited, sent by Messrs. B. J. Edwards & Co., London, showing the difference between the photographs taken on ordinary plates and on their isochromatic plates; the contrast between these was very striking, especially in the photographs of flowers. Mr. Kajima Sebi then exhibited an extraordinarily large bromide print (36×42) taken direct on a negative in his big camera exhibited at a previous meeting. Some views taken by the Dallmeyer telescopic lens were sent to the meeting by Mr. W. K. Burton, he himself not being able to be present. The telescopic lens was again shown, this time fitted with gear to enable the focussing and spherical aberration adjustment to be made more readily. Mr. Beilter showed a new lens by Carl Zeiss, of Jena, called the apochromatic triplet. It is claimed that this is more complete and correct for spherical and chromatic aberration than any lens which has hitherto been produced, and certainly some extremely beautiful views of cabinet size taken with the lens were exhibited, as also some larger views on aristotype paper taken by the same instrument; these were much admired.

FORTHCOMING EXHIBITIONS.

April 14–29	*Crystal Palace. The Executive, Crystal Palace, S.E.
,, 14–15	*Bolton Photographic Society. Hon. Secretary, J. E. Austwick, 10, Rushton-street, Bolton.
,, 17–29	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.
May 4–6	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Exchange Column.

*** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Exhange eight-inch gas burnisher, 5×4 bellows camera, and silver Albert chain for whole-plate camera.—Address, J. BENNETT, 38, James-street, Swansea.

Exchange Dallmeyer *carte* lens, splendid definition, for good-make half-plate bellows camera lens, and three dark slides.—Address, W. MELLING, 147, Newport-street, Bolton.

Doublet lens, by A. Ross, 18×16, has been used regularly for plates 24×18; exchange for 15×12 wide-angle tourist camera, half-plate.—Address, A. Cox & Co., Tavistock-chambers, Nottingham.

Will exchange Emmerson's head rest for two backgrounds, one in-door and one out; or half-plate camera and lens, for out-door work; must be perfect.—Address, F. MOORE, 36, Wollaton-road, Beeston, Notts.

Will exchange a heavy burnisher, by Richardson, eighteen-inch bar (oscillating), perfect condition, and with gas burner; wanted whole-plate wide-angle lens, any make.—Address, C. BENNETT, 104, High-street, Lymington, Hants.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

MR. PRINGLE AND THE SANDELL PLATES.

To the EDITOR.

SIR,—Although Mr. Pringle has confined his reply to my letter of the 17th ult. to another journal, I think the matter of such universal interest that it should get directly into the hands of your readers, and so you will oblige by inserting the following contribution to it. I hasten to reciprocate Mr. Pringle's kindly feelings. Mr. Pringle has been a friend to ourselves, speaking for my Company, and to myself, and trust he may ever remain so; but there happens sometimes in human experiences a period when it is well to be saved from one's friends, and this I have taken to be one of those interesting occasions. Mr. Pringle expresses regret that I did not attend at the meeting of the Camera Club. Well, I thought the matter was so simple that, in the hands of such an expert, the subject was quite safe; secondly, I disliked the appearance of "exploiting" at scientific meetings; and, lastly, I did not think it consistent with my *amour propre*, inasmuch as I had some time previously been advised by Mr. Pringle that I should not be considered worthy of the Club membership. Of the first idea I have been altogether disabused, and it is entirely due to Mr. Pringle's handling of the subject that it has been thought desirable to give instruction in the uses and capabilities of the plates by demonstration at the Societies.

Mr. Pringle seems to wish to represent my former letter as dealing "mainly with opinions." Nothing is further from my desire. I want facts, and facts only; and I maintain the facts of the case are so easy of proof as to be within the reach of all.

Mr. Pringle objects to my use of the adjective "preposterous." I can only repeat that the idea of stripping the films in practical negative making is preposterous, and consider I was justified in being so emphatic on the point when a gentleman, Mr. Gregor Grant, who admittedly had received instructions from Mr. Pringle on the proper use of the plates previous to starting on a trip, is reported to have said at a meeting of the West Kent Society that he gave enormous exposure, developed, and stripped off the top film; but I understand even then nine good negatives were secured out of twelve, the remaining three being under-exposed. I take it the latter were the cause of Mr. Grant's adopting Mr. Pringle's notion, that a little over-exposure produced a failure with the plates.

In discussing the question of rapidity, I contend I am entitled to have from Mr. Pringle some suggestions as to why he should go out of his way to represent the plates as slow, in order to release him from any suspicion of being disingenuous. Either he must imagine I cannot make a fast emulsion, or must have an idea that the successive coatings interfere with one another.

Mr. Pringle must surely know there is every inducement to put the most rapid emulsion on the surface, for, with the increase of rapidity, halation is increasingly troublesome in the single film. As a matter of fact, the plates are as rapid as any plate of any make I have ever tested, and I am more than sanguine of soon being able to provide a plate of much greater rapidity still.

Mr. Pringle's assertion at the Camera Club, "I found that in a view with trees in it, the normal exposure to get a good negative on the top film was ten seconds at *f*-32," if unaccompanied by an extempore explanation, was an outrage. I will here point out that the questionable advantage possessed by the ordinary plate of the supplementary exposure from reflection (which I maintain is stupidly called halation) is absent. Why I think the term halation stupid is, because it detracts attention from the undue density, and what may be called the inner effect of the reflected rays when not sufficiently strong, or the angle of reflection is not large enough to produce the halo.

Mr. Pringle, in his use of the adjective "absurd" in connexion with my assertion as to the practically unlimited latitude of the plates is, I submit, somewhat unscientific. If it is possible to do, as I have done, give an exposure on an open landscape of half a second, and another of one hour with the same stop (and, in all probability, six hours would have answered equally), is my claim unjustified? I should be glad to know who requires greater latitude. Mr. Pringle says he has not found the plates an absolute cure for halation. I shall esteem it a great favour if he will furnish me with details of the alleged failure, and will guarantee, if the exposure is within the province of what can be fairly described as practical photography, to make a negative free from it.

On the question of quantity of light passing a film, Mr. Pringle appears to give himself entirely away, or I cannot understand his language. He says, "I think under-exposure is one of the most certain ways to produce halation." Now, taking it for granted that the halation meant is reflection, and as the reflected rays are only a small percentage of those transmitted, it stands to reason that a large quantity of light has passed the film even in the cases of under-exposure. Then, am I right or wrong in claiming a great advantage for the double films in cases where one wishes to develop up all that is possible?

Now on the question of amenability to development.

I have not the advantage of a knowledge of the results obtained by the *savants* referred to as having "studied the subject."

It has been a matter of daily, almost hourly, study to me for the past fourteen years, and this is the only way in which I can account for the fact that a weaker developer is necessary for a slow plate than for a rapid one, and also for another fact, that a weak and restrained developer with a rapid plate will furnish a finer-grained negative than a strong one. Why this, unless it is that the finer grains are more easily reduced? This, in my opinion, also furnishes the correct answer to the Rev. F. C. Lambert's question as to the appearance or non-appearance of the positive effect in negatives, propounded at the Camera Club on the same evening. Mr. Pringle, I expect, will agree with me that light and heat are only different manifestations of the same natural phenomenon. Now, in sensitising an emulsion, heat is as necessary as light is in making a negative. We know the effect of light is, up to a certain point, to facilitate or render possible the development to maximum density; beyond that point it renders it more and more difficult, and at last it makes development by any known method an utter impossibility; in other words, the salt of silver is what is termed perfectly solarised.

Then I suggest the action of light and heat being similar, that in the more highly sensitised emulsion we have an approach to the effects of solarisation, and consequently density is less easy of achievement, as it is well known to be with the most rapid emulsions.

I can assure Mr. Pringle there are many items to be found in the philosophy of a dry-plate maker, which are not to be found in the philosophies of the majority of our handbooks; neither is it fair to expect it. We, as emulsion-makers, make thousands of gallons of emulsion of different kinds during the year, whereas our authors may make their few half pints.

In conclusion, I can only beg of Mr. Pringle not to fail to pay a visit to the Exhibition which is being held during next week at 24, Regent-street. If he cannot there find that I have more than proved my case to the hilt, I shall be surprised.—I am, yours, &c., J. T. SANDELL.

Thornton Heath, April 10.

REDUCING ACTION OF HYPO ON AMIDOL-DEVELOPED NEGATIVES.

To the EDITOR.

SIR,—The reducing action of hypo on amidol-developed images is not confined to bromide paper. A few days ago I developed in amidol and fixed in a somewhat strong bath two hand-camera exposures. The negatives produced were fairly strong and of good gradation, without fog, and fixation appeared to be complete. I rinsed them under the tap for about three or four minutes, and placed them in a draining rack, intend-

ing to finish washing them as soon as I had developed the remainder of the exposed plates in the magazine.

I was then called away for two or three hours, and, as soon as I returned, at once proceeded to complete the washing of the negative. To my consternation, I found only the merest ghost of an image left. There was no sign of fog, and the gradations had not suffered.

It has long been an article of my photographic faith that negatives underwent merely apparent reduction in the fixing bath, and that prolonged fixation did not perceptibly increase this apparent reduction. An exception must evidently be made in the case of images produced by amidol.

I would recommend a comparatively weak fixing bath for both plates and paper when this developer is used.—I am, yours, &c.,

54, *Loftus-road, W., April* 7, 1893. L. CROSSLE.

To the EDITOR.

SIR,—In the last two issues of THE BRITISH JOURNAL OF PHOTOGRAPHY I have read letters on the above subject, and write these few lines to inform your readers that, having used the above developer upon several different brands of dry plates for negative work, I have noticed that when the negatives have been left in the fixing bath for, say, two hours, their density appeared to be reduced a little as compared with their density after about half an hour's stay in the fixing bath, which for all ordinary plates is the length of time I consider necessary in order to thoroughly fix the image. I may also mention that I have even left negatives developed with amidol for at least twelve hours in the fixing bath, and, although they have been a little more reduced in density, none of the finest details appeared to have suffered in the least, *and in no case did the image entirely disappear.*

It will be interesting to many of your readers to know that negatives developed with pyro, hydroquinone, eikonogen, and rodinal will be reduced a little in density if left in the fixing bath for several hours; *but I do not think that amidol-developed negatives* are reduced to a greater extent than those developed with the other developers above mentioned—at least, this has been my experience. An ordinary, and not an acid, fixing bath is always used in my dark room; therefore I cannot say what effect the latter or any other kind of fixing bath may have upon the image.

The foregoing facts may set many of your readers' minds at rest as regards the permanency of their negatives—from this cause, at least; indeed, this is the only reason why I wrote this letter.—I am, yours, &c., J. T. HACKETT.

Fleet, Hants, April 7, 1893.

CYANIDE OF POTASSIUM.

To the EDITOR.

SIR,—May I be allowed to correct a statement you make in answer to correspondents, re cyanide of potassium? You say this is only sold by "qualified pharmaceutical chemists." All *registered* chemists can sell it; but the latter are *not* pharmaceutical chemists, although both are registered as duly qualified to sell poisons. At the same time, you will find it in the British Pharmacopœia method of making its characters and tests.—I am, yours, &c., J. W. WRIGHT.

141, *St. James's-street, Burnley, Lancs, April* 7, 1893.

ALBUMENISED PAPER *VERSUS* P.O.P.

To the EDITOR.

SIR,—As so much has been written upon the superior permanence of P.O.P. paper over albumenised, there is one test I have never seen mentioned, viz., hot water. Our old friend will stand boiling; the other—well, try it.

I should recommend amateurs to be wary of discarding old and tried friends.—I am, yours, &c., AMATEUR.

April 8, 1893.

[Our readers will be amused to be told that the "permanence" of gelatino-chloride prints is open to question because they will not resist the application of boiling water! Our correspondent's test is such a ridiculous one that it obviously explains why he has never seen it mentioned.—ED.]

TRADE DEPRESSION—THE CAUSE AND THE REMEDY.

To the EDITOR.

SIR,—Your valuable JOURNAL, ever alert to the interests of those who seek a livelihood by, and are entitled to a position in, our much-abused profession, will gladly entertain the above—the burning photographic question of the day. The thorough practical remarks of "N'Importe" in your issue of March 24 are a step in the right direction. So let us proceed to consider the facts. When circumstances are adverse to progress, we must understand the cause thereof, and what is conducive to improvement; in our case, this is not difficult. While we submit to incompetents usurping the rights of genuine aspirants, the present state of matters will prevail, to the discredit of a nation whose boast is, "Liberty and the suppression of all unrighteousness." Let us follow the expedient adopted by other trades and professions, and prove our genuineness by technical examination and registration. Those unable to survive a test would find their proper insignificance seeking pastures new, while those who proved their superior claims for a position in the photographic world would no longer incur the sceptical view, as one of the many sheep in the fold (black included), but as a distinctive class. To further our interests we have established our National Association of Professional Photographers, Photographic Society of Great Britain, and others. If they wish to uphold their profession as an honourable one, will they not endeavour to suppress the existing evil? In this advanced age, when competition is so keen, we must establish measures for the protection of a genuine business career. Then, and not till then, can photography maintain the high position which it is destined to, and deserves to occupy, as one of our many arts and sciences.—I am, yours, &c.,

April 10, 1893. ONUS PROBANDI.

PROPOSED HAND CAMERA CLUB.

To the EDITOR.

"The cry is still they come."

SIR,—I note in your last impression a proposal for a Hand Camera Club. As there is now a Photographic Society in most parishes, I should have thought that the hole cut in the stable door for the fowls would have been large enough for the chickens; however, I may be wrong, and the new Club may fill a long-felt want, after all.

Should the proposal succeed, I would suggest a "Half-plate Club," a "Seven and a Half Five Association," and a "Whole Plate" Society (with power to add to their number), the subscription to be in proportion to the size of the plate adopted, thusly, quarter-plate, 2*s.* 6*d.*; half-plate, 5*s.*; 7½ × 5, 7*s.* 6*d.*; whole plate, 10*s.*; and, when these are all in good working order, an "Iris Diaphragm" Society, a "Portable Symmetrical" Club, a "Tele-photographic" Association, and a "Concentric" Union might be started. I was going to add an *Eccentric* Club, but possibly, by the time the others are in full swing, there will be several of these under other titles.

I would also suggest that, if these Societies are formed, some of the meetings should be arranged for the daytime, as at present there are only six *evenings* in the week available for those who make either a hobby of, or a living by, photography.—I am, yours, &c., DROP SHUTTER.

April 10, 1893.

THE GENESIS OF THE GAS REGULATOR.

To the EDITOR.

SIR,—Allow me to say that Birrell's Gas Regulator was patented and used on his automatic oxy-hydrogen apparatus on July 25, 1875, seven years earlier than 1882. His regulator is different from all the other regulators, his is a Bellows and Stud Acting by means of a lever and Connecting Rod on a Keyed Cork.

The latter is a more certain form than a valve as any dust between it and its seat regulator renders the regulator entirely useless. His has one of his Anti-friction Keyed Cork which reduces the friction of the key to a minimum.—I am, yours, &c., WILLIAM BIRRELL.

109, *Graham-street, Airdrie, N.B., April* 10, 1893.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street Covent Garden, London.*

PHOTOGRAPHS REGISTERED:

John Anderson, Dalry, Ayrshire.—*Photograph of the Mother Lodge of Scotland.*

Mackintosh & Co., Kelso.—*Four photographs of the grave of the late G. A. Baird.*

R. DAVIS.—The prints will not curl if they are well rolled.

HERMANN SCHNAUSS.—We shall be pleased to receive the article.

BRUTUS.—Your post-card was quite inexplicable, please write more fully.

JOHN A. LLOYD.—Sharland, Thavies Inn, Holborn-circus, is the address you lost.

B. O.—We have no information as to any imminent scientific Exhibition at Islington.

XXX.—Try the effect of refixing the plate in an acid (bisulphite of soda) hypo fixing bath.

H. W. H.—The tincture meant is the compound one in which water is the solvent.

COLLOTYPE.—Apply to Messrs. Waterlow, Messrs. Bemrose, or the Loudon Stereoscopic Company.

A. E. PLATT.—The negatives are out of our possession. Try either daylight or magnesium, whichever is most convenient at the time.

J. W.—Practical information on the subject of process-block and collotype work is given in the Editorial article of the last ALMANAC.

JOHN BUCHANAN.—1 : 15 and 1 : 6 in the formula mean solutions containing respectively one part of gold chloride to fifteen parts of water, and one part of hypo to six parts of water.

E. H.—Hydroquinone, as well as eikonogen, may be obtained from all the dealers. Neither article is, or ever was, kept by ordinary druggists. You are misinformed as to its being withdrawn from the market.

T. G. SHAPE.—If the seller says the rose tint on the albumen paper is permanent, it ought to be. The thing is easily tested. Expose a piece in a pressure frame to the sun for a few days, part of the paper being shielded by a mask.

COMPARE.—1. No bag is needed for changing the plates, the reservoir being complete in itself. It is adaptable to any camera. 2. The lens mentioned will, when stopped down to *f*-8, do all the work that can be done by a lens in which thia is the maximum aperture.

A. E.—The combined toning and fixing bath, at one time universal, was abandoned for albumen paper prints some thirty years ago. The theory of its action will be found in some of the earlier editions of Hardwich's *Photographic Chemistry;* see the sixth and seventh.

SEPTIMUS.—Any of the wholesale stationers who supply enamelled paper for lithography will also supply paper suitable for collotype. Sometimes the plates have to be modified to suit any particular make of paper. But the makers can modify the surface of the paper to order. Of course, they will only do this when a sufficient quantity is ordered at a time.

W. HOBBS.—We cannot hazard an opinion as to the safety of the mounts. Methods for ascertaining the influence of the mount upon the photograph have been published in the JOURNAL. In the meantime you may plaster, by means of water, a print face down upon a mount, and place under pressure for a fortnight. You will then see whether any signs of spots or other imperfections are apparent.

T. ROWE says: "I always see it recommended for the photo-lithographic and other mechanical processes that wet collodion be used for the negative. Will not dry collodion do as well? Surely a negative may be as good by one process as it is by another?"—It matters not by what process a negative is made, so long as it is of the kind suited to the work. Wet collodion yields negatives of the character best suited to most of the photo-mechanical processes. It is for that reason that it is almost universally employed.

A. MOUNTER.—If eight girls are employed in the establishment you are engaged in, we should certainly say that it comes within the Factory Act, and that the employer is not justified in keeping the hands employed for so many hours a day, particularly with only three-quarters of an hour for the three meals. You are certainly entitled to the Saturday half-holiday according to the Act. Communicate with the factory inspector of the district, or write direct to the Home Office, Factories Department, Whitehall. According to your account, you are all being "sweated."

C. FERMER.—We are not familiar with the "liquid gum" named, and do not know its composition. Many of the cements sold ready for use, though excellent adhesives, are quite unsuited for photographic mounting purposes, by reason of the injurious action they would have on the print. Some of these liquid cements, we are told, contain bichloride of mercury as an antiseptic. We need not say the effect such a one would have on a silver picture. As a mountant, nothing is better than starch, or gelatine, and either is easy of preparation as required.

E. W.—When a youth is apprenticed, the indentures, whether a premium is paid or not, should be properly drawn out and duly stamped, otherwise they are not binding on either party. It should also be clearly stipulated as to what the youth is to be taught; otherwise the apprentice, at the end of his term, may find that he has wasted his time to no purpose, unless he obtains redress by legal proceedings. In the indentures have it stipulated the time he is to serve in each department, so that the whole of his time is not expended in mere drudgery. See letter and comment in our penultimate issue.

D. MCMAHON.—1. If the collodion you have made peels off the glass while the plate is in the silver bath, it shows that it is not suitable for negatives. In a first essay of the wet-collodion process, a beginner had better purchase his collodion of one or other of the well-known makers, he will then be sure of obtaining what is necessary. 2. The "metallic markings" on the glass are due to its not being perfectly clean. 3. In working the collodion process, the plate is not placed in a dish for development. Why not get a lesson or two from an old hand, as you wish to work the process for commercial purposes? you would save much time by so doing.

J. R. WILLIS writes as follows: "I often see it mentioned, in connexion with the stability of some of the old silver prints, that they were made on slightly albumenised but heavily salted paper—fifteen or more grains to the ounce—and sensitised on a hundred, or stronger, grain bath. Can you tell me who supplies such a paper, ready sensitised, as I should like to give it a trial, for all my prints show signs of deterioration after a year or two?"—Such paper, either sensitised or unsensitised, is not a commercial article now. If our correspondent requires such a paper, he will have to prepare it himself.

PHOTOGRAPHIC CLUB.—April 19, *Cold Bath Platinotype Experiences.* 15, Saturday Outing, Hadley Wood; meet at Hadley Wood Station at three o'clock.

MESSRS. MARION & CO. write: "It may be interesting to you to know that the successful group taken at Windsor by Mr. Cartland was with Slingsby's flashlight apparatus."

BRIXTON AND CLAPHAM CAMERA CLUB.—At the next meeting on April 18, Mr. T. C. Hepworth, F.C.S., will lecture on *Photography applied to Journalism,* with lantern illustrations.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—April 20, Adjourned Discussion, *Determination of the Speed of Plates.* 27, *The Influence of the Hand Camera,* W. D. Welford. May 4, *Developers,* Technical Lecture of the Series, E. J. Wall.

THE London Sensitised Paper Company writes: "To meet the demand for our albumenised and matt-surface sensitised paper, 'Sans égal' brand, also to provide accommodation for machinery and plant for two new brands we are going to introduce at an early date, we have found it necessary to acquire new and spacious premises—Caversham Works—which we are fitting up for the production of silver printing papers. Our new office address is 2A, Caversham-road, N.W."

THE Bradford Amateur Photographic Society hold their annual Exhibition at the British Art Gallery, on May 1, 1893. The form of entry to be returned on or before April 28, to the Secretary, 15, Beech-grove, Pollard-lane, together with a postal order for entrance fees, payable to Mr. F. B. Pickles. The entrance fee is 2*s.* 6*d.* for each class.

RECEIVED.—An Amateur; T. H. Faulks; Morgan Backus, many thanks. We shall probably utilise.

MR. W. M. WARNEUKE, of Glasgow, occupies a considerable space at the Chicago Exhibition with several large direct portraits, some of them about 40 × 30 inches, in sepia platinotype.

MR. S. HERBERT FRY writes: "I shall be much obliged if you will permit me a little of your space to add the following remarks to your report of the meeting of the London and Provincial Photographic Association for March 30. The Chairman of the meeting, Mr. J. S. Teape, showed some comparative results upon a 'Sandell' plate and one of another maker. If the result appeared somewhat to the disadvantage of the multiple-coated plate, it was only because it was not given the treatment which would develop its qualities. A multiple-coated plate can be spoiled in use. In this case it was. Given an exposure which is longer than what I may describe as a normal exposure, development must always be tentative. By this I mean development must be commenced with a solution which is both weak and restrained. If this be done, and the developer strengthened only sufficiently to produce an image of the same character as the image upon an ordinary dry plate, then the inherent advantages of the multiple-coated film will be utilised to their utmost. Backing, judiciously done, does in a large measure prevent halation, but the advantages of multiple-coated films are not confined to this one point. They are also practically over-exposure-proof, a quality which is by no means bestowed by backing."

*** *Owing to great pressure on our columns this week, we are compelled to hold over several interesting articles and other communications that we have in type.*

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1720. Vol. XL.—APRIL 21, 1893.

THE CAMERA CLUB CONFERENCE—VAN DER WEYDE'S PHOTO-CORRECTOR.

It is difficult at first sight to account for the lamentable falling off that this year characterises the gathering of the members of the Camera Club at the annual conference which was held on the Wednesday and Thursday of last week. The attendance altogether was meagre in the extreme, and, but for the presence of the press and a few others belonging to the outside world—at the second day's proceedings six of the press in an attendance of eighteen—it would have been simply appalling.

We have said that at first sight it is difficult to account for this, but imagine that a factor towards the solution of the problem is to be found in the attitude lately taken by the Club in its relation to the public by interdicting the outside press from publishing any of the papers which from time to time are read, or the communications made at the meetings.

It is only in accord with human nature that those who have anything valuable to say would prefer to have their *dicta* presented to the whole world rather than be confined to the limited number of the Club members who may happen to be present on the occasion of such communication being made, and thus be inclined to select some other wider channels for the dissemination of their ideas. In adopting this new exclusive course, the executive are acting quite within their rights, but they might consider whether it would not be a kind and graceful act to open their doors, so far as publication is concerned, to their professional and less favoured brethren throughout the world.

It seems we were not wholly right in our surmise last week when indicating, as we did very briefly, the direction which Mr. William Taylor (not Thomas, as we had it) would take in his paper on the *Establishing of Standards* in photography, for this paper was of wider scope than we had anticipated, and not merely embraced the screws and fittings of photographic lenses, but every point on which there was likely to be a divergency of opinion, such as the metre or the yard; the centimetre or the inch; the gramme or the grain; the sizes of plates and films, &c. His paper, however, was not so much practical as philosophical.

The knowledge that Mr. Henry Van der Weyde was to disclose the secret of his so-called photo-corrector on Thursday evening brought a larger attendance than had hitherto been the case. Pending the time when in another week an exhaustive paper is to be read on the subject before the Society of Arts, and which we will publish in due course, we may here give the following brief explanation of what an artist might call the photo-corrector, but which would be designated by a scientist as a photo-distorter, each of them being right from his own particular point of view. Let us suppose that the hands, or the feet, the nose, or, in short, any part of a sitter were, from the nearness of the camera, represented in the photograph on a scale somewhat larger than was quite satisfactory to the fair sitter, the question arises how are these individual portions to be reproduced photographically on a less accentuated scale, and so as to be in harmony with the desires of the sitters, if not of their actual measurements?

In addition to the ordinary or primary lens in front of the camera, and by which the image is formed, there must be interposed in the path of the rays coming from the lens to the ground glass one or more other lenses having a peculiar form, and mounted so as to be adjustable directly in front of the offending hand, nose, or foot, or, for that matter, of the whole head, for Mr. Van der Weyde is of opinion that many heads are, speaking artistically, formed on a scale too large for the body, and should therefore be curtailed in dimensions in order to fulfil or satisfy the conditions of art. By the interposition of the lens referred to, the focus of such rays is virtually shortened, and the size of so much of the picture as is produced thereby is reduced.

The form of the lens required to effect this is peculiar; it is not plano-convex, but as if a plano-convex lens were cemented to a disc of flat glass, and made to rise almost imperceptibly from the surrounding plane instead of suddenly—very much, in short, as a gently undulating hill would rise from a level prairie or plain. This would undoubtedly reduce the dimensions of the portion acted on, but it must do so at the cost of magnifying all the surrounding parts. This will be apparent if, instead of a lady's hand or her nose, or any other part of her figure, the central spots on a chess-board be selected for this class of remodelling or reducing in dimensions, leaving the margins unaltered. Just try to imagine how this could be done.

The law of compensation demands that the space vacated by the diminution of one part must be added to its immediate surroundings; that the reduction, say, of the mouth, must be attended by the enlarging of the muscles or space in its vicinity. Mr. Van der Weyde admits that photography cannot lie, *optically;* but he says optical truth is not visual truth. As far as photography is concerned, optical truth is the result of a mere mechanical impression on a plate, which, while sometimes wonderful and beautiful, is sometimes so brutal in its fidelity, and microscopically vulgar, as to give a disagreeable surprise. Visual truth, on the other hand, depends for its appreciation on the artistic sense and power of observation on the individual, which he claims to be hereditary. Whereas in

the former the camera focusses every spot at the same moment without favour or prejudice, in the latter they have to please the family relatives and friends of the subjects who are most familiar with their appearance, and in this case the visual truth is the outcome of loving and friendly contemplation.

Mr. Van der Weyde is undoubtedly a clever artist, and produces admirable work; but we shall prefer waiting before writing more until he further promulgates his ideas before the larger world of the Society of Arts, for which, we observe, he is down for the 26th inst.

Before quite leaving the subject at present, we may notice that artists are and have long been in the habit of improving upon nature, especially as regards the human figure. We have heard Sir George Harvey, President of the Royal Scottish Academy, speak in approving terms of the action of the late Kenneth Maclea, who invariably when painting a photograph or using a photograph to mak an oil painting from it, drew the eyes larger than nature had represented them. Possibly it was this craze, so prevalent in former times, that accounts for the large goggle, saucer-like eyes to be found in so many of the ivory miniatures of by-past times. Whatever artists may say, and however much they may decry optical truth, there is no doubt that photography has conduced to a more accurate and healthy tone in their drawings.

LENS SCREENS.

It has been objected by thoroughly practical men that our recent suggestions as to the need of lens screens, especially in studio work, err on the side of unnecessary precaution, the ground our objectors take being that in their own personal experiences, covering long periods of time, they have produced thousands of negatives without taking any such care as we have stated to be needed, and yet have had no negatives spoiled by "lens fog." Quite apart from the legitimate argument that a number of negative results do not necessarily invalidate an apparently sound logical predicate, it is enough to say that the particular conditions of every individual studio have to be taken into account before forming a judgment upon the subject at issue. Now, it is very easy to show that the position and construction of the studio itself may be such that a natural screen, if bricks and mortar may be so called, may exist. Thus, take in the first case a studio built upon a roof-ridge roof, lean-to, or other style, a lens screen is a *sine-quâ-non* to the production of uniformly good results, for under many conditions of lighting the light must enter the lens from the sky or clouds, and frequently under such conditions will mar the otherwise attainable perfection of result. Let, however, as is often the case, a studio—one worked from one end only—be built against a lofty building, say, on the ground level in the gardens of a square, the sitter being so placed that his back will be against the outer building, there will be practically no need for the precaution of a lens shield, seeing that the building itself intervenes between lens and sky and so shuts out objectionable outer rays.

We have thought it well to allude again to this subject and the objections brought against it, seeing that it affords an opportunity of emphasising our advice and further pointing out conditions that may render them unnecessary. That under the majority of circumstances a screen is highly desirable our arguments conclusively show, and we cannot too strongly or emphatically recommend every photographer not using one to look around and see whether he cannot better his results by adopting some plan of screening. If we thought our argument needed fortifying, it would be enough to point out that it is no new theory, for such screens are by no means uncommon among professional portraitists, though we laid stress upon the recommendation, knowing that they might with advantage become far less uncommon. Their forms are very numerous, every user of them having his particular views as to the most suitable construction. One of the most elaborate we have seen is the patent Lafayette camera stand, fitted with curtains and blinds. So complete are the arrangements in this that the camera itself is screened from the light, while provision is made for the lens itself to be hidden from external useless rays of light by the curtains of the stand, further aided by a spring-roller blind in front, which may be drawn down to any extent required to shut off sky light; and this blind is still more increased in protecting power by two hanging side pieces for cutting off side light that might offend.

The simplest form that has been brought before our notice is a provision for hanging black velvet over two projecting arms, swinging in sockets attached to the camera itself. Another good plan is a light wooden skeleton framework lined with velvet, and attached to a wooden support, which slides under the camera in grooves cut on the under side of the stand. This can be pushed in or out according to the conditions of light and the particular lens used. To describe all the expedients we have seen would need far more pages than are to be found in a whole number of this Journal. We have said enough to show the need, and to impress on those who have not before felt it the desirability of adopting some one or other plan to meet it.

The same remarks apply to cameras for outdoor use. It may here be said that, seeing the great want of some plan of this kind for outdoor use, it is very unfortunate that we now never see lenses provided with the attached shutter, such as were fitted to the original Ross doublet lenses. These, it may be remembered, had an outside flap for use as a screen, and an exposing arrangement inside the lens. This use of the flap was little understood, and we have frequently seen the inner exposing arrangement always set open, and the shutter or flap used for making the exposure. It answered for that end, of course, and occasionally, at the same time, subserved its original purpose. But with the advent of dry plates and instantaneous shutters the sky shade seems to have dropped out of existence, the more the pity. Then, again, before the elaborate cameras of modern days, it was no unusual mode of construction to have them with a sunk front, which served both to protect the lens when the whole apparatus was folded and put away, and for use as a sky shade when landscape work was going on. It needs no instruction for any one to devise an arrangement, economical or elaborate, to provide a screen. There are abroad contrivances as numerous as those used by portrait photographers. All we say is, let every one give careful thought to our arguments and carry into his daily practice the adoption of some scheme or other in which these recommendations will be embodied.

The Photographic Society and Affiliated Societies.—The recent revision of the rules of the Photographic Society of Great Britain has resulted in the adoption of a rule which should greatly facilitate the ingress of members into the Society. In future, members of affiliated societies, who have belonged thereto for a period of two years, may be proposed for membership of the Parent Society on the nomination of their own Secretary, and will be admitted without entrance-fee.

Water-colour Exhibition.—The Exhibition of the Royal Water Colour Society, which opened on Monday last, is one that photographers, particularly those devoted to landscapes, will do well to visit. A large proportion of the pictures are just that class of subject that the majority of amateur photographers delight to render. A visit cannot fail to be profitable, as the photographer will see much to imitate, and, in a few instances, what to avoid.

More Photographs for Chicago.—English photography in its various phases will, apparently, be well represented next month at the World's Fair. At the last meeting of the Astronomical Society it was mentioned that Dr. Ainslie Common had, at the request of the Council, produced a fine series of astronomical photographs for the Exhibition. The series includes a number of diagrammatic enlargements of different solar eclipses with corona that will prove highly interesting to Transatlantic scientists. Every one is familiar with Dr. Common's astro-photographic work, so there is no question that this branch of English photography will be represented at its best.

The Photographers' Benevolent Association.—It is to be hoped that this institution will receive a good benefit from the Sandell Exhibition. It did from Mr. Fred Hollyer's recent Exhibition of platinotype reproductions of Mr. Burne Jones's and others' works. The Photographic Society of Great Britain annually gives the Association a benefit night, and the Photographic Club did so once, and it is somewhat surprising that other Societies have not followed the example; for, by this means, the funds of the Association might be considerably increased. By the way, could not the Benevolent Association get up one or two entertainments during the winter season, as it once did, on its own account? There is considerable talent, both vocal and instrumental, in the photographic world, most of which would be forthcoming gratuitously for so deserving an object. We commend the idea to the Committee, although it would be too late to carry it out this season.

Success of Societies.—Notwithstanding the number of Photographic Societies that have sprung into existence during the past few years, the majority of them are in a flourishing condition. The annual report of the South London Photographic Society shows that it has 105 paid-up members. This is many more—probably double—the number that the original South London Photographic Society possessed in its palmiest days. Yet the old Society preserved an active life for more than a quarter of a century, and its meetings were well attended by experienced workers. The roll of members cannot be taken as a criterion of the activity of any Society—it is by the attendance at the meetings, and the business transacted, that an opinion must be formed. For example, the original North London Photographic Association, if we mistake not, had something like 120 paid-up members at the time of its decease. It died of inanition—the members took but little interest in the meetings. The new South London Society is to be congratulated on its membership and the attendance at its meetings.

The Eclipse of the Sun.—The total solar eclipse was observed at Para Cura, on Monday, under favourable conditions by the British astronomical expedition under the charge of Mr. Albert Taylor, assisted by Mr. William Shackleton. The clouds were heavy shortly before contact, but afterwards dispersed, leaving a clear space for observation during totality. The photographs taken are not yet developed, but are believed to be satisfactory. Professor Pickering, of Harvard College, states that the atmospheric conditions prevailing at Minacaris during the solar eclipse were perfect, and that the results of his observations were very satisfactory. Professor Pickering says that he observed four streamers proceeding from the corona, two of which stretched over a distance of more than 435,000 miles. Several dark rifts were also visible, extending directly westward from the moon's limb to the utmost limit of the corona. Several solar prominences attained great distinctness and brilliancy. During the eclipse the surface of the moon appeared almost of an inky blackness by contrast with the dazzling brightness of the inner corona. The observations, Professor Pickering remarks, showed very conclusively that the present condition of the sun is one of great disturbance. There were very distinct evidences of a large number of spots, and of the presence of faculæ. The corona was whitish rather than red in tint. The results obtained may be said to be a combination of the observations, as drawn by Liais, of the eclipses of 1857 and 1871. The photographs taken on the present occasion, Professor Pickering concludes, were both numerous and satisfactory.

Richmond Heads—a Novelty.—Just now portraitists are on the alert for anything in the form of novelty to give a fillip to business during the coming season. We were recently shown some portraits that possessed great artistic excellence, and, although the style was by no means new, it, under its present aspects, was certainly novel, hence our allusion to it. The portraits were vignetted heads, cabinet size, by the platinotype process, but, instead of the figure being merely shaded off in the usual way, some delicate hatched lines were introduced in the vignetted portions of the figure and the background after the manner of Richmond's celebrated heads. This destroyed much of the photographic appearance of the picture, and gave ita close resemblance to a chalk or crayon drawing, particularly when it was on moderately rough paper. As we have just remarked, the style is not new. It was introduced by Mr. N. Sarony for *cartes-de-visite*, and patented by him something like thirty years ago. It did not take then, probably because the crayonlike hatching on such small pictures on highly glazed paper was quite out of keeping. But with larger sizes on a matt surface, as in the platinotypes referred to, the effect is widely different. There are many ways by which the hatching can be introduced, such as that of Sarony by a double exposure in the camera, first to the sitter and then to a hatched background, double printing, using a vignetting glass upon which the lines are etched by fluoric acid, or with the lines scratched on a plate coated with black varnish. In the present example, the hatching was introduced by a second printing from a negative made from some artistically hatched lines of larger size; indeed, from one of the lithographed backs that used to be supplied for the old photo-crayon portrait.

Graver versus Process.—It is always well to look an adversary squarely in the face. This is the attitude that was only slightly taken last week at the first annual dinner of the International Society of Wood Engravers by Mr. W. L. Thomas, R.I., who presided. While it is quite true, as he observed, that the much-threatened art of wood-engraving has never been more worthily upheld than by the engravers of the present day, and that a fine engraving of this class has an inexpressible charm about it, still we know that process work has made fearful havoc among the ranks of wood-engravers—a havoc that is constantly increasing, witness the numbers that are being compelled to retire from that profession in consequence of the rapidly advancing tide of "process." But since the times of Palmer, who was the first to strike a blow at wood-engraving, process work has undergone a revolution, which dates from the time that photography has been impressed into the service, for not till this was done was there any real danger to the profession. Over a quarter of a century has elapsed since, *àpropos* of the Graphotype process, which was then being introduced, we published an article entitled "A Blow at Wood-engraving," which led to some far-seeing engravers taking just alarm at the prospects of their profession, and providing against a possible further development of that encroachment; yet did the danger from the source named pass away with the failure of the Company that worked it and controlled the patents. It is really the Gillotype, or its congeners, for line work, and the grated screen system for half-tone that have imparted the most severe blow yet given to the wood-engraver, and these processes have come to stay, and will eventually oust skilled hand work from its strongholds, at any rate, from the important position it has so long occupied in relation to serial and book illustration. The time has now passed when wood-engravers can afford to treat photo-process work as "a foeman unworthy of

their steel." We know of numerous draughtsmen who are producing their drawings with special reference to their being engraved by process, and the encroachment cannot afford to be ignored. It may be remembered that a hostile attitude was taken against portrait photography by miniature painters some forty or fifty years ago, but photography eventually proved to be too strong.

RESTORING FOGGY PLATES.

A short time back, in turning out a box that had not been unpacked for several years, and which was supposed to contain only books and papers, I came across a packet containing some dozens of dry plates, which had been entirely forgotten during all that period. From the memoranda on the various packages I found that the plates were all over ten years old, some of them nearer twelve, having been made at various times for experimental purposes; and from other data I have to go by I know that most, if not all of them, contained a certain proportion of chloride in their composition, while many also contained iodide. I had, however, nothing to guide me, except in one or two instances where the information was pencilled on the packet, as to their precise composition, but I take it that they were all either bromo-chloride or bromo-iodo-chloride films.

An examination showed that they were all more or less—some very badly—affected by iridescent markings round the edges, a fault which has been said, with what truth I cannot decide, to be a necessary concomitant of the employment of chloride. On submitting some of them to development, the worst cases were found to be hopelessly ruined by fog, while others, though comparatively free from heavy fog, fell far short in quality of what a modern plate of even moderate character is expected to be. The greyness and veiling of the image was in all cases accompanied by a poorness and difficulty in obtaining density that rendered the plates quite useless for practical work even when giving a fairly clear image.

I tried every possible means, by ringing the changes on modifications of development, to overcome the tendency to thinness, but without any great degree of success. But I may say here, in passing, that our old friend, pyro, once more proved itself a more trustworthy servant than any of its newer rivals, for no modification, either in strength or otherwise, of hydroquinone, eikonogen, amidol, or para-amidophenol, produced the slightest improvement. With pyro, however, on increasing the strength to about six grains to the ounce, printing density was obtainable with some of the better samples; but this, unfortunately, was accompanied by an increase in the veil or fog that practically nullified the advantage gained.

It so happened that I ran out of plates of a particular size for some work I was doing at home, and, as there were some of that size amongst the defective ones, I resolved to try if they could not be restored to workable condition. From the fact of the plates having been packed away, instead of going to the "wash-tub," I conjectured that they had at one time been of good quality, and indeed, except for the iridescent edges, they appeared all right even now, being rich and dense in character; indeed, from a knowledge of the formulæ I was in the habit of employing, I knew they contained a liberal quantity of silver, if it could only be brought into available condition for use.

The first attempt at renovation was made with a plate of medium character, neither one of the worst nor one of the best, but picked out almost hap-hazard, since I concluded that, if the treatment answered for one, it would for all, in which it subsequently turned out I was correct. A solution was made as follows:—

Bichromate of potash	2 drachms.
Bromide of potassium	1 drachm.
Water	10 ounces.

In this the plate was immersed in a dish for five minutes, and then it was carefully rubbed over, especially at the edges, with a fine and very soft Turkey sponge, rinsed with water, and returned to the bichromate solution for another two or three minutes. It was then copiously washed from a jug and left to soak afterwards for an hour, face downwards, in a basin of water, the latter being changed some half-dozen times during the interval.

It was then taken out, drained, and exposed wet, a comparatively long exposure being given, and on development it turned out as good a quality of negative as could possibly be desired. The loss of sensitiveness brought about by the treatment, too, had been over-estimated, for, though not over-exposed, a shorter time would have sufficed.

The next experiment made was with a view of improving the sensitiveness, for which purpose the plate before exposure was immersed for three minutes in a weak solution of ammonia—three minims of strong liquor ammoniæ to the ounce of water; but, though this had the desired effect so far as it brought the sensitiveness back to about that of an "ordinary" gelatine plate, it reintroduced a slight tendency to fog, which without the ammonia treatment was conspicuous by its absence. As the work I required the plate for did not necessitate any great rapidity, the ammonia was relinquished for the time, though as I shall show, I later on succeeded in securing the extra rapidity without the addition of fog.

The process of restoration as thus conducted was all very well under the circumstances, where the plates were wanted, and it was the only way of getting them; but it was an eminently tedious one for ordinary use, and, of course, entirely out of the question for outdoor work. So I set to work to improve upon it by removing the fog and restoring the plates to the dry condition, so that they might be available for any purpose whatever.

The films as they stood consisted of gelatine with a mixture of silver haloids and probably some unremoved soluble matter that had assisted in bringing about the deterioration, though, no doubt, the silver chloride they contained contributed more than anything else to the result. The action of the bichromate solution is primarily to remove the fog and next to convert the chloride of silver into bromide, while the various washings the film has to undergo further bring about the removal of any soluble matter. Therefore it seemed reasonable to anticipate that, if the plates were treated as already described, washed with sufficient thoroughness to remove every trace of bichromate and dried, the result would be not only films that were usable, but that would keep owing to the elimination of the deleterious agents that had led to the previous deterioration.

I need not enter in detail into the various experiments that led up to the final method adopted, but will briefly describe the process as completed:—The plates were treated eighteen at a time in rack, holding that number, being dipped first of all into a tank containing the bichromate solution, in which they remained five minutes. The sponging of the individual films may be resorted to, but I came to regard it as an unnecessary refinement, and relinquished it. The racks were transferred one by one to a large tub of water, each receiving the contents of a large jug of water to remove the large excess of bichromate solution from the plates and rack. Living, as I do, in the country, though I have unlimited water supply, I have not the facilities for keeping up a constantly changing current, and must therefore rely upon periodical changes, which necessarily prolongs the time occupied in the process. However, by drawing off and replacing the water once every half-hour for a couple of hours, I found, with the volume employed, that the bichromate was practically eliminated: but, with a constantly changing stream, it would be, no doubt, removed in a much shorter time.

As the treatment with ammonia for restoring sensitiveness had proved a failure, or partially so, I cast about for a better plan, and succeeded at last by imitating as nearly as possible the condition that prevails in the sensitising of an emulsion by the "ammonia process." Here the silver haloids are subjected to the action of ammonia, not alone, but in the presence of excess of soluble bromide and of the by-products produced in the act of sensitising, in other words, nitrate of potash or of ammonia, both of which act as fog-restrainers. This gave me the "tip" for the next part of the process.

After a couple of hours washing the plates were transferred for half an hour to a solution composed as follows:—

Liquor ammoniæ	2 ounces.
Bromide of potassium	1 ounce.
Nitrate of ammonia	2 ounces.
Water	40 „

This, while adding to the rapidity of the films, further ensures the total removal of the bichromate, the slightest trace of which allowed to remain would be fatal to sensitiveness, and, if present in any quantity, to development, except in the best lighted portions of the

image. Although for actual working purposes it is not so absolutely necessary to remove every trace of the above solution, still it is most desirable it should be done; and, indeed, if the plates are to be kept for any length of time, it really is needful. A preliminary rinse, followed by a soaking of half an hour in three or four changes of water, will do all that is necessary.

All that remains now is the drying, which may be effected by simply resting the plates on end on a few thicknesses of blotting-paper in a dark cupboard or a large packing-case. Films of ordinary thickness will thus dry perfectly in less than twenty-four hours. But to ensure perfect regularity of drying, and also to materially hasten it, I prefer to remove the superfluous moisture from each individual film by one or other of the following means:—I prefer to use a sort of roller squeegee, formed of a wooden roller mounted in a handle in the usual way, and covered, first of all, with several thicknesses of blotting-paper, round which is finally wound, for two or three times, a short length of soft, *old* linen, neatly sewn, so as to leave as little ridge at the edge as possible. Before using this, the plates are allowed to drain for a few minutes until they become nearly surface dry; they are then taken singly, laid on a flat surface, and the squeegee passed over them with considerable force or pressure, which will squeeze a good deal of moisture out of the film, and leave the surface perfectly even.

Failing the squeegee, a thick pad of blotting-paper faced with soft linen, free from "fluff," will answer the purpose very well; it is simply laid on the plate on a flat surface and rubbed with the hand with considerable pressure. After either of these methods of treatment, the films will dry with great evenness in a few hours.

I have mentioned this method of restoring plates, firstly, because by its means or similar I have not, for the first time, been able to utilise otherwise useless films; but, secondly, because it may frequently prove of value to either amateur or professional who may have the misfortune to light upon a bad lot of plates. I have, for instance, only to-day made a good negative on one of a batch of commercial plates that have hitherto puzzled me entirely. The trouble involved is really very little, although it may seem so in description, for, with fairly convenient washing arrangements, three or four dozen plates may easily be treated in an evening and left until next day to dry. The quality, moreover, is scarcely to be surpassed by the best commercial plates now on the market.

I omitted to say in connexion with the sensitiveness that, although I have not obtained—for I have not really tried—the rapidity of the quickest commercial plates, yet the films I have restored are quick enough to be used for groups and animal pictures, using *f*-11, and taking the cap off and on as rapidly as possible. No doubt still shorter exposures would do, but I have not tried them.

W. B. Bolton.

JOTTINGS.

The weather recently has been phenomenally fine and genial in this country—except in the vicinity of Sydenham, where, according to all accounts, it has developed Siberian severity since Monday week. The wintry visitation gives every indication of lasting till April 29, when a change for the better may be expected, consequent on the closing of the National Photographic Exhibition on that date. The photographic press is unanimous in characterising the apparatus section of the Crystal Palace show as a fiasco. On the principle of evil coming out of good, the trade, the dealers, and the manufacturers are to be congratulated at standing aloof from the Exhibition, and the moral of their action, it is to be trusted, will not be lost on organizers of future exhibitions who may be blind to the fact that they do not possess the confidence of those they aspire to represent, or who shut their eyes to their own unfitness for the task they undertake. Such is the vanity of photographers, that it is not difficult in these times to get up a large and fairly good exhibition of photographs, but business men do not as a rule give way to the pleasant vice unless there is money in it, so that it is becoming increasingly difficult to get up a good apparatus show. I throw out the suggestion, that any future exhibition of photographic apparatus, on a large scale, should be managed by the trade, and for the trade. It is a matter that might well have fallen within the province of the defunct trade association, in collaboration with a small committee of photographers charged with the care of the pictorial department.

I read in an American photographic journal that the Camera Club have forbidden the English photographic press from reproducing papers read before the Club and published in its *Journal*. Strange to say, in others of the American papers issued at about the same time as the one I have referred to, I came across several Camera Club papers printed in full. The Club, I suppose, can do what it likes with its own, but I wonder whether the ukase meets with the approval of readers of papers who are thereby prevented from addressing on occasion the photographic world at large, of which the Camera Club, much as I respect that body, is, after all, only a trifling fraction? The action of the Club, which finds no parallel in any learned Society, from the Royal Society, of which the Club's President is a Fellow, down, is explicable on two grounds alone: First, that the photographic pabulum served up at Charing Cross-road is too intellectual for the vulgar photographic public, in which case I hope the legislature will at once pass a Bill making it penal for anybody not a member of the Camera Club to pretend to know anything at all about photography; or, second, that the said photographic pabulum has got too ridiculous for reproduction at the hands of charitably disposed editors anxious, as far as possible, to give everybody a hearing in their pages, so that the Club are simply protecting the readers of papers against themselves. In this case, let us be grateful for small mercies, and say, The Lord be thanked!

I see it stated "that, if a platinum print be very much over-exposed so that all the details are out, a good result comes by fixing in the acid bath without developing." Granting the accuracy of this, have we not here the germ of a simplified process for platinum printing? I draw the attention of Mr. Willis to it in the hope that he will make a note of it. I suppose the presence of moisture would be essential for obtaining the necessary quantity of reduction product, unalterable in dilute hydrochloric acid, and that it would consist of a mixture of platinum and iron. It is a great pity that when these interesting communications are conveyed to us they are not accompanied by some attempted explanation of the phenomena observed and the conditions prevailing. I have tried platinum printing according to the method described, and could get nothing but a faint image, looking more like a stain than a deposit.

I beg to ask Mr. H. W. Peal, the President of the Ealing Photographic Society, who read a paper on *Copying Engravings and Drawings* before the West London Society on March 28, and which is given in the Journal of April 7, upon what experimental evidences he bases the statement that amidol enables a photographer to do with one-third of the usual exposure? I am well aware, from practical observation, that a plate is frequently found to be faster to one developer than another—a fact which is easily conceivable by any one having the slightest acquaintance with the physics of emulsion-making—but, until it is proved to be the case, I refuse to believe that there is any known developer combination in current use which, all else being equalised, will allow of the photographer reducing his usual exposures two-thirds. Think, Mr. Peal, how nice and convenient for the portrait man it would be if he could give studio exposures of two and three seconds instead of six and nine, simply by substituting amidol for pyro! He can't; take my word for it.

Ditto to you, "Drop Shutter!" What possible object a Hand Camera Club can serve, beyond contributing a more or less appreciable addition to the pretty little game of you-scratch-my-back-and-I'll-scratch-yours, which is such a marked feature in photography nowadays, I'm afraid very few people could tell, even in a prize-guessing competition. There are too many photographic Societies as it is. Every parish, as "Drop Shutter" points out, possesses one; and to ask us to believe that adequate facilities are not afforded in the broad kingdom of hole-and-cornerdom which those Societies occupy for talking about the hand camera and all that appertains thereunto,

is to draw an uncommonly big bill on the credulity of the photographic public; for, after all, I fear the hand camera "is a thing of beauty and a toy for ever" with most of those who use it, and who have neither the capacity nor the desire of completing their photographic education. It will be found, I believe, that the few good hand-camera workers we have are in other respects capable photographers, and for them there are plenty of Societies where they can secure opportunities of listening to their own voices. According to the published reports, that is about all for which most of the photographic Societies are useful.

"Sweet Spirits, hear my Prayer." This would have been an appropriate sentiment for Mr. Traill Taylor when that gentleman was making his now famous experiments in psychic photography. I wonder if, in the midst of the subsequent alarums and excursions which his paper has provoked, he has been inclined to parody the line and mutter, "Sweet Spirits, hear me swear?" Whether they heard him or not, you couldn't blame him if he *did* use a big, big D or two, could you?

COSMOS.

RETOUCHING.

[Newcastle-on-Tyne and Northern Counties Photographic Association.]

I FEEL I must not begin to-night without offering a sort of apology for the brevity and the incomplete state of this paper. I would fain have got off altogether, but have not dared again to mention it to the Secretary, as he has already let me off once before. It was my intention to have prepared examples and slides to illustrate it, but I have really had no spare time to devote to slide-making, having been so fully occupied with business lately. On some future occasion I hope to be able to give a more complete and comprehensive paper, with lantern-slide illustrations.

Retouching is the art of improving or doctoring a negative or positive by the aid of a lead pencil, or by the use of a sable brush, and not, as a certain writer on so-called naturalistic photography would have it, when he says it is a process by which a good, bad, or indifferent photograph is converted into a bad drawing or painting. Now, I cannot agree with that in the slightest degree. I do not mean to say but that there are many instances where a good negative, without any retouching whatever, would give a finer print than if it were given into the hands of the most competent and experienced retoucher. Retouching, like many other things, is an operation which is very much abused, and has been overdone to an alarming extent. It has been said many times that some operators depend entirely on the skill of the retoucher, caring very little whether his subject is well or badly lighted, thinking all will be put right by the retouching. Now, this is perfect nonsense, for, unless a good and well-lighted negative is put into the retoucher's hands, all the skill and artistic knowledge he possesses will not enable him to make it into a perfect negative. Certainly a badly lighted and defective negative may be considerably improved by judicious retouching and careful printing. Some recommend thin and weak negatives as being the best; others, again, strong and denser ones; but from experience I find that the best results are got from negatives that are all round good, both in lighting and everything else. It is, no doubt, true that retouching—that is, a certain kind of the work—has done much harm to photography, and, unless the operator and retoucher work in harmony together, each striving to get the best possible results, the standard of retouching is considerably lowered.

Retouching is a branch of photography which an amateur does not often attempt. In working upon the negative with the pencil, one of the greatest difficulties to amateurs and beginners is to be able to obtain texture, a process by which much time is generally wasted, and the result very often disappointing. He tries to get a good result, but without knowing how to go about it. I think amateurs are often much puzzled by a too elaborate description of how to do this and how to do that; whereas, if the thing was put in a more practical form, many would be better able to accomplish more in the way of such operations as retouching and improving the printing qualities of their negatives generally, than they would with such impractical instructions.

It must not be supposed that retouching can be learnt easily by taking a course of lessons, no more than drawing or painting can, but can only be attained by careful practice and experience, and the examination of good examples by first-class men. I just intend giving a few verbal instructions to amateurs present, which are in no way tended for any professionals who may be here to-night. The simplest method of all is the working on the back of the negative and often a very great improvement can be made by doing so, especially in the case of much heavy shadow and want of detail. There are various methods of preparing the back of the negative. A fine quality of tissue paper or, better still, an oiled paper called *papier minérale*, pasted carefully on the back, and, when quite dry, worked over lightly with the pencil on the parts that are too transparent, at the same time cutting out those parts that may be already too dense. I have seen a harsh printing negative yield a very good print after such treatment. This answers as well for a landscape as a portrait, and is what I frequently do in practice. If a negative is too weak and wanting in contrast, the high lights can very easily be strengthened by stronger lines with a soft pencil, or crayon can be used.

I believe, some years ago in America, the use of both black and red crayons was recommended for certain kinds of work, but I do not think with much success. Crayon powder is sometimes useful, but more difficult to work. I find, if there is only very little work required on the back of a negative, it is quite sufficient to give a light wash of madder brown in water colour, with a little gum added, on the glass itself. It may seem a difficult operation to spread an even wash of colour on glass; but it is not so, requiring very little practice, only the glass must be perfectly clean and the colour free from grit or dust. In a landscape clouds can sometimes be worked over a thin sky so as to be passable, but I would rather recommend blocking out the sky entirely and printing from a cloud negative. Working with a pencil on the film side is not such an easy matter for the beginner. For this a retouching desk is necessary, which is a piece of apparatus needing little or no explanation. It must have a piece of very finely ground glass, or the coarseness of the grain will be visible through the negative, and will confuse the retoucher. I also would explain that, if the negative be raised up from the ground glass to the extent of about an inch, leaving a little space between the negative and the glass, the grain is destroyed when the eyes are focussed on the part to be worked upon.

I may here give a word of caution with reference to the eyes. On no account practise retouching if your eyes are not strong or suited for it, as the injury done to weak eyesight by persistent retouching, with a strong light on them, is considerable. A good plan, if the eyes are weak, is to cover the reflecting mirror with white paper, which gives a very soft and pleasant light to work by, unless, of course, the day is dull. Some use a magnifying-glass for small heads, but that I don't recommend, as the point of the pencil is also magnified, and very awkward to use in consequence; the natural eyesight is preferable, if the eyes are strong enough to bear the strain. With regard to the surface for retouching upon, it is necessary to roughen or abrade the bright surface, so that the pencil will bite. There is great difference of opinion with regard to the proper kind of surface; some prefer using a matt varnish, others prefer rubbing the part with turpentine or powdered cuttlefish bone. There are many other methods of preparing the surface so as to give a tooth to the pencil. I have tried almost all, but cannot find anything better or simpler than powdered resin, applied to the part with the tip of the finger and dusted off with a flat camel's-hair brush. In the days of the collodion negative, a little very fine coal ash, rubbed on very carefully, gave an excellent surface for working on, but great care was required to avoid damaging the delicate film; with gelatine plates it is quite different, as it is surprising what an amount of rough handling they will stand without damage.

The pencils are an important item in the retoucher's outfit. The best for the purpose are either Faber's or Hardtmuth's; HB, HH, and F are the most suitable, although I have known four and six H's to be recommended, which is very absurd. The pencil must be sharpened to a fine point, and, as it wears away quickly, it must be kept in condition by rubbing it gently on very fine emery cloth. The best way to use the emery cloth is to glue a narrow strip on a piece of flat wood.

In beginning work at the desk, sit in an upright position; do not bend or stoop over the work, do not look too closely at the negative, unless you are short-sighted; a far better effect is got by working at a little distance; you will find it more comfortable, and not so tiring.

Before commencing to retouch a head, it is advisable to take a rough print from it, although it is rarely done by the profession. Now comes the most difficult part, the actual retouching. If the negative has been properly lighted, a correct exposure, and carefully developed, the work will be quite easy, unless the subject is much marked with freckles, in which case it requires a certain amount of skill and patience to remove them. It will be best seen from an examination of the rough print what is required. Many spots and blemishes will be seen which really are in the subject's face, but considerably exaggerated in the photograph; to get rid of these and

soften strong shadows, without in any way losing the likeness, is the work of the retoucher. Different faces require different treatment; old faces may be worked over without in any way altering the character, but still may be improved. Some faces are patchy, which would be unwise to leave so; the patchiness must be removed, which will not affect the likeness, but will give a more pleasing expression. Children's faces require very little work, unless much marked with freckles. In the faces of young ladies and gentlemen there should be no very strong lines or wrinkles. About the most difficult faces to do, to give satisfaction, are those of middle-aged ladies. The majority of lady customers say nothing about wanting to be flattered, but it seems to be an understood thing that the photographer is to do his best in that way. Of course, there are exceptions. One lady gave me special instructions to touch out all lines and wrinkles, and to make her look as youthful as possible. Only once, I think, have I been asked to do it, and only once have I been requested by a gentleman not to touch up his photograph at all—he wished to come out just as he was, as Oliver Cromwell said, warts and all. But I did touch him up, and he was perfectly satisfied.

When commencing a head, the better plan is to give it a general clean up, get rid of all the defects first, and soften shadows and lines that are too strongly marked. Do not fill in all shadows alike, or a flatness will be the result.

Rules cannot be laid down as to the movement of the pencil. Almost all workers have a different style of their own, some working with certain comma-like strokes; others, again, in small circles, in straight lines, in cross hatchings, and a variety of other ways. I prefer partly cross hatching and a sort of zigzag rubbing motion as being as good as any other. Delicacy and freedom of touch can only be acquired through practice and experience; strokes of the pencil should run in the direction of the muscles as much as possible. I remember many years ago, when retouching first came into general use, some of the heads done in the "Berlin" style, as it was then called, looked more like a person who had had a very bad attack of small-pox, so coarse was the grain on the face.

There are many who condemn retouching altogether, and no wonder when we see such attempts as we often do in every-day work. Some faces are covered with white spots, others are like sand-paper; children, old men and women are all made alike. Others, again, are in favour of it, and, I think, rightly so, many photographers using it only as a necessary continuation of good and careful work. I think a good retoucher is as useful a member of the photographic profession as any other, and I think, if amateurs would devote a little time to retouching, their negatives would be sometimes much improved by it.

William Parry.

SOME NOTES ON NATURALISTIC PHOTOGRAPHY.

[Photographic Society of Ireland.]

My excuse for giving a paper to-night on a subject so much debated already, and one having given rise to so many violent and wordy contests, is the fact that Dr. Emerson has come forward once again from his retirement as the champion of his old ideas on art and their adaptability to photography. In fact, in his recent paper read before the Photographic Society of Great Britain, he takes up, with very slight modifications, the doctrines he taught in "Naturalistic Photography." There can be no doubt that the first feeling his reappearance gave rise to was one of genuine pleasure at his return to the photographic fold. I must confess that I strongly feel what an advantage it is to have on the side of photography one so enthusiastic on the theories of art, and possessing a large amount of artistic taste combined with a practical knowledge of photography. There can be no doubt that "Naturalistic Photography" has done an immense deal of good to photography; there are certain principles laid down in it, there are ideas suggested that have revolutionised our art, and, in fact, have created a new school; and it is a strange fact that in several instances the pupils have produced very superior practical results to their master in carrying into effect his principles.

Having thus freely expressed how much I appreciate the teaching, theoretical and practical, of Dr. Emerson, I will now, with equal liberty, say how thoroughly I am at variance with many of his theories, assertions, and criticisms, which are marked with an extraordinary narrowness of view and an absolute want of appreciation of the position taken up, or of the arguments advanced by, any one holding views opposed to his own. Nothing is more conspicuous in his writings than his absolute want of judgment. He poses above all as a critic, and yet he cannot even correctly judge his own productions.

In his book, *Naturalistic Photography*, his first and truest merit is, that he saw clearly and boldly advocated the high position that photography had a right to claim amongst the methods of pictorial representation. Could this be better expressed than when he says: "Photography may be, and is, in the hands of an artist, a method of expression producing works of fine art, because no such works can be produced in photography by a man who is not an artist." And, again, "Photography stands at the top of the second or tone class of methods of expression, so nearly perfect in its technique that in some respects it may be compared with the third or colour class. The scale here, too, is limited, but less so than that of any other black and white method. Its drawing is all but absolutely correct—that is, if the lenses be properly used. It renders the values relatively correct if orthochromatic plates are used, and it renders texture *perfectly*." The first passage occurs at page 17 of the work, the second at page 277, so we may say that, from beginning to end, his book is an eloquent pleading in favour of the claim of photography to a high place in pictorial art. In this respect the only fault to find with the author is that perhaps his enthusiasm makes him go a little too far, for, much as I love and appreciate photography, I feel that it has serious limitations which can never be removed.

It was, no doubt, the consideration of these limitations, and particularly those connected with perspective and the altering of ratio in development, that brought about Dr. Emerson's renunciation, which renunciation is, however, for all practical purposes, itself renounced in his latest paper, for there we read: "I may now say the methods of practice I advised in naturalistic photography I still advise, and the artists I held up for admiration in that work I still hold up as the best examples of their various crafts; but my art philosophy is different, and I do not consider photography an art." The difficulty about perspective is settled by the admission that the opticians are right from the mathematical standpoint, and he was right from the physiological and psychological standpoints. Of Messrs. Hurter & Driffield's theories on development, on which he laid so much stress in the renunciation, there is not a word in his latest utterance. Dr. Emerson's art philosophy, when it deals with pure theory, is often very hard to follow; it consists too often, as Mr. A. Pringle aptly said in the discussion that followed the paper, "of a number of truisms as old as the hills and a certain amount of extremely debatable matter clothed in high-flown and enigmatical language." The principal point where his latest theories lead him to differ from his former opinions is the denying to photography the title of art, and to photographers that of artists.

To me the whole thing seems a mere question of words and definitions, for when he admits that "photographs are worth doing if well done, because they give us certain beautiful qualities art cannot give, and that the producers of such may prove themselves as keen seers of the beautiful as the master artists themselves, and they may have art knowledge too," I think it matters very little whether Dr. Emerson calls them artists or photographers. You might just as well dispute over the question whether a man should be called an artist or a painter. Again, the so-called difference between mathematical perspective and physiological perspective seems to be a distinction without a difference. There is really but one perspective, which is ruled by the mathematical laws which govern the correct rendering of different solid objects in different planes on a flat surface. The shapes and sizes of objects thus depicted may appear distorted, altered, or exaggerated from being taken from a point of view from which we do not usually see them, or even could not actually see them, and from which an artist would never take them, because, as Dr. Emerson rightly says, a photograph, or a picture, must be "true in fundamentals to the point of illusion." Speaking practical photographic language, this means, we should use as long-focus lenses as possible, so that no object in a picture should strike us as looking different to what we see it in nature. The painter has the advantage of being able, in case he cannot change his standpoint actually, to be able to do so mentally, and thus render the objects at the same time true to mathematical perspective, and yet so little at variance to the way we see them as to produce the desired illusion. Of course, some painters have purposely altered the true perspective to produce certain effects, but these are exceptions that only prove the rule. The example Dr. Emerson refers to—a man's boot being twice as big as his head—means, I presume, his own pictures, entitled, *The Barley Harvest*, and *The Basket-maker*, and I think any ordinary photographer would tell him that, if he had used a longer-focus lens, and taken his picture from a greater distance, the difference of size would hardly have been noticed. Indeed, Dr. Emerson so well understands this, that he hails with delight Mr. Dallmeyer's new tele-photographic lens, and its length of focus is the only advantage it possesses for artistic work. Used to its full power—as in taking the pictures exhibited last season in London—it could scarcely receive his praise, for a picture

taken under the conditions described in the Exhibition catalogue would seem very different to anything he ever suggested. The following is the description:—"Mont Blanc, at a distance of fifty-six miles; smallest stop; extension of camera, sixty inches; seven minutes' exposure; windy weather." There, everything is pretty well the opposite to what Dr. Emerson recommends in the practical part of his work.

Having now placed before you the position assumed by the author before and after what he calls his renunciation, and having, I think, made it pretty clear that it is in point of fact unchanged, I will now examine what are his methods of teaching, and what is the practical outcome of this teaching.

In his last paper he would seem to reduce his influence on photographic art theory and practice to the discovery by him of the fact "that the closest truth to nature in photography was to be obtained by throwing the background of the picture out of focus to an extent that did not produce destruction of structure, the principal object of the picture being either sharp or just out of the sharp." I think if he had said that this was the *base* from which he started to edify the structure of Naturalistic Photography, he would have more correctly stated his position. It was certainly no new discovery to find out that the background of a photograph should be less sharp than the foreground, nor was it quite new to assert that even the foreground might be part out of focus and yet produce good results. The first was taught by a large number of landscape photographers, the second had been practically demonstrated by Mrs. Cameron and some other portraitists, and the producers of pinhole photographs. The merit, then, of Dr. Emerson's book is not that it gives us these facts for the first time but that, starting from the beginnings of art, it traces up the gradual development of naturalistic feeling in the works of the painters of every age, till it culminates in the modern French school of landscape painting as represented by Rousseau, Corot, Daubigny, Trojon, J. F. Millet and their followers, whom he holds up as models for all times and all men.

Perhaps the hardest thing in all this writing is to find a definition of this *naturalistic* feeling; the nearest thing to it is where the difference is described between realism and naturalism (p. 24). "The realist makes no analysis; he is satisfied with the motes, and leaves out the sunbeam. He will, in so far as he is able, paint all the veins of the leaves as they really are, and not as *they look* as a whole. For example, the realist, if painting a tree one hundred yards off, would not strive to render the tree as it looks to him from where he is sitting, but he would probably gather leaves of the tree and place them before him, and paint them as they looked within twelve inches of his eyes, he might even imitate the local colour of things themselves; whereas the naturalistic painter would care for none of these things, he would endeavour to express the impression of the tree as it appeared to him when standing a hundred yards off, the tree taken as a whole and as it looked, modified as it would be by various phenomena in accidental circumstances."

Having examined the history of art from this one standpoint—and I fear sometimes grievously misjudged it, as men will do when they try to judge things with one preconceived idea—having shown us his ideal in art, he devotes the rest of the work to demonstrating how photography can to a great extent be moulded into the form of this ideal. Now, this seems to me the strong point of Dr. Emerson's teaching, for it at once raises the status of photography from that of a mere mechanical device for copying nature to a graphic art for reproducing nature with a personal modification, as far as its limited means allow. The chapters which follow on the phenomena of sight and art principles derived therefrom are highly instructive. We must not, however, forget that when, in examining and describing the functions of the eye, we compare it to a photographic camera and lens, that we must not for a moment think the view we perceive, admire, and wish to reproduce, if we possess artistic faculty, is simply the miniature representation thrown on the retina as on a ground glass; it is the image as translated by the brain in its full size and proportion, in all its aerial harmony and natural solidity. I think this explains in a great measure the object of throwing a picture out of focus and using rough surfaces for printing, which gives an impression of size and texture as seen in the mind better than the microscopic definition of a lens or a very smooth surface.

The chapters on the practical part of photography are good and useful, but contain little that is new except the part on focussing, which expresses its author's well-known opinion and which many are too apt to associate with his name, to the exclusion of the teachings that have led up to it.

In this part of the work occurs his strong advocacy of grey day effects and a general preference for gloom and haziness over sunshine, brightness, and warmth. This may, I think, be traced to two causes, his admiration for Millet, whose genius was inclined to those effects and to the difficulty that photography has in reproducing correctly strong effects of light and shade. Neither seem to me sufficient reasons for renouncing such beautiful and exhilarating phenomena of nature as sunshine and brightness of atmosphere. What can be more false "quality?" This finishes my notes, and I trust that I have fairly described and judged the system advocated by Dr. Emerson and its results. As I said in the beginning he has done much to advance photography from an art point of view but has done much to spoil the effect of his teaching by the narrowness of his views and by allowing his natural artistic faculty to be interfered with by prejudice. He has sometimes also given pictures of his own to the public which were quite at variance with the theories he has taught and unworthy of his undoubted talent.

G. MANSFIELD.

INFLUENCE OF DEVELOPMENT ON GRADATION.

MR. CHANNON has done us the honour to make five experiments on the lines we have laid down, with the result of satisfying himself that the hundreds of experiments we have made go for nothing, and that our conclusions are erroneous. We cannot submit to be thus summarily disposed of, and as Mr. Channon's opinions may carry some weight, and so retard the progress of what we consider to be the truth, his recent article calls for some reply.

Mr. Channon's conclusions, summed up by himself in one sentence, are, "Development is likely to remain a mere rule-of-thumb matter." Nevertheless, he invites photographers to devote some part of their time to an attempt to add something to the small knowledge we possess of the action of developers. Assuming that we have done nothing whatever to throw even a gleam of light upon the action of developers, we think Mr. Channon might at least have credited us with showing photographers how to go about such an investigation, and with having worked out a system of experimental quantitative photography, of which he has not hesitated to avail himself, and of which he has so far approved as to draw sweeping deductions by its means.

It is not encouraging to us to be informed that things are, after all, only where they were before we devoted our attention to the subject; and we warn those who accept Mr. Channon's invitation to make investigations on development that, whatever may be the results they arrive at, they are sure to interfere with somebody's so-called experience, and to call down upon themselves the fulminations and the ridicule of such who cannot or will not adapt themselves to newer and brighter light. That the old views on the subject of development were not very deeply rooted, because not based upon sound experience, and were consequently easily shaken, is, we think, proved by the flutter and misgivings caused by our original paper.

While Mr. Channon's opinion that "rule-of-thumb" development still holds sway may find acceptance on the part of that extraordinary body of photographers who revel in trying to correct "known errors of exposure," we venture to think that the majority of photographers would prefer to avoid "known errors of exposure," and to regard development as, on the whole, no very complicated matter; indeed, as the comparatively simple matter which our experiments have shown it to be, and, as we shall presently proceed to show, it is demonstrated to be by Mr. Channon's recent and independent experiments.

If, after five experiments, we had, like Mr. Channon, despaired of ever finding in photography that which is characteristic of every other phenomenon in nature, namely, laws of causation, he would, in all probability, have been spared the doubtful honour of having his name associated with the sentence which his despair has called forth. We were not satisfied, however, with five experiments; and, looking *broadly* at the whole of the hundreds of experiments made before and since the publication of our paper by ourselves and others, we say still that *gradation of a negative is essentially a function of the exposure, and cannot be altered at will by modifications in development.*

Mr. Channon has investigated six differently constituted developers in their behaviour to five specified exposures upon one particular make of plate—the Ilford Ordinary. In making his experiments he has closely followed our methods, the exposures given being expressed in our unit of exposure, C.M.S., and the numerical results expressed as "densities" in our sense of the word. Mr. Channon has, with respect to five (he says four, but it really applies to five) of these developers, found that there was not so much variety in the density ratios (gradation) as he had *expected*, and he willingly admits that between the exposures 10 and 100 C.M.S. the density ratios in his experiments vary not more than in similar experiments of our own. He further gives one experiment

(D_5 and D_6) in which our conclusion, that gradation is not affected by time of development, is as accurately confirmed as we ourselves could possibly expect, and within limits very unnecessarily wide, but for this reason all the more satisfactory to Mr. Channon.

The only difference between Mr. Channon's experience and our own is confined to this abnormal behaviour of an abnormally restrained developer. In order to show this clearly we have retabulated all his experiments with the exception of those in which this abnormally constituted developer was used. The following table gives Mr. Channon's results calculated so that the density for the exposure 100 C.M.S. is represented by 100, the other densities being percentages of the density obtained by actual experiment for the exposure 100 C.M.S. :—

Exposure C.M.S.	Mean of all the results.	Pyrogallol.						Eikonogen.	Amidol.	Hydroquinone.
		B 1.	C 1.	D 5.	D 6.	E 1.	E 5.	E 2.	E. 3	E 4.
1	21·0	30·5	29·7	25·5	25·2	18·0	13·2	15·8	17·1	14·0
10	68·1	73·6	77·2	66·2	73·1	69·9	62·4	65·4	63·6	61·7
100	100	100	100	100	100	100	100	100	100	100
1,000	110·8	110	107	112	109	111	117	107	110	114
10,000	118·5	120	117	—	—	—	—	—	—	—
100,000	96·1	—	—	104	101	109	104	84	85	86

Looking at these results broadly, and considering that they were obtained upon four different plates at different times, that there is no guarantee that the four different plates were equally thickly coated, or that the coating was absolutely uniform on any of them, and that there is no guarantee that the illuminations were exactly the same in one experiment as in another, either relatively or absolutely, the wonder is not that the results are so different, but that they are so similar. The similarity is so great that we are sure no expert could have distinguished prints from the nine negatives, supposing them to have been so developed that the densities due to the 100 C.M.S. exposure had been all alike.

We are entitled to maintain that, instead of Mr. Channon's results contradicting our statement, they fully bear it out within the widest ranges of exposure, and it is inconceivable to us how this similarity of results did not lead Mr. Channon to the same conclusions. Were it not that he has candidly admitted that, within the range of exposure we adopted for most of our experiments, his results and ours agree, we could only assume that he is simply desirous of opposing our views at all hazards.

The only fault which Mr. Channon and other critics have found with our work is that, in most of our experiments, we limited the range of exposure to from 10 to 80 C.M.S. If Mr. Channon and our other critics realised, as we have long done, how exaggerated this general impression is as to the range of light intensities which occurs in ordinary photographic work, and that the contrasts to be photographed are usually no greater, and seldom exceed the ratio 1 : 20, either in portraits or landscapes, and if our critics were alive to the fact that a range extending from one to eight is the only really useful range of most brands of plates, they would perhaps have seen that we were wise, in so extensive an investigation, in keeping only practically applicable ranges in view.

It will be perceived from the table that, on an Ilford ordinary plate the whole useful range lies somewhere between 1 and 100 C.M.S. ; for the whole alteration brought about by extending the range from 100 to 10,000 C.M.S. lies only between 100 and 120, and consequently negatives obtained within this extended range of exposure, and developed with any of the developers used by Mr. Channon, would yield flat results, *i.e.*, over-exposures.

Mr. Channon considers that his developer No. 1 is excellently suited for the development of under-exposed negatives, or, as he expresses it, of "instantaneous or very short exposures, in which the light acting on the various parts of the plate ranges from about 100 C.M.S. in the brightest parts down to a fraction of a C.M.S. in the shadows. It has apparently not occurred to him that every other developer he tested on plate E (No. 2 pyrogallol excepted) would have given identically the same, or rather better, results in gradation than this developer No. 1, and that, as far as under-exposure is concerned, his whole research falls to the ground, and ends in the conclusion that no ordinary developer known to him will alter the gradations materially. A glance at our diagram, No. 16 would have informed Mr. Channon that an illumination of 100 C.M.S. already belongs, in the case of the Ilford plates, to what we have termed the period of over-exposure, and the speed of the Ilford Ordinary plate has, since our paper was published, been materially augmented.

Mr. Channon's great discovery, however, consists in the pyrogallol developer No. 2, which is compound of—

Pyrogallol	2 grains,
Sulphite of soda	8 ,,
Bromide of potassium	2 ,,
Ammonia	1 minim,
Water	1 ounce,

or, when expressed centesimally (assuming the ammonia to have been 0·880 specific gravity = 0·300 grammes per litre), 100 c.c. contain

Pyrogallol	0·457
KBr.	0·457
NH_3	0·0625 at most.

If this be compared with the developers used in experiments Nos. 10 and 11 in our original paper, it will be seen that it approaches the condition of a highly restrained developer, the bromide being seven times the weight of the ammonia ; and that it belongs to that class of which we said "development is entirely prevented within four minutes when the amount of bromide is about ten times that of the ammonia present." In experiment No. 16 we go on to show that, if time is only allowed for the development to extend to all the details, *i.e.*, if the usual rule is followed of developing until detail in the shadow is visible, in the negatives then produced, even with developers much richer in bromide than Mr. Channon's was, the density ratios are practically undisturbed. Mr. Channon's developer was so feeble that it took fully fifty minutes before the exposure 1 C.M.S. produced a distinctly measurable result ; but, when this was attained, the resulting negative differed in no material degree from the mean result obtained by the other developers.

The following table gives the results obtained by Mr. Channon with this developer, arranged according to time of development, the result of 100 C.M.S. being put 100, and the mean of all the other experiments being added for comparison :—

Exposure C.M.S.	D 4 mins.	D 10 mins.	B 15 mins.	D 20 mins.	C 30 mins.	E 30 mins.	D 50 mins.	Mean of other Expts.
1	—	—	5·7	3 9	8·5	2·6	16·6	21·0
10	—	17·1	44·3	37·6	53·1	39·2	55·6	68·1
100	100	100	100	100	100	100	100	100
1000	200	202	126	135	129	145	119	110·8
10,000	—	—	138	—	153	—	—	118·5
100,000	316	217	—	107	—	144	91	96·1

Had the development been continued, say for 100 or 120 minutes, we have no hesitation in saying there would have been no essential difference between the negative produced with this developer and those produced with any other.

Thus, Mr. Channon's results with developer No. 2 are in perfect harmony with our experiments on a similarly or even more restrained developer. We admit, however, that the alteration in the rate at which the different densities make their appearance was not investigated by us ; the fact that, when properly developed, the density ratios remained the same as with other developers was, at that time, the only fact of importance to us.

But Mr. Channon thinks that practical use may be made of the intermediate stage in development of over-exposed plates, or of what Mr. Chapman Jones terms the "lagging stage." We say that it cannot ; and we point to Mr. Channon's results as giving the reason for such an answer. He proposes to stop development after ten minutes, and then to intensify. The densities obtained with his developer would, however, be so small, and the range of gradation so contracted, even after intensification, that such a negative would serve no useful purpose. After ten minutes' development he obtained, for 100 C.M.S., a density of only 0·35 ; and for 1,000 C.M.S., a density of only 0·71. Supposing these densities had been fully intensified—they would, at most, have become 0·70 and 1·42 respectively ; thus giving a printing range of only $1·42 - 0·70 = 0·72$, which would be too small to yield even passable prints. After twenty minutes' development, the density for 1000 C.M.S. reached 2·08 ; and for 100 C.M.S. 1·54. Such a negative would not stand intensifying, and, its printing range being only 0·54, would render it wholly useless.

We intend to make an experiment to show the futility of correcting under and over-exposure by Mr. Channon's No. 1 and No. 2 developers

respectively; but, as we have not leisure to do this without delaying the publication of this article, we will reserve our report of the result for another occasion.

We are glad that Mr. Channon has afforded proof that most of our work will bear repetition by others. We are sure that he must see the value of all our units, and of our system generally; and it affords us pleasure to say that we agree entirely as to the facts he has observed, but we differ wholly from him in the sweeping conclusions he has arrived at. We yet hope to accomplish the task of rescuing development from a mere rule-of-thumb operation.

Mr. Channon had the courtesy to send us his plates for inspection, and we are glad to state that his work was done accurately, and that we agree to most of his measurements. His plates bear evidence of serious fogging, and, unless Ilford plates have materially deteriorated, they should yield better results than those obtained by Mr. Channon. The smaller exposures ought to have produced more decided results, and the apparatus used for exposure seems to have been of a very primitive description. It is clear to us also that the ratios of exposures 1 : 10 : 100, &c., were not in all plates of quite equal value.

F. HURTER,
V. C. DRIFFIELD.

CAMERA CLUB CONFERENCE.

THE Seventh Annual Conference of the Camera Club was opened at the Society of Arts, on Wednesday afternoon, April 12, with a comparatively small attendance. The President (Captain Abney), in the course of a brief introductory address, said the Conference must be of benefit to every one interested in photography. Photographers were most strongly conservative, and it was only when radical alterations were proved to be improvements that they were adopted. Those alterations could only be effected at long intervals.

"ESTABLISHING LENS STANDARDS."

Mr. William Taylor (Messrs. Taylor, Taylor, & Hobson) read a paper on this subject, in which he traced the efforts of the Photographic Society of Great Britain, and the International Congresses of Brussels and Paris to standardise units of light, sensitiveness of films, the sizes of plates, &c. After stating that the central purpose of standards should be simplicity, he examined the means necessary to secure their adoption, such as practical convenience, emulating ideals, the force of international law (as in the case of the adoption of the metrical system by France), and the force of accident. Incidentally referring to the standard sizes of plates, Mr. Taylor said he believed that the standardising of large sizes might be useful as affecting the smaller sizes. So long as the standards selected were convenient, he believed they would be ultimately adopted. The Photographic Society of Great Britain, ten years ago, went into the question of screws for the attachment of lenses to the camera, and a new series was suggested. The results were disappointing, as lens-makers, for a long time, did not offer to supply them. The standards, however, were sometimes adopted, and he believed that they were gradually established, as they contained a large measure of practical convenience, which was a strong force tending to secure their adoption.

Mr. J. Traill Taylor, after urging the adoption of standard screws for lens flanges and lenses, put in a plea for a standard screw for attaching the camera to the stand. He had a great many such screws, which when held a couple of feet from the eye looked identical. He entirely sympathised with the subject of the paper.

After some remarks from Mr. Sturmey,

Mr. L. Warnerke thought that the focal lengths of lenses should be engraved on the mounts, and in the case of doublet lenses advocated the interchangeability of screw threads, so that the back and front combinations could be used at will.

Mr. W. Taylor, in reply, pointed out that the focus of a lens engraved on its mount had no reference to any other lens in the world, but the question of standard screws was of universal interest. As regards Mr. Traill Taylor's reference to the adoption of a standard screw by the makers of microscopic object-glasses, it should be observed that only one screw was dealt with. The makers readily undertook a little trouble in the matter, but it was difficult with photographic opticians, who would be put to great expense.

The President, in moving a vote of thanks to Mr. Taylor for his paper, which, he said, was conceived in a philosophic and scientific state of mind, expressed the opinion that standards would not be adopted until photographers had a kind of trades union of their own, who would decide that nobody was to buy only what that union laid down. The matter, therefore, must be relegated to public opinion, which in due time would, no doubt, make up its mind. He pointed out that beginners in photography were ignorant of the requirements of standards, and therefore simply took what was sold them without question.

LENS SYSTEMS.

Mr. T. R. Dallmeyer read a paper on *Lens Systems*, illustrated by diagrams and formulæ, in which he dealt with the question of focometry when applied to lens systems in which the Gauss points are considerably removed from the elements of which they are composed. At the conclusion of the paper Mr. Dallmeyer projected on the screen, with the tele-photo lens, images by positive and negative combinations of equal size, as illustrating a convenient method for determining the "equivalent lens" of a system containing negative lenses of a powerful nature.

In the course of a short discussion which followed Mr. H. M. Elder said that the paper gave them some new ideas about the capacities of the tele-photo lens. He was glad that Mr. Dallmeyer had put the Gauss points so much in evidence; ordinary writers on photographic optics were ignorant of their existence. In the ordinary rectilinear compounds they were not, perhaps, of much importance; but in other combinations they became of very great importance indeed.

Mr. Dallmeyer pointed out that the images shown in both cases were the same, so that the same angle was necessarily included on the same plate, no matter what the focus was; but there was nine degrees more included with the negative in front than with the positive in front.

A vote of thanks was passed to Mr. Dallmeyer for his paper.

ON CERTAINTY IN PHOTOGRAPHY.

Mr. H. Chapman Jones read a paper on this subject, which dealt with the theory of development as propounded by Professor Armstrong, and laid down the conditions of exposure and development under which certainty of uniform results could be obtained.

Mr. H. A. Lawrance reminded the President that he (the President) had read a paper in that room on the photographing of a subject of a uniform colour which bore on the want of truth of photography, and he (Mr. Lawrance) was wondering how the two papers could be reconciled?

Mr. J. Sterry had proved that, if development were stopped in an early stage, the ratios were not the same as if the development were continued.

The President said that a year or two ago he had read a paper in which he stated that he did not think it possible to obtain a true photographic rendering of black and white, and he still held the same view. Mr. Chapman Jones, on the other hand, wound up his paper by saying that it was possible to get a truthful photograph of an object with uniform exposure, development, &c.; that was easy to talk about, but we must take what was theoretically perfect. He had been shown negatives and positives superposed in which the pictures gave even tints, but this was no proof that a theoretically perfect photograph was obtained. In the paper he had shown that there was a possibility of getting a fair approach to truth; but he had proved by calculation that a certain amount of variation was always obtained. In looking through a negative two densities might seem exactly alike, but he would bet a crown to a penny that those two densities were different when measured.

After further observations, the President moved a vote of thanks to Mr. Chapman Jones.

INFLUENCE OF PHOTOGRAPHY ON THE VISION.

Mr. Davison (the Hon. Secretary) read a paper by M. Leon Vidal, which dealt with the influences which the work of Muybridge, Marey, and others, who had photographed rapidly moving objects, had exercised over the art of painting, and also their effect in training the eye to see objects in motion as photography showed them to be.

A discussion followed, chiefly on the point as to the educational influences on the eye which instantaneous photography has had, in which Messrs. Webber, Davison, Keene, Conybeare, and Godbold took part.

SCIENTIFIC APPLICATIONS OF PHOTOGRAPHY.

On Thursday afternoon the Hon. Secretary (Mr. Davison) read a paper on this subject by Professor E. Mach, treating of the employment of photography in photographing sound waves, flying projectiles, waves and vortices of air, by means of the electric spark.

ORGANIZATION OF METEOROLOGICAL PHOTOGRAPHY.

The next paper was on this subject by Mr. A. W. Clayden, who gave for the guidance of photographic societies and individuals, rules for the photographing of cirrus and cumulus clouds, lightning, and other natural phenomena. The paper was in substance a *résumé* of previous remarks on the subject which have appeared in our pages. A discussion followed on a remark by Mr. Webber that he had obtained good cloud effects with a slow plate and a yellow screen, it being pointed out that the use of the latter simply served to prolong the exposure.

The New Art and Photography.

Mr. Hume Nisbet dealt in a critical spirit with recent developments of impressionism in brush work, concluding as follows:—

"But what I wanted chiefly to say, when I dragged in those very modern amateur impressionists with their foolish affectations, was that they can, not help you in any way, but that there are impressionists, such as Whistler, who can help you if you study carefully their suggestiveness, action, and refined naturalism.

"In order to come down to the level of the young school of the so-called impressionists, the plan would be to get the worst plate in the market, put your sitter in the most ungainly position, and unlearn all you have learned of composition, then over-expose your plate while the sitter is encouraged to move about as much as possible, bother as little as you can help about the developing of your negative, and then print as hard as you can in a blazing sunshine; that's the way to become an impressionist photographer, and doubtless you might, if you do this, get some of our new youthful critics, who know as much about painting as they do about the other secrets of humanity in general, to write a glowing article about that mysterious print, whose relations of idea and sound should affect us as beauty, and advise the other lunatics to watch until some mysterious affecting note comes out of the blank; and if all this does not come to them by watching, then this critic will loftily tell the unappreciative that the confusion and affliction from which they suffer are incurable."

Mr. Hector Maclean recommended photographers to leave Whistler and other impressionists severely alone, and to keep to the proper province of photography.

Mr. Rowland Bryant defended impressionism in photography. It gave one more trouble than ordinary photography. Impressionism was the expression of soul with as little external detail as possible. By its means they endeavoured, as it were, to get behind the eye. Years ago Whistler was laughed at, but his work was as good then as it is now, in his popularity.

The President and Rev. F. C. Lambert continued the discussion, when Mr. Nisbet painted an impressionistic picture, which he called a "Purple Thrill in three Gasps." Nobody seemed to know what it meant, and Mr. Nisbet did not enlighten the meeting.

Astigmatism for Pictorial Effect in Photography.

Mr. Bryant's paper treated of the effects produced with spectacle lenses, and the use of various slit diaphragms. He showed a number of pictures in illustration of the subject.

Mr. E. J. Humphrey said the best answer to Mr. Bryant's paper was to read the paper read before it. He believed in softness in certain parts of the picture, but of seeing it as nature enabled one to see it. Mr. Bryant's pictures made nature appear one hopeless, uninteresting, deadly blur.

Mr. W. D. Welford said that before any one could see nature as the pictures showed it he would have to be drunk.

Mr. G. Davison said that no doubt Mr. Welford was able to speak with authority on that matter. (Much laughter.) As regards diffused definition, he thought it was much a matter of individual preference.

The Rev. F. C. Lambert admired the way in which Mr. Bryant had modified his results, and they owed him a debt of gratitude, if he had only pleased himself and was original. He (Mr. Lambert) confessed a preference for out-of-focus effects where occasion—such as a brick wall used as a background—permitted of them.

Mr. Bryant hailed Mr. Lambert as a valuable disciple to the school of softness.

The President, in moving a vote of thanks to Mr. Bryant, said that the effect of some of his pictures upon him was to make him sick. It seemed to him that the same effects might be obtained by shaking the camera in the direction in which the diffusion of the focus was required. He sympathised with Mr. Bryant; but, if he (the President) could not take better photographs than his, he would not take them at all.

The Photo-corrector.

In the evening, before an improved attendance, Mr. H. Van der Weyde read a paper, with lantern illustrations, describing the use of his photo-corrector in the curing of the visual distortion of parts of a portrait by the interposition of a local lens when reproducing the negative. To this we refer elsewhere. The Conference concluded with a paper on *The Speed of Plates* by the President, and *Some Notes on the Effect of Light on Plates* by Mr. H. M. Elder. The discussion on these two highly abstruse papers was adjourned to a future meeting of the Camera Club.

THE SANDELL EXHIBITION.

In aid of the funds of the Photographers' Benevolent Association, an Exhibition of photographs from negatives on multiple-coated plates by Mr. J. T. Sandell and other gentlemen was opened at 24, Regent-street, on Monday last. In all about 140 pictures are on view, the exhibits being arranged on the walls of two rooms.

Regarding the photographs taken by Mr. Sandell himself, we expressed ourselves in general terms in our article, on March 3, on *Multiple-coated Films*, so that we have very little to add to the opinion then given. As examples of Mr. Sandell's interior work, the photographs of the Scalchi Church (Venice), the Jesuit Church (Venice), St. Paul's-without-the-Walls (Rome), St. Peter's at Rome, the Vinery at Frogmore, and other specimens, are, notwithstanding the advantages which the use of the multiple-coated films entails, admirable from a technical point of view, and, in spite of Mr. Sandell's modest protest that he is not a photographer, do him infinite credit. The marble columns in the view of St. Paul's and the Royal Vinery (the latter having an exposure of fifteen minutes in bright sunlight) give an exceptional accuracy of rendering. Some large Alpine views are also of especial merit in the delicacy of their gradation, both as regards near and distant objects.

Prominent among Mr. Sandell's other outdoor views are the Colosseum (a fine photograph), St. Mark's, Venice, St. Peter's at Rome, General View of the Roman Forum (perhaps the best as regards composition), Team of Oxen, Sermione (which, notwithstanding that it was taken in full sunlight, is characterised by great softness and perfect half-tone); and a capital exterior of Wells Cathedral.

Mr. Sandell supplements his own pictures with contributions of great excellence from several other gentlemen. Of these, a series by Mr E J. Hughes of Canterbury Cathedral are perfect of their class. Messrs. Green Bros. of Grasmere show some charming Welsh views in platinum or bromide, thereby relieving the almost universal prevalence of gelatino-chloride, C. F. Oakley (clever snap-shots), A. J. Sargeant (architectural subjects), S. H. Fry (enlargements), and A. Leblanc (a good enlargement from a snap-shot of a cat). A frame of really meritorious small views taken by Mr. Lane, who was using a camera for the first time, is also shown.

All the pictures hung are from negatives on Sandell plates, and the catalogue gives full particulars of light, lens, stop, exposure, and plate in each case. Armed with this catalogue, the young photographer may gain a fund of technical information from an inspection of the pictures on the walls which should be of the greatest service to him. The Exhibition remains open to-day and to-morrow (Friday and Saturday).

CENTRAL PHOTOGRAPHIC CLUB.

On Monday evening last a largely attended meeting of intending members and others interested in the Central Photographic Club was held at the Memorial Hall, Mr. W. D. Welford being voted to the chair.

Mr. Thomas Bedding, (the Hon. Sec. *pro tem.*) having laid a statement of the position of the club before the meeting, the recommendations of the Committee as to the premises in Fleet-lane, Ludgate-circus, for administering the affairs of the Club by means of a limited Company, and the rules as already published were unanimously adopted.

Mr. Howson was appointed Hon. Treasurer, and Messrs. W. Fenton Jones, 12, King Edward-road, Hackney, N.E., and C. H. Oakden, 53, Melbourne-grove, East Dulwich, were appointed Hon. Secretaries.

Our Editorial Table.

Photographer's Guide to Oban.

By M. Isaac & Riddle, Esplanade.

This is, without doubt, the most terse guide we have ever seen, for it contains only four pages, and is of such dimensions as to go into one's card-case. It is issued by a firm of well-known photographers, and its *raison-d'être* is to inform tourist photographers that they reserve a dark room for their exclusive use, where for a small sum they may change plates with safety and procure plates, paper, and chemicals. It also contains a list of places in the neighbourhood that form good pictures. Accompanying the *Guide* are a few "scraps" showing what one may expect to get who is enthusiastic enough not to be afraid of a rough walk; and in a note from the firm we are informed that every information relating to the neighbourhood will be imparted

by Mr. Riddle, who worked the ground for many years in the interests of one of the large photo-publishing houses in Scotland.

The "scraps" referred to are charming, one of them being the finest view of Kilchurn Castle on Loch Awe that we have ever seen. In the interests of the amateur photographic tourist we recommend him to call upon this firm, who will give him good welcome and render his holiday enjoyable. Oban is a pretty place in itself, and forms a nice centre of operation.

Hints on Enlarging.

By the London Stereoscopic and Photographic Company, Limited.

These hints are compiled with special reference to the use of the Company's patent "Black Band" enlarging apparatus. They are well written, and evince the hand of one who has an intimate and intelligent acquaintance with the subject. After bringing the preparation of the print (a bromide enlargement being understood) up to the final stage of being mounted, it is then a question as to further finishing, and we are told that crayons, either black or coloured, may be effectively employed. It is recommended to employ a special kind of black crayon sold under the name of "Bromide Pencils," with which the shadows may be deepened, high lights relieved on lace or drapery, and any obtrusive detail toned down. Beyond this the average amateur is advised not to go, unless he or she has had some experience or training in artistic work. If the effect of a brown tint on the paper is required for working upon in black and white crayons, after the manner of the many art studies published as drawing copies, the print is to be soaked in cold weak coffee until the desired tint is attained. Price sixpence.

Eikonogen Developing Cartridges.

Mr. Arthur Schwarz has sent us a sample of some new developing cartridges prepared by Dr. M. Andresen, and, from a fair trial, we very willingly attest not only the convenience but the real excellence of eikonogen as thus put up. The powder from one cartridge having been dissolved in 100 cubic centimetres of water (distilled water by preference, although rain or any soft water will do) is then ready for use, and in this solution quite a number of plates can be developed.

Over-exposure is simply met by diluting the developer up to twice its volume with water, and, if necessary, a few drops of a solution of bromide of potassium may be added. The resultant image is singularly clean and brilliant, and the tone is a fine black. The simplicity of developing powder put up in this form will commend itself to all, and more especially to a photographer on tour.

Practical Pocket-book of Photography.

By Dr. E. Vogel, Berlin. London: Swan Sonnenschein & Co.

The name of Vogel attached to any book is a sufficient guarantee as to the soundness of the tuition imparted thereby. The present little volume, which is a translation, by E. C. Conrad, F.C.S., from the second German edition, treats with a considerable degree of succinctness on apparatus, the arrangement of the dark room, various negative processes, printing processes on albumenised and plain paper, bromide papers, carbon, platinum, ferro-prussiate, and aniline. Colour sensitising of plates both wet and dry finds a place, and all the methods of preparing the developers in common use also find a place in this comprenensive "Practical Pocket-book." Dr. E. Vogel has compressed much sound information in this manual.

A small sample of sensitised albumenised paper, "The Perfect," has been submitted for trial by Messrs. Williams, Read, & Co. We find that, as stated in a circular by which it was accompanied, it prints quickly and tones readily, and, so far as our trials were permitted to extend, we had no blisters or spots.

Mr. Francesco Duran, of 21, Terrace-road, Handsworth, Birmingham, has submitted to us a number of photographs of scenic and clouded backgrounds painted in flatted oil which he is supplying. The subjects and effects are of a most diversified nature and are generally characterised by artistic taste, while the backgrounds are moderate in price.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 7307.—"Turn-cards, an Apparatus for Displaying Photographs, Pictures, Advertisements, Samples, &c." F. E. Suddard.—*Dated April* 10, 1893.

No. 7341.—"Improved Means for Preserving Paintings, Prints, and Photographs against Atmospherical Deterioration." W. S. Simpson.—*Dated April* 10, 1893.

No. 7343.—"Improvements in and relating to the Colouring of Photographic Prints, Transparencies, and Negatives." Complete specification. C. Klary.—*Dated April* 10, 1893.

No. 7443.—"An Improved Method of Photographing Persons or Objects in Motion, and Improved Apparatus for Effecting the same, and Improved Apparatus for Exhibiting the same, and for Applying it to the Optical Lantern." J. D. Burton.—*Dated April* 12, 1893.

No. 7480.—"Improved Objective for Use in Photographic Cameras." Communicated by A. Steinheil and R. Steinheil. W. P. Thompson.—*Dated April* 12, 1893.

No. 7481.—"Improvements in Photographic Cameras." W. Rice.—*Dated April* 12, 1893.

No. 7656.—"Coin-freed Apparatus for the Automatic Production of Photographs." Complete specification. Communicated by A. Hahn. A. Strauss-Collin.—*Dated April* 14, 1893.

No. 7680.—"An Automatic Safety Bar and Ejector for Use in Hand Cameras." R. Crowe and H. Nicholls.—*Dated April* 15, 1893.

PATENTS COMPLETED.

Improvements in Photographic Cameras and in Stands for Same.

No. 6303. John Boultbee Brooks, 115, Great Charles-street, Birmingham, Warwickshire.—*March* 18, 1893.

I make the case or dark slide for the plate of cardboard or other suitable material, the slide consisting of two parts, the plate-holder and its cover. The plate-holder is a flat box, open at its front face to expose the surface of the plate, and is a little longer at each end than the plate is. At the back of the plate-holder at one end is a hole, and at the other end a stud, for the purposes hereinafter described. The cover is a flat box open at one end only, and is just sufficiently large to slide over the plate-holder and completely cover it, except a small part at the one end.

The cover has a slot or groove, which extends nearly from end to end of its length, to admit of the stud above mentioned as being on the plate-holder. The cover can thus be slid back and forth, covering or exposing the plate, but the stud engaging in the slot prevents the cover being drawn completely off the inner case.

To prevent the light from entering when the slide is closed, the cover has a tongue projecting from its front edge, which, when the cover is closed, enters a groove across the end of the inner case.

At the rear part of the camera is a slot which admits the dark slide to enter a groove which runs round the inside of the camera; and at the back of the camera, at the side opposite to the slot, I attach a bolt—preferably a spring bolt—which projects through to the inside.

Thus, when the slide is slid into the camera, the bolt engages with the hole before mentioned which is in the back of the plate-holder, and holds the latter fast while the slide cover is drawn out of the exposure. After the exposure, the cover is again thrust in, and on the bolt being pulled back the whole slide (now closed) can be drawn from the camera.

I put an exposure plate or shutter on the camera as follows:—The lens is sunk flush with or below the outside of the camera box, and on the outside of the camera I fix a pair of parallel grooves or slides, one on each side of the lens. For simplicity of manufacture, I may make these grooves by taking a strip of metal and turning the two longer edges over to form a groove down each side. A hole is then pierced out of the centre of the strip to allow the lens to show through. The shutter is a flat strip of metal of the proper width to slide easily in the grooves, and of such length that when it is at either end of the grooves it covers over and shuts out the light from the lens. The shutter has a hole pierced in its centre to give the requisite exposure, and a small projection or a notch at one end to engage with the catch hereinafter mentioned. At one end of the grooves I fix a screw or stud, projecting from the camera, to which I attach a spring of indiarubber; the other end of the spring I attach to the shutter. Or, instead of attaching the spring to one point on the camera, as described, I may attach it to two points at a distance from each other so as to use a longer spring. At the opposite end of the grooves I affix to the camera either a spring trigger catch or a catch bolt, so that when the shutter is drawn down by the finger it is held by the catch, and on the catch being released the shutter is drawn rapidly across the lens, the central hole making the necessary exposure.

For giving a time exposure, the spring may be detached from the shutter, and the shutter worked with the hand.

I construct a stand for supporting or carrying the camera in the following manner:—I construct a metal top plate having on its under side flat metal brackets arranged radially. Towards one end of each bracket I pierce a hole, and at the other end a quadrant-shaped slot. I cut out a slot in the end of each of the wooden supports or legs of the stand, so that it will fit on the metal bracket, to which I pivotally attach it by means of a pin passing through the leg and the hole of the bracket. A screwed pin is now passed through the leg and the quadrant-shaped slot, and by tightening this pin the leg or support is fixed at any desired position or angle.

I make these wooden supports in two or more lengths, and I fix them in any position I desire by means of spring clips hereinafter described. The clip is made from a piece of folded metal, which is made fast to one of the supports by encircling it and fixing with a screw or rivet. The remaining portion of the clip encircles the other part of the support, but slides thereon readily, and is fixed or tightened by means of a lever so arranged that it draws the two ends of the clip together when pressed downwards, and releases on the action being reversed. This lever action is much quicker and readier than a screw.

I may also make the support to the camera so that one leg only is employed, and in so doing I affix the aforesaid clip on the camera, and let the support slide into it; or I fix a peg or projection on the camera and the clip on the support, and let them slide into one another.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 24	Camera Club	Charing Cross-road, W.C.
,, 24	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 24	Lantern Society	20, Hanover-square.
,, 24	North Middlesex	Jubilee House, Hornsey-road, N.
,, 24	Putney	Boys' Gymnasium, Charlwood-road.
,, 24	Richmond	Greyhound Hotel.
,, 25	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 25	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 25	Hackney	206, Mare-street, Hackney.
,, 25	Halifax Camera Club	
,, 25	Lancaster	Springfield Barracks, Lancaster.
,, 25	Leith	165, Constitution-street, Leith.
,, 25	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 25	Paisley	9, Gauze-street, Paisley.
,, 25	Rochester	Mathematical School, Rochester.
,, 25	Warrington	Museum, Bold-street, Warrington.
,, 26	Bath	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 26	Burnley	Bank Chambers, Hargreaves-street.
,, 26	Leytonstone	The Assembly Rooms, High-road.
,, 26	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 26	Southport	The Studio, 15, Cambridge-arcade.
,, 27	Camera Club	Charing Cross-road, W.C.
,, 27	Glossop Dale	
,, 27	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 27	Hull	71, Prospect-street, Hull.
,, 27	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 27	Liverpool Amateur	Percy-buildings, Eberle-street.
,, 27	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 27	Oldham	The Lyceum, Union-st., Oldham.
,, 28	Cardiff	
,, 28	Croydon Microscopical	Public Hall, George-street, Croydon
,, 28	Holborn	
,, 28	Maidstone	"The Palace," Maidstone.
,, 28	Swansea	Tenby Hotel, Swansea.
,, 28	West London	Chiswick School of Art, Chiswick.
,, 29	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 13,—Mr. T. E. Freshwater in the chair.

There was a long discussion on private matters connected with the Association.

A work on *Elementary Photography* by J. A. Hodges was presented to the Association.

Notice was also given of the Sandell Exhibition, proceeds of which were to be devoted to the Photographers' Benevolent Association.

EXPERIMENTS WITH P.O.P.

Mr. George Lorimer brought forward experiments which he had made. He took a piece of P.O.P., exposed it under a negative, bleached it with mercury, and fixed it; all the image disappeared. He took another piece, exposed, toned it with gold, and fixed it, then treated it with mercuric chloride; found the image vanish a little. Another piece, toned with platinum and then treated with mercuric chloride, was found to be scarcely affected at all. He then followed the treatment advised by Mr. Spiller in THE BRITISH JOURNAL OF PHOTOGRAPHY, but he found the print so treated lost a great deal. He found also that platinum toning degrades P.O.P. very much in the high lights, especially the pink-tinted paper.

Mr. HADDON alluded to Mr. Lorimer's experiments as proving conclusively that platinum was deposited in a print that had been toned with platinum, and said he believed that Mr. Lorimer had sent several prints to Mr. Howson showing such results.

THE SANDELL PLATE.

Mr. J. S. TEAPE stated that he had followed Mr. S. H. Fry's suggestion to repeat his experiment of exposing the Sandell plate to various lengths of magnesium ribbon, and, instead of using a normal developer, to try tentative development; so he reduced the strength of the developer by adding eight ounces of water to one ounce of developer. In twenty minutes a faint image appeared. He then added a drachm at a time of a stronger developer, and ultimately found, after one hour's development, that the results were no more satisfactory as regards halation than when using a normal developer. He did not wish to find any fault with the Sandell plates, and he would suggest that by using them backed they would be proof against any halation whatever. The plates he used were double-coated.

Mr. BECKETT asked whether a triple-coated plate should not have been used if such a test as Mr. Teape's was applied?

Mr. ARCHER CLARKE referred to Mr. Sandell's exposures abroad, and would like to know what was used to develope them, as they were told all the various exposures were developed in the same solution. He also referred to a make of plate that was not in the market now that for interiors was perfectly free from halation. He believed the emulsion contained a large quantity of iodide.

North Middlesex Photographic Society.—April 10.—Mr. J. Humphries, F.S.A., the former President, attended, and showed samples of a new lantern plate which had been patented. The great advantages claimed were that it was unbreakable and non-burnable, thus being able to stand the fiercest heat produced in any lantern. The support was a prepared mica. Great trouble had been taken to find a way of treating the mica to give it such a surface as would take and retain colour, but this, he claimed, had at last been accomplished. The specimens he produced were all by a mechanical process, but he expected that they would shortly be on the market coated with emulsion for ordinary photographic use. The mica was beautifully clear and translucent, of a fine white colour, and absolutely free from spots and blemishes. Mr. Cox opened a discussion on development. He restricted his remarks to the pyro developer, as he found he could get results with that agent that were not surpassed by any of its more modern rivals. He recommended sulphite of soda as the preservative, with citric acid to render it neutral, using four ounces of sulphite and eighty grains of citric acid to the ounce of pyro. He produced some of his stock solution which had been kept eighteen months, and it had only changed to a straw colour. He dealt fully with the development of over and under-exposed plates, and for the latter recommended a preliminary bath of either hypo (1 or 2 parts to 1000 of water) or a weak solution of ammonia followed by a developer weak in pyro, strong in ammonia, and strong enough in bromide to prevent fog being caused by the ammonia, and followed, should the negative be wanting in density, by a fresh solution strong in pyro and weak in ammonia and bromide. To get the fullest gradations of nature a thickly coated plate was necessary, as, although printing density could be obtained on a "starved" plate, the range of tone would be limited. He always used cathedral green glass and one thickness of canary fabric as being better to work by than a ruby light, and by exercising care in keeping the plate from the direct light rays no fog caused by light would be found to take place. A most interesting discussion ensued, in which Messrs. Beadle, Mattocks, Gregory, McIntosh, Wall, Smith, Marchant, and others took part. Mr. MCINTOSH mentioned that metabisulphite, if used as a preservative, became more acid by keeping, and required the addition of more ammonia, often leading beginners to think their plates under-exposed. The award for the best print from plates exposed at the outing at Penshurst was gained by Mr. H. Smith. Next meeting on the 24th, when the subject of *Retouching* will be treated by Mr. J. Matthews, who will illustrate his paper with lantern slides.

THE fourth of the series of elementary technical classes being given by the above Society was held on Wednesday, 12th inst., when Mr. J. C. S. Mummery dispensed practical instruction in toning gelatino-chloride paper, with both the combined and separate baths. The next evening has been fixed for May 10, when the subject will be the improvement of negatives (intensification and reduction), by Mr. J. McIntosh. Any gentleman wishing to attend is requested to make application to the Hon. Secretary, M. G. Gosling, 13, Lausanne-road, Hornsey.

Hackney Photographic Society.—Mr. E. Puttock in the chair.—The Hon. Secretary (Mr. W. Fenton-Jones) was welcomed back by the members after his tour through Italy and Switzerland, and he informed them he would give an account of his trip later on in the year, with slides from negatives taken by him. From the question box: "What is the cause of a negative turning pink?" A suggestion was that the hypo had not been eliminated sufficiently. Mr. Beckett showed a table showing loss of reflection from polished glass plate (lent him by Mr. Wall). Messrs. Sodeau and Smith showed comparative tests in unbacked, backed, and Sandell plates. In the backed and Sandell plates there was hardly any halation, but the unbacked one had much halation. Other work was shown by Messrs. Salmon, Roofe, Richardson, Hudson, after which lantern slides, the work of Messrs. Roofe, Roder, Carpenter, Wire, Barker, Barton, Dean, Salmon, Cross, Olney, Harvey, Hudson, and Beckett were shown.

Kensington and Bayswater Photographic Society.—April 17, Mr. C. W. Brummell in the chair. The Hon. L. M. St. Clair gave a lantern lecture on Norway and Sweden, and also showed slides from negatives taken in Nepaul, Thibet, and India. The lecturer also exhibited native weapons, &c., describing the manners and customs of the people in each of the countries.

West London Photographic Society.—On the 11th inst., Mr. W. S. Rogers, the Hon. Secretary of this Society, gave a practical demonstration in *Frame-making*. He explained the method of cutting the mitre joints, and showed how the four sections of moulding could be readily glued up to form a picture frame. Mr. Rogers employed for the purpose of his demonstration a bench by Messrs. Syer & Co., and he exhibited and explained a very ingenious mitre-cutting machine, by Messrs. Booth Bros., both of which had been lent for the occasion. Afterwards a series of slides by Mr. H. Selby, illustrating a tour in the counties of Durham and Yorkshire, were put through the lantern, and Mr. Selby gave an interesting discursive lecture on the places represented.

Croydon Microscopical and Natural History Club (Photographic Section).—April 14, Lantern Evening, Lecture on *Winchelsea and Rye*, by Mr. A. Brooker.—In tracing the history of these picturesque and old-fashioned towns, the lecturer showed, by means of ancient maps, the vast changes that, owing to the vagaries of the sea, had taken place round the mouth of the Rother, whereby these ports had been left stranded, high and dry, surrounded by marshes. The lecture was copiously illustrated by views of the numerous archæological remains, and of marshland and shipping scenes, some of these latter being particularly fine.

Liverpool Amateur Photographic Association.—A Reception and After noon Tea was given by a few of the ladies of the Association on Thursday, April 13. A large number of the members and their friends attended. The arrangements were in the able hands of Mrs. Marriott, Miss Adams, Mrs. Morrison, and Mrs. Southell. The Club room had quite a holiday appearance with the decorations, flowers, and other comforts known to the fair sex. In the evening a practical demonstration on *Alpha and Bromide Paper* was given by Mr. Wilkinson, of Manchester. He also exhibited and gave the formula for a home-sensitised print-out paper.

FORTHCOMING EXHIBITIONS.

April 21-29 ..... *Crystal Palace. The Executive, Crystal Palace, S.E.

,, 21-29 ..... *Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.

May 4-6 ..... *Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

LENS STANDARDS.

To the EDITOR.

SIR,—I was pleased to read your article on "Lens Standards" in your issue of April 14, not alone because of your kindly reference to my work, but because your JOURNAL may thus be one of the most effective instrumenta in the real establishing of such standards as those to which you refer. It has fallen to my lot to observe, perhaps more closely than any one, the progress made in the establishing of standard interchangeable fittings for the attachment of lenses to cameras, and I have been particularly struck with the fact that, while every one recognises the great conveniences which will be secured to photographers by the effective establishing of such uniformity of practice, each individual concerned seems to expect that it is the business of every one but himself to act in the matter.

There is a tendency among users of lenses to look to the opticians for the necessary action. Few photographers can, however, realise the enormous cost in cash and inconvenience which the departure from his old standards will entail on each individual optician, and it cannot be expected that opticians will adopt new standards except under pressure of public demand.

I believe that the time has now arrived when sufficient interest has been awakened in this matter to secure among photographers the solid belief that these standards must ultimately be everywhere adopted, and what I should like to point out is the need of individual effort. Any photographer who wishes to have standard fittings to his lenses can have them, probably by merely specifying these standards when ordering lenses, although the optician may not offer the standards under ordinary circumstances.

I believe that the work of improving these fittings which is associated with the name of my firm, will do much to make the standards popular, through securing to them several great advantages of practical usefulness which belong to no other system.—I am, yours, &c.,

Leicester, April 17, 1893. WILLIAM TAYLOR.

DETERMINATION OF THE SPEED OF PLATES.

To the EDITOR.

SIR,—I gather from the report in your issue of April 14th of the remarks made by Mr. G. F. Williams before the London and Provincial Photographic Association, that he bases his conclusions on the fact (as he asserts) that certain speed numbers placed on boxes of plates by makers who have adopted Messrs. Hurter & Driffield's system have not proved in practice to represent truly their *relative* speeds.

During last season I had a considerable number of plates from different makers tested by means of Messrs. Hurter & Driffield's system by Mr. R. C. Phillips, of Oxford-street, Manchester, the result of which testing showed that frequently the printed descriptions of the plates on the boxes were very misleading. Certain boxes were marked with speeds purporting to represent *accurately* their speed on the Hurter & Driffield scale. It turned out, however, that in some cases the numbers were entirely wrong, the fact being that the makers had either misunderstood or misapplied Messrs. Hurter & Driffield's method of testing. This was admitted to be the case with some of the batches first tested.

The correctness of speeds, as determined by Mr. Phillips, were subsequently verified when the plates were used in the camera, the exposure being, of course, calculated with the actinograph. I believe I am correct in saying that I have not had a single incorrect exposure on the numerous plates so used.

I, like Mr. Williams, felt that I had a right to demand that the goods sold to me should be what they were represented to be. It is easy to understand, however, that, in first adopting the system, errors might be made; and it is unfortunate that any makers should have placed the speed numbers on the boxes before they had made quite certain that they were using the system aright. I have little doubt that, by this time, experience has taught them to use the method correctly.

If Mr. Williams did not have any of the plates he experimented with tested by Hurter & Driffield's system *independently*, it is evident that he may have obtained some, as I did, wrongly marked, which would be sufficient to account for his having formed an adverse opinion of the system, though his method of testing can scarcely be considered an accurate one, and he would certainly have arrived at very different, and probably correct, conclusions had he tested the system itself.

As regards orthochromatic plates, Mr. Phillips tested only one of such for me, with the result that the speed given by the same procedure as in testing the other plates was very largely in excess, as one might reasonably expect, of its true daylight speed.

Mr. Phillips tells me, however, that he finds no difficulty in establishing a special constant for any particular make of orthochromatic plates, though, of course, it is not very likely that the same constant would be applicable to plates orthochromatised by different methods and treated with different staining substances.

I trust that these few remarks may be the means of deterring those who have read some of the recent adverse criticisms of Messrs. Hurter & Driffield's system from forming an opinion that it is faulty or unreliable.

No one who is competent to form an opinion on these researches can do otherwise than appreciate their scientific value and thoroughness. Beyond this, however, experience of the practical application of the system proves it to be perfectly reliable and of enormous convenience and economy, and I am confident that, if the numerous users of the system will make known their experience, this fact will be fully substantiated.—I am, yours, &c., WALTER BOURKE.

Worsley, April 18, 1893.

MR. TEAPE AND THE SANDELL PLATES.

To the EDITOR.

SIR,—Will you kindly allow me a brief reply to the remarks of Mr. S. H. Fry in your last issue? I consider that I was quite justified in using the Thomas's hydroquinone developer undiluted under the circumstances.

I purchased a box of Sandell plates. There were no instructions of any kind in or on the box. This was mentioned at the meeting. I asked Mr. Fry if the method of tentative development was given in the instructions with the Sandell plates. Mr. Fry answered, "No, he believed not. New instructions were being made out."

I think you will see by this that I had no information to guide me to any particular mode of development for the Sandell plates, and that there was nothing remarkable in my selection of the said developer and using it undiluted.

My experiments were comparative, and made for the purpose of showing the presence or absence of halation in the two kinds of plates given absolutely the same exposure and treatment in development. If this is rough treatment for the Sandell, it should prove the same for the other plate in the production of halation. This is proved to be the case, for, in my later experiments developed tentatively as explained by Mr. Fry, the same relative amount of halation is shown—that is, most halation on the unbacked Paget XXX, less on the Sandell, and none on the Paget XXX backed.

I have also used the Paget XXXXX under the same conditions, with the same result. The development of these plates extended over sixty-five minutes, and I could have withdrawn the Paget plates in forty-five minutes, for they had attained quite enough density, but I kept them in for the same time as the Sandell. This must have been a great strain in the direction of producing halation on the Paget XXXXX. These plates are in the library of the London and Provincial Photographic Association, and may be seen by any one interested in the matter.—I am, yours, &c., J. S. TEAPE.

London, April 15, 1893.

THE CONCENTRIC LENS.

To the EDITOR.

SIR,—I note that, in a communication to one of the photographic journals, Professor Burton says that the concentric lens, when used with a stop of *f*-22, "gives excellent definition." I send you some spoiled negatives—not caring to put good ones in a letter, though on Eastman films—to show that the definition of the concentric with *f*-16 is as good as with a smaller stop. The two pairs were made simply with a view to test this power of the lens, and are the centres of 8×10 negatives, taken with an eight-inch lens, one with *f*-16 and the other with *f*-64. Will you be good enough to examine them, and say frankly if you find that the larger stop shows any inferiority in definition? The negatives were spoiled by a crack in the camera front, which let light in on the foreground, and the development was not completed; but I may say that up to the workable dimensions of the negative, say 7×9, there was no falling off in the margins as far as definition was concerned, though certainly there was a better illumination up to the very corners in those taken with the *f*-64 than in the others. But it must be remembered that this is a case of straining the lens, for, the focus being eight inches, we have no right to expect it at *f*-16 to cover a field of 8×10 with equal illumination. Should there be no near foreground, the lens will cover a whole plate with the *f*-16 so well, that for all ordinary observation no one could tell whether the stop was *f*-16 or *f*-64 when it comes to the printing.

As the Roman season for photography is just opening, and colleagues of the camera may be drifting this way, I take the opportunity to supply an omission in the ALMANAC of this year by giving the address of our Amateur Club, which we regard as the primate of Italy. It is in the Piazza di Pietro, at the back of the Bourse, and visitors will find there all facilities for developing their own negatives, or having them done by our technist, Cav. Montagna. We have an excellent portrait studio, enlarging room, and half a dozen dark rooms, some for cold and some for hot weather. In the Via di Pietro, which leads to the Piazza, there is a very quiet little hotel, the Hotel Cesari, kept by a member of the club, one of our most enthusiastic amateurs, where the visitors will

find, at the top of the house, a studio and a dark room always at his service if he does not care to go to the club. The Cesari is excellently suited to wanderers, as it does not furnish meals except breakfast, leaving the client free to dine and lunch where he pleases. He takes his room, and, if he likes, his coffee in the morning, and comes home at night, with no further limitations. The quarter is the healthiest in Rome.—I am, yours, &c.,

W. J. STILLMAN.

Rome, April 16, 1893.

THE SPEED OF PLATES.

To the EDITOR.

SIR,—In Mr. Williams's remarks respecting determination of speed of plates by the Hurter & Driffield method, made before the London and Provincial Photographic Association, there occurs a little inaccuracy, conveying a wrong impression.

Mr. Williams says:

"To this correspondence I replied briefly, to the effect that I should abide by my experiments, and such was the courage of my own opinions, that I offered to submit everything to a disinterested jury, and I further offered to repeat any individual experiment such jury might select. *To this challenge none of my dissentients have responded.*"

In Marion & Co.'s letter to Mr. Williams, published February 10, they say:

"Knowing the value of the system from more than twelve months' daily working, we are most desirous of offering the utmost facilities for its trial. We should be pleased *if Mr. Williams or any committee of experts would take the matter up with us.* We invite Mr. Williams to favour us with a visit at Southgate, and, in conjunction with our Mr. Cowan, practically test the speed numbers."

Mr. Williams could scarcely expect us to respond to his challenge when he himself has not cared to accept ours, which was *issued a week previous* to his own. We still leave our challenge open for Mr. Williams' acceptance, with any committee of experts nominated by the Society before whom Mr. Williams' paper was read.—We are, yours, &c.,

April 19, 1893. MARION & Co.

IMPORTANT NOTICE—AMIDOL OR DIAMIDOPHENOL; METOL OR MONOMETHYL-PARA-AMIDOPHENOL; GLYCIN OR OXYPHENYL-GLYCIN—PATENTS IN ALL COUNTRIES.

To the EDITOR.

SIR,—We beg to inform you, and we shall feel obliged if you will give publicity to the fact, that the patent disputes between the manufacturers of the above developers have been settled amicably by mutual consent, and in future the sale of same in Great Britain and colonies will be effected through the undersigned firms, at even prices and terms.

All photographic dealers will supply these products at the retail prices advertised, and professionals as well as amateurs will, no doubt, continue to derive satisfaction from the use of these now well-known developers.—We are, yours, &c.,

FUERST BROTHERS,
17, *Philpot-lane, London, E.C.,*
Sole Agents for
J. HAUFF,
Chemische Fabrik,
Feuerbach, near Stuttgart.

HENRY HAUSSMANN,
Dashwood House, New Broad-street, London, E.C.,
Sole Agent for
DR. M. ANDRESEN,
Actiengesellschaft fuer Anilinfabrikation, Berlin.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2 *York-street, Covent Garden, London.*

PHOTOGRAPHS REGISTERED:—

Alexandor Gendall Gibson, Penzance.—*Two photographs of the ship "Horsa" ashore at St. Martin's, Scilly Isles.*

Alexander Gendall Gibson, Penzance.—*Two photographs of the ship "Horsa" ashore at St. Martin's, Scilly Isles.*

James Soames, jun., Oxford.—*Photograph of a bulldog dressed in football cap and jersey. Two photographs of bulldogs in barristers' costumes.*

H. W. H.—In the formula referred to, cyanide of potassium and tincture of iodine are meant.

RAJAH inquires if we can tell him of some good provincial town where the club system has not yet been introduced?—We cannot.

X. Y. Z.—From your description, we cannot quite understand the alteration made on the lens. Please send a rough drawing.

LIGHTS.—The address of the Incandescent Lights Company is Palmer-street, Westminster, S.W.

W. J. N.—It is certainly possible to use sympathetic ink in printing, but water is usually the solvent for such inks, whereas you will require an oleaginous ink.

C. R.—The question is one entirely for the County Court. As the man was acting as an agent, and not as a servant, we do not see how he can be charged with embezzlement.

AUGUST BAER (Winterthur).—We do not know the name of the manufacturer of the air brush, but Ross & Co. are the sole agents for this country. See advertisement in ALMANAC.

EDGAR SCAMELL.—Of the two designs for a studio we should prefer No. 1, if the ridge be carried more towards the centre and the glass also taken up proportionately higher.

AVONDALE.—We have heard the London-made production well spoken of, but cannot speak of its capabilities from personal knowledge. We think, however, it should serve your purpose.

E. WALKEN desires to know if grit would make his Beard's regulators unworkable, and asks Mr. Birrell's opinion as to this, and further, as to whether the anti-friction arrangement could be adapted to them.

ERRATUM.—We are reminded by Mr. W. Wray that, in giving their sources of supply of optical glass in our article last week, we have omitted the Jena glass, of which they use a considerable quantity.

H. DUNNING.—We have returned the correspondence to you. Possibly the matter had better end with the expression of our opinion that the matter was entirely one for settlement between you and the other party.

W. W. T.—1. We do not know any work which treats specially of photographing anatomical subjects. 2. A paper on *Architectural Photography*, by Mr. S. F. Clarkson, published in our volume for 1886, may help you.

SALOP.—If you have publicly charged the man with infringing your copyright photograph, while you have no copyright in it, you will most likely find yourself in an unpleasant position. An apology ought to be tendered.

B. W. C.—Ether should be used for thinning down collodion, especially so if the thickness arises from evaporation. We do not know the composition of any retouching varnish such as you describe, in which collodion plays a part.

S. SINGLETON.—No difficulty will be experienced in photographing in Germany, provided the camera is not used in the neighbourhood of fortifications. It will, however, be advisable to be provided with a passport in case of accidents.

INQUIRER.—We do not know any American paper that takes just such a position. Your course is first to determine in what city you would wish to reside and then advertise in those papers published in that city. Having thus decided, you may write to us again.

G. I. J.—The opening out of the aperture in the lens to *f*-9 should, theoretically, cause it to work with an equal degree of rapidity to the rapid rectilinear of similar aperture, although of different focus, provided its correction is such as to give sharpness when thus opened.

F. E. G.—We suspect that your cyanide has lost its virtue by long keeping. Stick cyanide at best is but weak. As an alternative, try a strong mixture of solution of ferridcyanide of potassium and hyposulphite of soda, or you may use them singly, the ferridcyanide first, of course.

S. RUNNICLES (Braila).—The cement referred to may be obtained through any English stationer. Nothing is better for mounting photographs than freshly made starch paste. Most, if not all, the cements sold that do not require heating are not to be recommended for photographic purposes.

T. JENNINGS.—If the transparencies are not dense enough, they can be intensified. Carbon transparencies are intensified by treating them with a solution of permanganate of potash. The strength is unimportant. Ten to fifteen grains to the ounce of water is, however, a good proportion.

DUBIOUS.—As you say that the toning and sensitising baths are in good order, and that only three or four prints out of a batch are defective, it is clear the paper is not at fault. Therefore the trouble is due to the manipulation, but in what way it is impossible to say without seeing the operations carried out.

LOUIS MELDON.—On examining the negative microscopically, we find a well-marked nucleus in the centre of each spot, but how caused, or what it consists of, we are unable to say. Place a little of the water employed in a clean test-tube, and examine for any floating specks through a magnifying-glass.

H. B. W.—If the negatives are very much under-exposed, there is no remedy in the development to anything like the extent there is with over-exposure. Amidol will sometimes bring out detail where pyro fails. Try that, and use a fair share of patience. Then some of the plates may be made to yield fair negatives.

A. RAWSON.—There is certainly no novelty in the idea of coating albumen prints with collodion with the object of making them more permanent. This was tried in a series of comparative experiments many years ago, and the result was that some prints treated with the collodion were found in some instances to fade quicker than corresponding ones that were not coated. From this it will be seen that the proposed patent, if obtained, would not be valid.

W. O. J.—Read the articles on the various photo-mechanical processes in the ALMANAC and then experiment for yourself. We fear you will not get much that is reliable with regard to the practical details of working without paying for it—and rather a good price, too. Practical details are treated much in the light of trade secrets.

A. X. Y.—Very likely, if you exhibited, you might get a medal. We have seen worse pictures that have obtained medals at societies of the Little Peddlington type. These are the societies that the avowed "pot hunter" usually seeks. In the best societies he is usually conspicuous by his absence. The prints would be best in platinotype.

A. MACKINNON.—Your trouble is, no doubt, increased by over-sensitising the tissue. Five minutes' immersion in a five per cent. bichromate bath at this season is too much. Reduce the strength of the solution to three per cent. and the time of immersion to three minutes. Are you aware that carbon tissue can be purchased in small quantities ready sensitised?

SULPHC.—1. By procuring a copy of the Poisons Act from Eyre & Spottis woode, New Street-square, you would be able to see if the chemicals are scheduled. 2. We scarcely understand the question. Sulphite, as a preservative for pyro in solution, is best in a neutral state, although, as a rule, it is faintly alkaline. If it is placed with the soda solution, it is also doubtless present with the pyro.

W. C. DRUMMOND.—It will be very difficult to etch on glass by the method you adopt, because no portion of the surface is quite denuded of gelatine, which acts as a resist to the etching fluid, which we suppose to be fluoric acid. The interposition of a grating might aid you. Instead of glass, you might try a copper or brass plate, and etch in the manner adopted by Fox Talbot.

DUBLIN.—There are many causes that may conduce to an emulsion yielding foggy plates. If it were prepared strictly according to the formula quoted, we should say the most probable cause was over-cooking. Try again, and boil for half the time, and see the result. The gelatine appears to be the right brand. But we may add that many of the finer kinds of thin gelatine are so similar in appearance that it is quite impossible to recognise them by the examination of a single flake.

A. J. BONSON writes as follows: "I have a quantity of chloride of silver from the washings of prints. Is there any means by which I can convert it into nitrate without sending it to the refiner? I may say that I have no furnace by which I could bring the chloride to the metallic state. I have heard or read somewhere that there is a method by which it can be done."—Proceed as under: Wash the chloride, and drain it closely. Then strongly acidify it with sulphuric acid and drop in a few pieces of pure zinc, and allow it to rest for a day or so. This treatment will reduce the chloride to metallic silver. Any zinc remaining must be carefully removed, and the silver well washed. After the zinc is taken out, it is a good plan to add some more sulphuric acid to dissolve any small fragments of zinc that may have become detached. After the silver is thoroughly washed, it is dissolved in nitric acid and crystallised.

RECEIVED:—Morley & Cooper's price list of cameras.

PHOTOGRAPHIC CLUB.—April 26, *Novelties in Hand Cameras*. May 3, *Lenses for Copying*.

THE fishing picture, *Steady*, at the Crystal Palace, which we referred to as being by Mr. H. Young, should have been attributed to Mr. H. Smith.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—April 25, Technical Meeting, *The Manufacture of Gelatine Plates*. A demonstration by Mr. J. Desiré England at 8 p.m.

ERRATA.—Mr. W. Birrell writes: "Permit me point out to you that you have put 'cork' instead of 'cock,' which renders the meaning of my last week's letter hard to discover."

WE have received from Mr. W. F. Slater, of 169, Southampton-street, S.E., his price-list of frames and mounts. Mr. Slater's frames are always distinguished by excellence of taste and other good qualities.

MESSRS. ARTHUR SCHWARZ & CO. inform us that the specimens of coloured photographs sent in for the Brunn's Gossy Colours Competition are on view at the National Photographic Exhibition now being held at the Crystal Palace.

MESSRS. MARION & CO. inform us that they are bringing out a new trade catalogue in sections. They have sent us a copy of the section relating to camera stands and shutters, which is replete with illustrated descriptions thereof. Other sections will appear in due course.

REDUCTION OF AMIDOL PRINTS IN THE FIXING BATH.—With reference to this, Mr. A. K. Dresser has handed us our bromide prints, developed each respectively in sulpho-quinone, metol, eikonogen, and amidol. The development was in each case carried to the same stage, and the prints were soaked in a strong solution of hyposulphite of soda for a night. There is no apparent reduction in any of them. It is Mr. Dresser's opinion that the reduction of amidol-developed images would not be heard of if photographers would give a shorter exposure and a longer development.

CRYSTAL PALACE NATIONAL PHOTOGRAPHIC EXHIBITION.—List of awards. National challenge cup, the West London Photographic Society: Gold medal, W. M. Warneuke; silver medal, E. T. F. Goodwin; bronze medal, Messrs. Morgan & Kidd, A. R. Dresser. Art division: Silver medals, William Howell, C. H. Oakden, W. J. Wright, J. E. Goold, C. Job, E. Hawkins, G. Hankins, Miss A. Heath; bronze medals, F. W. Edwards, G. H. Catt, R. H. Lord; certificates, Douglas Pym, E. M. Stone, C. Court Cole. Scientific photographs: Silver medal, Sir Henry E. Roscoe and Joseph Lunt (joint exhibit); bronze medal, John Carpenter. Lantern-slide division (professional photographers): Silver medal, George E. Thomson; bronze medal, P. H. Fincham. Amateur photographers: Silver medal, F. Golby; bronze medal, J. Shaw, G. Bingley; certificate, Harry Holt; silver medal, W. E. Cowan; bronze medal, J. O. Grant; certificate, W. Taverner; bronze medal, W. C. Beetham; silver medal, F. Anyon; bronze medal, E. Dockree.

DESTRUCTIVE FIRE AT A BARNSLEY PHOTOGRAPHER'S.—A fire which caused considerable damage occurred on Wednesday night, April 12, on premises in Sheffield-road, owned by Mr. Walter Guest, tobacconist, and occupied by Eastman's, Limited, butchers; Mr. Eddison, photographer; the Danish Butter Company; the London and Counties' Tea Company; and others. The fire was discovered by Inspector Mellor and P.S. Williams about nine o'clock on the night named. They at once gave information to the Corporation Fire Brigade, who were soon on the spot. They were able to obtain a good supply of water from the street mains, and the fire was totally extinguished by eleven o'clock. The greatest amount of damage was done to the property of Mr. Eddison. The room which he occupied was used as artists' room, and contained a number of pictures that were ready for sending out, and also frame mouldings. Mr. Eddison estimates the damage at about 1000*l*. His property was fully insured with the Royal Exchange Assurance Company. The damage to the building is computed at 350*l*., and is also covered by insurance. Messrs. Eastman's damage amounts to about 50*l*.; and the Tea Company's to from 50*l*. to 100*l*. It appears from subsequent examination that the fire began in a small place partitioned off from the butcher's shop, to which it belongs.

BOLTON PHOTOGRAPHIC SOCIETY'S EXHIBITION.—On Wednesday, April 12, the Bolton Photographic Society opened an exhibition of its work. Mr. J. R. Bridson J.P., the President of the Society, had for exhibition over a dozen fine pictures, including portraits of Princess May, Miss Bridson, Miss Fortescue, and various landscapes, some of which were worked up in colour and crayon. In portraiture there was a very fair representation of professional artists in the town, some highly finished work being exhibited by Mr. Nathan S. Kay, Mr. F. Proctor, and Messrs. Weatherley, Bros. whilst Mr. H. Birtwistle was also an exhibitor in this class. Mr. J. S. Roscoe, a skilled amateur, had several landscapes on view, and also worthy of special mention in the miscellaneous exhibits were Messrs. Walter Staton, W. Collier, W. L. Entwistle, H. Haywood, J. Kellett, W. Green, and A. Harper. Other exhibitors who figured very creditably were Dr. Johnston, and Messrs. E. J. Roscow, F. Roscow, J. Thornley, Jabez Boothroyd, R. Fielding, jun., R. Paiton, S. L. Coulthurst, A. Graham, J. Leach, Jas. Morris, J. H. Galloway, R. Leigh, R. Gregson (Blackburn), J. H. Cowan, J. Lomax, I. Brooks, and J. Young. Several manufacturers of photographic materials had on view specimens of their latest processes, and local dealers in photographic outfits, including Mr. W. Banks, Corporation-street, and Mr. T. H. Heyes, Deansgate, had very interesting exhibits of their specialities on view. The Eastman Company had on exhibition eight views as specimens of their bromide and solio processes; but the exhibit which was the commanding attraction in the room was Messrs. Elliott & Son's green carbon enlargement, *Break, break, break, at the foot of thy crags, O sea!* which is seven feet by five feet in size, and attracted great attention at the Pall Mall Exhibition last year. In opening the Exhibition Mr. Bridson expressed his pleasure at seeing so large an assembly and such an encouraging manifestation of interest by the public in the science of photography. He thought the display on view that night was a great improvement on its predecessors. The Bolton Society had been in existence fourteen or fifteen years, and had a membership of one hundred, which he trusted might be increased as the result of the Exhibition. The results of the judging were then announced as follows:—Members of the Society only: Class 1: Best set of six photographs from negatives taken since March, 1889.—1, Silver medal, Walter Staton; 2, bronze medal, H. Heywood; 3, bronze medal, A. Harper; and highly commended, Dr. Johnston. Class 2: Best set of at least six photographs taken at Society's outdoor meetings during 1892.—1, Silver medal, W. Collier; 2, bronze medal, W. L. Entwistle. Class 3: Best set of transparencies from negatives taken during 1892.—1, Silver medal, W. L. Entwistle; 2, James Kellett; 3. Ernest J. Roscow. Class 4 (open to all professional photographers): Best set of six portraits.—1, Silver medal, N. S. Kay; 2, bronze medal, F. Proctor. Classes 5 and 6, no competition. Class 7: Best picture in the Exhibition, belonging to any member of the Society.—1, Silver medal, J. S. Roscow; 2, bronze medal, W. Green. As supplementary attractions to the Exhibition the Committee arranged a series of musical entertainments and an excellent programme of American and other scenery. The Judges were Messrs. J. H. Welch, E. L. Marriott, and H. Hall, of the Liverpool Amateur Photographic Association. The Exhibition closed on Saturday. The room was crowded, the chief attraction being a lantern display, the *Peaks and Dales of Derbyshire*, which was highly appreciated. During the four days the Exhibition has been open upwards of 1200 people have visited it, and it has been a thorough success in every way.

*** We have received from Mr. Joseph George Hudson the sum of 15*s*., the proceeds of sale of groups taken by him at Anderton's Hotel on February 11, 1892, and which, as requested, we have handed over to the Treasurer of the Photographers' Benevolent Association.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1721. Vol. XL.—APRIL 28, 1893.

PERSPECTIVE IN PORTRAITURE.

Somewhat allied to, and suggested by, the subject of our article last week on the so-called photo-corrector, is the cognate subject of incorrectness of portraiture, produced by placing the lens and camera too near to the sitter.

Every one knows that, if the hand or foot projects, it will be rendered on a scale larger than it ought to be in comparison with the rest of the figure; but every one does not, seemingly, realise that this applies also to the projecting parts of the face in relation to those further away from the lens. This perspective distortion is, in both cases, the more pronounced the closer the lens—the point of sight—is to the figure. By receding, or withdrawing the camera to a greater distance, this disproportion becomes less and less, until it ceases to be noticeable.

While no one with any artistic perception would pose a figure so as to allow the hands or feet to unduly project, still t may be well to indicate in what manner such may be equalised without the necessity for having recourse to adventitious modes, such as are afforded by retouching or "photo-correctors."

The simplest and most obvious means for adoption is to avoid placing the camera too near the sitter. If, as we have seen some do, the lens is brought to within six or eight feet of the sitter, or even still closer, as when a large head is desired, what can one expect other than this distortion of perspective? While it is true that the perspective is not really false, still it is violent, and the portrait obtained in this way may not convey an accurate idea of the sitter. A useful object-lesson is to make a direct large portrait of a sitter from a distance of four to five feet, and then remove the camera till twenty-five or thirty feet intervene between them, afterwards enlarging the portrait last taken until of the same size as the first, and then comparing the two. It will be seen how much superior the one is to the other. Some studios may not be sufficiently long to permit of this being done; and this is a great misfortune, for, while no studio should be under twenty feet in length, it is still better when it exceeds this by twelve feet, or is thirty-two feet long. If it is found that at a distance of about fifteen feet the portrait is too small for the dimensions required, it is much preferable to attain this end by employing a lens of longer focus than moving the camera much closer to the sitter. What is said here about diminishing the too violent perspective of the component parts, so to speak, of a single sitter, applies also with even greater force to the taking of two or more figures in one picture.

In the case of a sitting figure, in which the feet almost necessarily project, any apparent enlarging of them can be reduced by the judicious use of the rising front and swing-back of the camera, observing this, that, in order to reduce the size of the feet, that part of the focussing screen—the top—on which these members are depicted must be brought nearer to the lens, although, when the face has been brought to a sharp focus, the feet, especially if the lens is at full aperture, will be less sharply defined than if the tilting were in the opposite direction. This defective definition must be ameliorated by stopping the down lens. The adoption of the system here outlined will prove useful, if not quite necessary, to the photographer whose studio is limited in length.

Who that is interested in the perspective distortion of the human face does not remember almost with a shudder the "chamber of horrors" opened in our midst in 1872, on the occasion of the late Mr. Robert Crawshay, of Cyfarthfa Castle, Wales, having offered liberal prizes for the production, direct in the camera, of *life-size* heads? Every large lens capable of doing the work, with others specially constructed for the purpose, was pressed into the service of photographers anxious to produce faces from five inches and a half to nine inches. This was in the times of collodion, and as the lenses, which had to be close to the sitters, could not be stopped down too much on account of the prolonged exposure then necessary, it is easy to conceive of the horrid caricatures of the "face divine" that often resulted from working with a moderately open portrait lens at such a short distance. The days when these things could be tolerated are now happily past, and a better taste prevails.

COMBINING ENLARGEMENTS FROM DIFFERENT NEGATIVES.

In an article a few weeks ago, it was explained how enlargements from different negatives could easily be combined into one picture. Then it was assumed that the negatives were in duplicate, and the object was to replace one or more faulty portraits in the one by more satisfactory ones from the other. It sometimes happens, however, that it is required to introduce the portraits of persons who do not figure in or were not even present when the original group was taken, while the only negatives of them available are on a different scale from that of the one to be enlarged. Suppose, for example, a cabinet-size negative, a group, say, of half a dozen persons has to be enlarged, and it is desired to introduce a couple more people, and the only negatives to be had of them are single figures on a larger scale, for instance, a head and bust in the one case, and a three-quarter figure in the other. Here, it is manifest, these negatives will require considerably less enlargement than will the principal or group negative.

If the method described in the previous article were followed,

it would prove, except with a deal of practice, somewhat troublesome, and then not altogether satisfactory. Anyhow, it will be clear to all that it would be convenient to be able to remove the sensitive paper from the easel. We are again assuming the picture is to be on bromide paper, between the different exposures, so that the various negatives can be adjusted to size, got into position, and focussed on a separate screen. This, as will presently be seen, is really easy of accomplishment.

Supposing that the finished enlargement is to be twenty-four by eighteen inches, we take two sheets of stout, white mounting board of these dimensions. On one we fix the bromide paper with strips of gum paper at the edges, or with a few touches of indiarubber solution at the back. This can then be put on one side till required. The other card is to be used as a focussing screen. A print is taken from the principal negative, and the positions the new figures are to occupy decided upon and then roughly sketched in with pencil. It will be better, in the majority of instances, for them to appear behind, rather than in front of, the others. Indeed, when bust portraits have to be dealt with, it becomes imperative that they do so. It must also be decided how much of the subject in the original negative is to be included in the enlargement, and this must be marked upon it at its margins with bold ink or pencil lines. Next, those portions of the two or more supplementary negatives that are not required are neatly stopped out with black varnish, leaving only such portions of the figures as are wanted. The negatives are now all ready for use.

The principal negative is placed in the enlarging camera or lantern, and the image projected on to the easel, upon which has been fixed the plain mounting board. But this must be so fixed that it can be removed from time to time, and replaced in exactly the same position and registration by that bearing the sensitive paper. This is easily ensured by utilising the principle adopted by lithographic printers in arranging "the lay." When the cardboard is placed in position on the easel, drive in a couple of small nails, or drugget pins, for it to rest upon; then, say, on the left-hand side, near the top, drive in another nail for the board to butt against. A few drawing pins will retain it in position. Now, it will be obvious that this board, the focussing screen, and also that carrying the bromide paper can be removed and replaced as often as desired, and identically the same position secured, if the simple precaution be taken that they always rest on the bottom pins and that the sides butt against the side one.

The image of the principal negative is now adjusted to size and focussed. The outlines of the figures are then roughly traced in with a black-lead pencil and the marginal marks, that denote the amount of subject, are also traced exactly—that is important. The card is then removed, and the tracing supplemented with sketches of the other figures that are to be included, and in their proper proportions. It is then replaced on the easel. The negative is then taken out, and one of the others put into its place. Its image is now adjusted so that it occupies the same position on the sketch, and is of the same size that it is to be in the finished picture. The focussing card is now replaced by that carrying the bromide paper, and the first exposure made. The lens is now covered with a yellow glass screen, and the image painted over as described in the former article (see page 209, *ante*). The paper is then taken away, the focussing screen substituted, and the image of the second negative arranged in position, and to size, upon it, and focussed. The paper is again put upon the easel, and the second exposure made. This image is also painted over, as was the other, the same procedure being followed if any more figures have to be introduced. The supplementary figures all being exposed and painted over, the focussing card is again put up and the principal negative introduced in the camera, and adjusted so that the marks on its margin, indicating the amount of subject, exactly coincide with those made on the sketch. This will ensure the image being accurate to the scale, and in the precise position first decided upon. It only remains now to put the sensitive paper once more in position, and make the final exposure. The pigment is removed with spirits, and the paper developed in the usual way.

Photography for Discovering Minor Planets.—The use of photography in this connexion seems likely to become embarrassing, as astronomers can scarcely keep time with the march of discovery. Thus, last month, no fewer than fourteen were discovered by the camera, the total number now known amounting to 375.

Death of M. Letellier.—We are sorry to learn of the death of Monsieur E. A. Letellier, who was a frequent contributor to several of the French photographic journals. M. Letellier, who was fifty-nine years of age at his death, was an officer of the Academy of Science, and was associated with several photographic and other learned societies.

International Photographic Exhibition at Geneva.—During the ensuing month of August an international Photographic Exhibition, under the auspices of the Association des Photographes Suisses and the Société Genévoise de Photographie will be held at Geneva. The Hon. Secretary is M. Th. Penard, 3, Boulevard de Plainpalais, Geneva, of whom particulars and entry forms may be obtained. The session of the Union Internationale de Photographie (the third International Congress of Photography) will be held concurrently with the Exhibition in Geneva, during the week from August 21 to 26.

An Exhibition of Daguerreotypes.—On May 23 Mr. W. England will demonstrate the Daguerreotype process before the Photographic Society of Great Britain. In connexion with the demonstration an exhibition of specimens of the Daguerreotype process is being organized, to which the Assistant Secretary, Mr. R. Child Bayley, 50, Great Russell-street, will be glad to receive contributions from those possessing them. We hope those of our readers having such will communicate with Mr. Child Bayley. A collection of Daguerreotypes would, we are sure, be of great historical and educational interest to many modern photographers, who have only a hearsay acquaintance with this charming process.

Gold Residues.—From inquiries we have made, we are inclined to think that the saving of gold is not much practised by photographers, although a considerable amount must be annually put aside in rejected baths and naturally accumulated in the stone bottles for toning solutions. The method of most simple employment would be that by solutions of iron, which throws down the gold almost immediately. It is, however, well to point out that so much silver chloride accompanies most gold deposits from photographic solutions that the best way is to redissolve the washed precipitate, precipitate again, dry, and weigh. The powder so obtained is nearly pure gold, quite good enough for chloride-making; the chloride may be roughly estimated as being equal to about double the weight of this brown gold powder. A solution made with a minimum of acid may be used without crystallisation, care being taken to neutralise the acid before use.

"The Linked Ring."—We gather from a Haddingtonshire paper, an extract from which has been sent us by a friend, that Mr. W. Crooke, the well-known photographer, of Edinburgh, has been

"asked to join a select body of amateur and professional photographers known as "The Linked Ring," the object of which is to promote artistic photography. It is understood that "The Linked Ring" has taken the Dudley Gallery for an exhibition, which is to be held in the autumn of this year." We wish the new Association, if formed, all the success it may deserve, and hope that it will falsify the fears to which a body having the usual attributes of a "select ring" inevitably gives rise in the minds of the public. A great deal of secresy seems to have been observed about the matter, a feature that rarely tells in favour of any movement.

Volatilisation of Precious Metals.—We have been assured by a veracious correspondent that when reducing silver from residues in a strong heat—a blacksmith's forge being the means employed—he dissipated a large proportion of the metal by volatilisation, on account of an assistant, through a misapprehension, continuing the heating of the crucible for a couple of hours. How far he was right we are not able to say, but in a recent paper by T. K. Rose, read before the Chemical Society, he conclusively shows that gold is volatilisable at a high temperature. We may give the brief summary of his results, merely premising that to photographers they would possess more interest if they had referred to silver, gold residues being mostly treated by wet methods. Mr. Rose says an increase in the loss of gold takes place when the temperature is high. A large amount is volatilised in an atmosphere mainly consisting of carbonic oxide. A comparatively small amount of gold is carried away by the more volatile metals, copper appearing to exert an exceptional action.

Photography and the Star Maps.—The advent of photography for this purpose was hailed as unerring, convenient, and useful beyond compare; but, as investigations are pushed, it is found that this handmaid to science needs considerable "looking after." It was found that different telescopes gave different results, as also which any practical photographer would have expected, did different makes of plates. Recently it is shown, by Schaeberle, that the height in the heavens is a most important factor. Thus a star at the zenith that had a photographic brightness represented by 1 would at a zenith distance of 79° be only ·87 bright, and on the horizon ·01. Lately M. Loewy has shown that the negatives obtained thus still remain important corrections to be made in the measurements. He shows that an error of $\pm 0{\cdot}1''$ is a probable error in the equatorial co-ordinates; in his own words: "Comme il faut encore admettre les erreurs réelles plus fortes que les valeurs théoriques calculées, il devient évident que le dégré d'exactitude obtenu, bien que suffisant, *est loin d'être exagéré!*"

Light and Electricity.—Some very singular light effects, as linked with electrical manifestations, have recently been described. In a paper to the Royal Prussian Academy, Dr. Philipp Lenard gives a description of some interesting experiments he has made regarding the phosphorescent light from the negative pole of a Geissler tube. Thin metal plates are quite transparent to these rays; and, taking advantage of this fact, he closed a small aperture in the glass tube by a very thin plate of aluminium, and so could study their properties outside the tube. These rays, passing through metal, produce a slight luminosity in air, and when falling on phosphorescent bodies near the metallic window caused them to glow. A quartz plate entirely arrested them, but gold, copper, or aluminium leaf allowed them to pass almost unchecked. The most remarkable fact about these rays—one which is the very opposite of all previously recorded behaviours of light rays—is that they do not pass in straight lines, but are diffused to such an extent that it is not possible to obtain a sharp shadow of a body placed between the window and a phosphorescent substance. These rays, composed of the smallest known waves, are thus acted on by gas as though it were a non-homogeneous medium, each molecule acting as an obstacle in diffusing the rays. Then, in another direction, M. Edouard Branly, in last week's *Comptes Rendus*, notes some very interesting light results. A disc of aluminium polished, and after a few days charged with electricity, parts with it in the usual gradual manner whatever light is allowed to act upon it; but, if charged immediately after polishing, the loss of electricity is rapid even in diffused light, and is only slightly diminished by surrounding it by orange glass, thus showing that the loss has not been, as has previously been thought, due, to any great extent, to what are commonly termed the photographic active rays, *i.e.*, those of the more refrangible end of the spectrum.

ALBUMEN BROMIDE PAPER FOR CONTACT PRINTING.

Some few years back a formula or method was published by which ordinary ready-sensitised paper—or, for that matter, any sensitised albumen paper—might at a pinch be converted to the purpose of enlargement, the chloride and excess of nitrate being converted into bromide of silver by floating on a solution of bromide of potassium, when, after a pretty thorough washing to remove the superfluous soluble salts, the paper might be exposed either wet or dry, and subjected to development in the same manner as gelatino-bromide or other papers. That such paper possessed any advantage over or even equalled the ordinary commercial productions I do not think was ever claimed, but that it formed an easily prepared makeshift in an emergency was proved.

I am not now going to recommend such a process as possessing any claim to practical utility when there are so many different kinds of paper both for printing out and for development on the market, and so easily obtainable that almost every country town that boasts a chemist's shop affords a supply; but, following out the lines indicated in connexion with dry plates in an article in last week's issue, I wish to show how a somewhat similar process may not unfrequently prove of use in working off what would otherwise be waste material, fit only to go amongst the residues.

Those who are in the habit of using ready-sensitised paper are, I dare say, like myself, not unfamiliar with the fact that a batch of paper will sometimes "go wrong," or discolour in an abnormally short time. It may be that it has been "old stock" before it reached the consumer's hands, or possibly the fault may be due to some defect in preparation, but the fact remains that a batch of spoilt paper is a by no means uncommon occurrence. Such a batch at present in my possession I can scarcely with fairness blame on to the paper itself, or on the sensitiser, since I have had it in stock for nearly twelve months, and during an illness, lasting through the best part of last summer, it remained simply wrapped in paper, without any further protection against the heat and variation of atmospheric conditions. When I add that it has passed the winter in a particularly damp cupboard, its condition, when I opened it a short time ago, may be easily imagined.

It occurred to me, more for the sake of experiment than with any hope that it could be converted to any practical use, to submit it to a somewhat similar course of treatment to that described in my article last week. Of course, there was no prospect of restoring it to usable conditions as a printing-out paper—at least, if such were possible, the game would scarcely be worth the candle—but there did seem to be a possible chance of converting it into a practically developable condition. The appearances were certainly not promising to commence with, for, in addition to its being "as yellow as a guinea," much of it was covered with irregular patches of metallic surface-bronzing. However, I decided to try the experiment.

In the first water the paper was washed to remove the free silver before submitting it to further treatment; but this seemed to be an unnecessary waste of the precious metal, of which there was none too much present, so in subsequent experiments the paper was floated at once on the restoring solution, floating seeming to offer the better chance of a uniform conversion of the free silver.

The restoring solution consisted of a five-grain solution of bichromate of potash, to each ounce of which a few drops of hydrochloric acid were added. The action of this solution was rather slow, but I found it necessary to use it weak in order to avoid the yellow stain otherwise produced. Subsequently I used a soluble chloride in place of the hydrochloric acid, but even then a slight trace of the acid seemed desirable. The action of this solution was to slowly restore the paper to its pristine whiteness—that is to say, after it had been washed to remove the bichromate—and this took place even in the

parts affected by the metallic markings. In fact, so far as appearances went, the change was far more complete than I had expected, and, indeed, as perfect as need be wished.

As already stated, the restored paper could not be expected to work as a "print-out," owing to the entire absence of free nitrate or any organic salt of silver; on direct exposure to light it darkened pretty rapidly to a dull, cold, slaty grey colour, and there stopped. On development, however, after a brief exposure in the printing frame, a better result was obtained, though I have not yet succeeded with chloride of silver in getting just the tone I should like, nor in securing perfect cleanness in development, possibly because I have not yet hit the right way. Plain chloride of silver is notoriously more difficult to develop satisfactorily than bromide, but with old and very weak ferrous oxalate, and with amidol also used weak, I managed to get very tolerable results, though not perfect.

The sensitiveness of the paper so restored was, I found, by no means of a high character, fifteen or twenty seconds with a negative of ordinary density being required in good daylight by contact, so that, for enlarging, the paper would have been practically useless. I therefore resolved to try the conversion into bromide paper instead of chloride, in the hope of securing greater sensitiveness, as well as a better tone and character of image. In this expectation the trial proved that I was quite justified, for the results obtained on the first attempt proved really surprising, and, so far as the technical qualities of the paper are concerned, as nearly perfect as possible. With ferrous oxalate, the delicate grey image of the best gelatino-bromide prints was obtained without difficulty, while, by a modification of the same developer, or, better still, by using amidol, a pure neutral black tone and image of greater robustness was the result.

The mode of procedure was precisely the same as that already described, with the exception that the restoring solution can be used stronger, for the reason I shall point out. In fact, the same solution as that applied to plates may be used, namely:—

Bichromate of potassium	2 drachms.
Bromide of potassium	1 drachm.
Water	10 ounces.

Upon this solution the paper should be floated with as much care as in sensitising paper in the ordinary way, and, of course, the same precautions must be taken for the avoidance of air bells, &c. If anything, I think, perhaps, a little more care is needful, for any check in the even flow of the solution over the surface of the paper has a tendency to leave a permanent mark, as occurs under similar circumstances in "dipping" a collodion plate. This arises, without doubt, from the action of the bromide in the restoring solution upon the free and organic silver salts in the paper. The floating must be continued for at least five minutes, in order to convert the whole of the chloride, for the solution is not strong in bromide; but it is not safe to greatly increase the quantity above that given, owing to the solvent action of a stronger solution upon bromide of silver. If hydrobromic acid be substituted for the bromide, or partially so, then a more rapidly acting solution may be employed.

In order to facilitate the floating it will be found a good plan to take the "curl" out of the paper in the usual way—that is to say, by laying it face downwards upon a sheet of clean paper, and, with a paper knife or straight edge pressed firmly on it, to draw it sharply across the edge until it curls in the reverse direction. It is then in condition to be easily and quickly floated without danger of air bells or other trouble.

Perfect conversion of the silver salts into bromide is the end to be attained, and beyond that the time of floating is immaterial—that is, floating for a longer time than is absolutely necessary is not injurious as in sensitising—*ergo*, float long enough. There is just the chance, if the floating is protracted excessively, that the bichromate may cause a permanent yellow stain, but this can be removed afterwards. After floating, the paper is first rinsed rapidly in one or two changes of water, and then left to soak for an hour or two, or until, on testing the drops that come from the paper itself in draining, there is not the least trace of chromic salts. This last may be performed by allowing the greater portion of the water to drain from a piece of the paper, and then causing two or three of the last drops to fall on a sheet of white blotting-paper. If the spot so formed be touched with a glass rod dipped in a solution of nitrate of silver, a red stain will be formed if any chromate be present. The test will be rendered more delicate if the solution of silver nitrate be preceded by a weak solution of carbonate of soda.

Should there be any tendency to permanent yellowness from the action of the bichromate upon the albumen surface of the paper, it may be discharged, if not very pronounced, by adding a very small quantity of hydrochloric acid to the washing water. In worse cases, the liquid sulphurous acid of the chemists' shops will be preferable, or, if it be at hand, metabisulphite of potash, which, by virtue of its free acid, reduces the yellow chromate, and removes the stain. Ordinary sulphite of soda, to which a small quantity of hydrochloric acid has been added, will produce the same effect, but in employing this solution it is necessary to bear in mind that bromide, and especially chloride, of silver are dissolved by it. Hence the strength of the solution must be kept down; indeed, in restoring the paper to the form of chloride it is scarcely safe to use sulphite at all, on account of the easy solubility of silver chloride.

After thoroughly washing the paper, there remains nothing to be done but dry it, an operation that requires no special care, except to protect the paper from light; when once dry, the albumen paper may be expected to keep at least as well, and probably much better, than most gelatine papers, owing to its thoroughly insoluble film, and the entire absence of any soluble matter or organic silver compounds. It has the great advantage over gelatine paper of insolubility of surface, and capability of being treated with warm solutions, if needful.

As regards sensitiveness, I have not used paper prepared in this manner for enlarging, but I should judge it is fully sensitive enough for the purpose. A momentary exposure to diffused daylight in the printing frame, or from ten to twenty seconds to lamplight, are sufficient for contact printing, and the development may be with ferrous oxalate or amidol, according to the tone preferred. So far I have only attempted black tones by development alone; I do not know whether it is possible by lengthy exposure and weak development to produce warm tones, but very probably such is the case.

W. B. Bolton.

AMERICAN NOTES AND NEWS.

A New Telephoto Objective.—Another new photographic lens, and Europe is not "in it!" *Credat Judæus!* We have seen no account of the nature or construction of this wonderful lens which is, from what we hear, going to lick all creation. True, we are put in possession of some of what we may term its externals, but are afforded no clue as to its optical nature. This, however, may not be a very difficult matter on which to hazard a guess. The invention, so far as we glean from a paper by the inventor, Mr. Albert B. Parvin, read at a meeting of the Philadelphia Photographic Society, consists of an objective, all the parts of which are mounted in a solid tube—that is to say, a mount in which there are no draw tubes by which to provide for any adjustment in magnitudes of the image. The mount is of short length, and can be screwed in the camera to alternate with the lenses in ordinary use. What Mr. Parvin claims specially as his invention is—a photographic objective of simple construction and effective action for enlarging the image of an object or objects at equal or unequal distances from each other with respect to the position of the camera; an objective having a non-extensible tube provided with a compound or combination lens; and a single negative lens of different length with respect to each other for securing enlarged images of distant objects with a marked degree of sharpness of detail. Now, by what means, different from those already recognised on this side of the Atlantic, are these features to be attained? The reply is tantalising. They are "due to the character of the lenses employed," and this is all. We certainly do learn a *little* more, but that little conveys no optical information. For example, in a 7 × 5 objective, "the combination positive lenses are 6½ inches focus, the negative single lens is 6 inches focus, and these are mounted in a tube of 2⅝ inches long. The diameter of both lenses is 1⅜ inches." Now, while there is but little real information here imparted, we very cheerfully admit that, judging from a lovely specimen of its work given in the *American Journal of Photography*, and from the high encomiums given at the meeting by Mr. John

Carbutt, the new lens will prove good and useful. We think, however, that Mr. Carbutt can scarcely have been lucidly reported, for, while he says that this lens "excelled" anything that had yet been brought before the public—and this with special reference to European productions of the sort—yet he felt certain that, in the near future, America would turn out lenses "equal" to any that came from Europe. Perhaps Mr. Carbutt will kindly enlighten us as to this.

Who first applied Bromine in Daguerreotyping?—A matter of much interest in reference to historical photography has been brought before the Franklin Institute (an American Society, something like our Society of Arts, only more technical) by Mr. Julius F. Sachse, who brings a second Richmond into the field. Here have we, and all the world, for these vast numbers of years, been quietly reposing in the belief that the first man who applied bromine in the sensitising of Daguerreotype plates, and by which that process was rendered sufficiently sensitive to enable portraiture to be easily possible, was J. F. Goddard, a lecturer in the Royal Polytechnic Institution of London, and who, between thirty and forty years ago, received fairly handsome recognition of his discovery after a long delay. Now, says in effect this Franklin Institute Iconoclast, you have been altogether wrong, for it is an American discovery. We have read Mr. Sachse's paper carefully, and in all fairness must state that the claim he has put in on behalf of Philadelphia having been early indeed in developing photography, seems just. He has arrayed a large number of facts, notes, and dates. From these we learn that another Goddard—not ours, but Dr. Paul Beck Goddard, of Philadelphia—in December, 1839, produced perfect specimens of the Daguerreotype, through the agency of bromine as an accelerator, and proof of this is adduced by reference to vol. iii. page 180, of the *Proceedings of the American Philosophical Society*, to which we have no present means of obtaining access. Now, it was in the autumn of the year following that our Goddard (curious coincidence of names) made his discovery, and published it in the *Literary Gazette* of December 12, 1840, and two months later (February, 1841) deposited a paper in the Archives of the Royal Society, detailing his sensitive process of bromine with iodine, for taking portraits from life by the Daguerreotype process. Be it understood that we are not here discussing the question as to who was the first to use bromine in photography in general, so far as it existed in those days—for that honour belongs, unquestionably, to Fox Talbot, who published his discovery nine months previous to the date claimed for the earliest of the other rivals—but who first applied it to the Daguerreotype? It is curious that both these should, although unrelated, bear a similar name, and that both should have been experimenting in a similar direction. It is highly suggestive of the simultaneous discovery of the planet Neptune by Leverrier, of Paris, and Adams, of Cambridge. Mr. Sachse further gives a facsimile of what is believed to be the first portrait ever made by the Daguerreotype process, which was taken by Robert Cornelius, in Philadelphia, November, 1839. But, as we recorded only a few weeks ago (April 7, page 211), the "first" portrait Daguerreotype, which is now on its way for exhibition at the World's Fair at Chicago, and which was taken in New York by Professor Draper in 1840, interposes an element of disturbance, for, if the Philadelphia history be correct, the New York one cannot be so, and *vice versâ*. The subject is not likely to cause a war between the "Empire City" and the "City of Brotherly Love," but the photo-archæologists of these rival cities must somehow have the matter settled. To do this once and for ever ought not to prove a very difficult matter.

Strong Hypo.—We learn that a chemical company in Massachusetts is manufacturing a hyposulphite of soda of a strength one-fifth greater than has ever before been accomplished. Although primarily intended for chrome tannage in the manufacture of morocco leather, it will, doubtless, soon find its uses in photography also.

A Kind Act.—An act such as we are now about to mention deserves being placed on record. Mr. H. H. Snelling was, two score years ago, conductor of the *Photographic Art Journal*, a high-class periodical, but now non-existent. He fell upon hard times, and in his old age became almost entirely blind, helpless, and destitute. But for Mr. W. H. Clark and Mrs. Fitzgibbon Clark, of the *St. Louis and Canadian Photographer*, poor Snelling's lot would have been a hard one, indeed; but these friends rescued him, brought him to St. Louis, and have kept him an inmate of their house for seven months. They have made appeals to the fraternity, with such effect that Mr. Snelling has been admitted into the Memorial Home of St. Louis, where he will be well cared for during the remainder of his life. Mr. Snelling, many years since, was an occasional contributor to THE BRITISH JOURNAL OF PHOTOGRAPHY.

A New Order.—The photographers of San Francisco and Oakland have started an organization bearing the title of United Order of Photographers, Studio No. 1. The meetings are to be held weekly. Their intention is to endeavour to remove the many evils which they say beset a number of their galleries, and to elevate the scale of prices to a paying basis. The *Pacific Coast Photographer* considers that, in order to effect the desired ends, it will be requisite that every gallery enters into the arrangements and compact. It anticipates much good to result from the organization.

An American in England.—A short time since we were much gratified at receiving a visit from one of America's oldest and most experienced technical photographers, Mr. T. C. Roche, who has for so many years been connected with the firm of E. & H. T. Anthony, New York. Mr. Roche is a man of vast information, both historically and technically, and has probably seen more of the American continent in company of his camera than any other man alive. We embrace this opportunity to say that any American visiting London during the forthcoming summer will always be well welcomed by us, and will have the privileges of our dark room for changing or developing his or her plates.

PHOTOGRAPHIC METASTASIS.

SOONER or later all investigation aims at elucidating "the whole truth." In this endeavour it is of paramount importance that, as a basis of operation, as far as it has gone, it is in possession of "the truth, and nothing but the truth!"

But this standpoint can only be attained by a few of those who have before them all the evidence that has hitherto been produced. For, although memory, penetration, reason, and impartiality are common gifts, they are seldom bestowed all at once, in equal measure, and in more than average quantity, on all and sundry. Therefore the dictum of him who has read much, of him who sees clearly, of him who reasons deeply, and of him who simply reads, sees, and reasons without bias are alike untrustworthy. Consequently, as the study of photography presents an exceptional array of facts difficult to reconcile with each other, and as photographers are as unfamiliar with *the scientific method* as the scientist is ignorant of photographic phenomena, it naturally follows that, although we have a plethora of nebulous hypotheses, we have not a single theory, worthy of the name, or capable of holding water, sufficient to quench the mildest milk-and-waterest thirst for knowledge.

The following remarks are intended as an elucidatory introduction to a description and analysis of the form, localisation, and nature of the various and variable parts of *minute* simple images, obtained by widely varying exposures, but submitted for the same length of time to the action of a constant developer. These images were of many different shapes, and were produced by two general methods. The first way was that of concentrating upon the film the images of several kinds of flames by means of a lens. The second was that of allowing light from divers sources to penetrate apertures of many geometrical forms cut in an opaque screen interposed between the light and the film.

The chief outcome of these experiments was a speculative investigation as to the nature of a *clear* "halo" "nimbus," or "ring," as I have indifferently termed it, and I would earnestly request the reader of these lines constantly to bear in mind that, where not otherwise specified, it is not the developed or fixed image which is the subject of conjecture, but the "latent" "developable" or *potential* image at the moment it is brought into contact with a given developer of constant constitution, and at that moment only.

Now, although I have no desire to press the analogy too far, I cannot but perceive, and be keenly impressed with, the very close resemblance between the growth of a plant and of a photographic image, for both forms of growth are subject to a twofold action of light—one chemical, the other mechanical. In both the chemical action at least gives rise to electrical displacement; both are retarded by cold and accelerated by heat. The presence of an alkali or basylous element, and the formation of a solution of the plastic material, is essential to both; and in both an excess of some essential—light, or one or other of its coefficients—greatly modifies or reverses the original form of growth.

When the light acts too strongly the plant becomes "struck," or "stuck" as it is technically termed, and when thus gorged it assumes, so to speak, a petrified or constipated aspect, and blanches through the destruction of the plastic material, the green colouring matter. A plant is only in normal robust health when the forces acting on its system are properly balanced. In botanical economy the two chief factors in the nutrition of the plant are the processes of *assimilation* and *metastasis*. Assimilation, which I regard as the counterpart of that normal reduction which gives rise to the normal negative or positive "plucky" image, or "perfect" picture, is only performed in cells containing chlorophyll, and then only under the influence of light, and ceases in the dark. The elaboration of the inorganic elements of two oxides (CO_2 and H_2O) into a carbohydrate I look upon as the type of the multiplication or development of the elemental molecules of the changed sensitive silver salt.

This process is quite distinct from that by which *the assimilated carbohydrate undergoes further alteration and changes its position* from one cell to another, this transference being accompanied by a change in chemical composition which constitutes metastasis, by which one compound, the carbohydrate, the protoplasmic prototype of our normally developable nucleus, is changed into another. But the resemblance between the conditions under which assimilation and metastasis occur, and between the circumstances accompanying a change from "normal" to "reversal" by no means ends here; for we have not only—

(*a*) Assimilation of inorganic elements into (organic) compounds, compared and contrasted with the metastatic resolution of these compounds into others which I accept with certain definite reservations as embodying the conditions under which the normal and reversing developable nucleus exists at the moment of contact with the developer, but we have—

(*b*) Assimilation taking place only in the presence of chlorophyll, whereas metastasis occurs indifferently either in the presence or absence of the green colouring matter. The former of these reactions is here to be viewed as equivalent to that state of matters in which the presence of a silver salt is essential to that aggregation of particles which admits of the formation of a normal image. The latter corresponds to that disintegration and displacement of the plastic material which takes place independently of the presence of a silver salt, as such.

(*c*) Assimilation, as a process which can only be accomplished under the influence of light, is different from that *continuing* metastatic process which, initiated indirectly by reflex action under that influence, goes on or is developed quite independently of its presence afterwards.

Note.—We must here carefully guard against confounding the parallel just drawn, and which runs closely throughout, with that which might suggest itself in the case of carbon printing. My leading idea is the comparison of the phases of silver salt normal, neutral, reversal, neutral, and normal, potential images, with a plant which, though it ultimately dies, sprouts, blossoms, remains comparatively stationary, fades, remains comparatively stationary, and blossoms again periodically.

(*d*) Assimilation as a process in which a chlorous element (oxygen) is liberated, is opposed to that metastatic process by which the chlorous element (oxygen) is recombined and its equivalent (in CO_2) liberated. These reactions are analogous to those conditions respectively admitting of the separation and recombination of the elements of the silver salt, developable alternately into a normal or reversal.

(*e*) In assimilation the dry weight of the plant is increased by the *fixation* of the essential element (carbon), and by the formation of carbohydrates. In metastasis there is loss of weight through production of removable chlorous (oxygenous) compounds from the organism. In normally exposed, developed, and fixed images the greatest density occupies that part of the film which has received most light; whereas, in the reversal, the part which has received most light develops no density and fixes more clearly. Thus we again see that the phases themselves form the scale upon which the difference between the assimilated or metastased material is read off, s upon a vernier, thus:—

(1) Half density = *assimilation mean.*
(2) Normal = *assimilation at a maximum.*
(3) Neutral or double half density = *assimilation mean and metastasis mean.*
(4) Reversal = *metastasis at a maximum.* HUGH BRENNER.

DETERMINATION OF PLATE SPEEDS.

A REPLY TO MR. WILLIAMS.

[London and Provincial Photographic Association.]

HAVING had the opportunity of seeing Mr. Williams's paper in print I venture the following remarks.

The first point that strikes me is where he says, "Such was the courage of my own opinions that I offered to submit everything to a disinterested jury;" and he then says, "To this challenge none of my dissentients have responded." In reply to this, I must remind him that a week previous to this the firm I have the honour to represent invited Mr. Williams and any committee of experts to practically test the matter at their works at Southgate, where every means is at hand to fully investigate the matter, but that, up to the present time, he had not availed himself of the offer.

Next Mr. Williams says, "For reasons best known to themselves, certain manufacturers have thought fit to adopt the system introduced by Messrs. Hurter & Driffield." All I can say in reply to this is that, for ourselves, the reason we adopted it was that, after exhaustive trials, we were compelled to admit that it was practically far and away the best method we were able to find for estimating the speed of plates, and after some thousands of trials we are more than ever convinced that we were right in taking the matter up and giving to the public the rapidity exactly as we found it of each batch of plates.

That we may have made some mistakes is quite possible, but I think if they had been very grievous ones we should certainly have heard about them soon enough; but I am sure that, if such has been the case, they have been quite accidental, and only incidental to the difficulty of at once perfectly mastering a rather delicate operation.

Mr. Williams, in the beginning of another paragraph, says: "Judging from the tone of the correspondence, one might imagine I had sat down with the deliberate intention of demolishing the Hurter & Driffield theory." Now, I think, if Mr. Williams will refer to the opening paragraph in his original paper, he must really see that he did give some occasion for this idea, for his words were, "So one event in photographic history has been the complete discrediting of the results shown by the Warnerke sensitometer, and we shall probably not have long to wait before we see a similar fiasco." But I am glad to see that he concludes the paragraph in the present paper with, "As a matter of fact, I had no such idea."

In connexion with the paragraphs marked *a* and *b*, all I can say is this, such is my confidence in the Hurter & Driffield principle, that, if plates we mark do not answer to the relative speed number marked, it is we that have, as Mr. Williams puts it, "blundered," but that the "system is right." And members of this Society know how often, from time to time, I have shown results that fully bear out this contention, that the system is right.

With regard to the isochromatic portion of the paper, I submit that it would have been better not to have imported it into this discussion at all, as it is certainly a subject that requires separate attention.

Mr. Williams, in his concluding paragraph, quotes Mr. Andrew Pringle's article, alluding to Messrs. Hurter & Driffield as saying, "If they mean that, after all, we can materially control our practical results by controlling the developer and the following operations, then no more need be said; but, with their writings before us, we must say that it is by no means clear what they do mean in the matter." Now, I really think that, if their original paper is carefully read, it will be found that they have been very careful to express what they really did mean.

They first began by asking the question, "What is a perfect negative?" and defining is as being, "mathematically, the true inverse of the original when the opacities of its gradations are proportional to the light reflected by those parts of the original which they represent."

Again, they say "their experiments conclusively show that the only control the photographer has over the development lies in securing a greater or less density of image, and that he has no control whatever over the gradations of the negative."

"That, with a well-balanced developer, there is a limit to density,

which depends upon the action of light, and that, so far, the only control the photographer has lies in deciding whether he will reach that limit or not."

"That the length of time of development does not affect the ratio of densities among themselves, but increases every density by proportional amounts."

"That during the period of under-exposure the amount of silver reduced is directly proportional to the exposure."

"That during the period of correct representation the densities are proportional to the logarithms of the exposures."

So that a negative can only be theoretically perfect by "carefully adjusting the time to the intensity of the light, that the exposures may fall within that period of correct representation."

"That thickly coated plates give a very much greater latitude of exposure." This I take to mean, in the matter of over-exposure.

"That thinly coated plates, on the other hand, need very accurately timed exposures."

And lastly, "that, when the inertia of the plate is known, it is possible to time the exposures in the camera so that the densities of the gradations are almost exactly proportional to the light intensities which produced them."

After these quotations, it can scarcely be fairly said that "it is by no means clear what they do mean in the matter."

I was very pleased to find, on referring to this leader in *Photography*, quoted above by Mr. Williams, that in the sentence immediately preceding it Mr. Andrew Pringle says: "We have, from the first, applauded and valued the investigations of Messrs. Hurter & Driffield, and it is possible that we are at one with them; in fact, of late we have begun to think we are at one."

There is only one other point that occurred in the discussion that I should like to make a remark upon, and that was Mr. Williams's remark that you could not be sure of getting the same speed number of a batch at different times. In answer to that, I can only say that I have reproduced the same number at various times from pieces of the same plate (seven times), extending over a period of eight months, with the greatest error of four per cent.

In conclusion, I should like to read you part of a letter I received on Saturday from a member of this Society, at whose request I had tested five different plates and films which were unknown to me.

He wrote: "No. 5 is one of the sample plates you sent me some time ago. In this case the Hurter & Driffield number on the box tallies *exactly* with the one now given me, viz., 75. This goes far to prove that your method of testing is accurate, as, of course, you could not know that No. 5 was your own plate. When I get back into the civilised world, I must come to you to see how you do this testing, as it certainly seems the truest that I know of."

ALEXANDER COWAN.

THE MULTIPOTENT CAMERA.

[Cardiff Photographic Society. Abridged.]

THE camera which I am to show you this evening was invented by me in February last year. It represents an attempt to make a complete camera for small plates, and has, I think, important advantages.

This machine is the first model, and those which I am now making will be better, as, until I had made and tried the first model, it was impossible to settle the best size for every part.

I had hoped that one of the three now being made would have been ready to show you, but both the mechanic who is making them and myself have had so many other things to do that we have been able to devote very little time to them. No professional camera-maker has worked at this camera, so you must excuse imperfections. The only important alteration in the new camera is that I have greatly simplified and, I think, improved the mechanism for actuating the shutter; but the store-box grooves and all the parts are more accurately made to the sizes I have found best by the experience gained with this model.

The construction will be found fully explained in my complete specification, patent No. 3680 (1892), and I shall be pleased to lend any one a copy who may wish to understand the details; but I will not weary you by reading it now, but will briefly explain the camera and method of working it, and will afterwards point out its advantages.

In the upper half of the camera is the exposing chamber. There is a rising front, which carries the lens and contains the shutter at one end, and there is a door for focussing at the other. Below the exposing chamber is a fixed store box, extending from the back of the lens to nearly the plane of equivalent focus. This store box is grooved to hold twenty-five plates; it has a door at the bottom, through which the plates are inserted, and light is excluded from the top of it by leather bands, which are attached to a slotted plate, which is covered by a sliding door.

There is an exposing frame, which traverses the exposing chamber over the store box. This is actuated by a tail piece, which passes out through the back of the camera and is hinged so as to lie down in a recess. It has twenty-five holes drilled in it (in series of five), corresponding with the twenty-five grooves in the store-box.

If I want No. 13 plate, I put a peg in No. 13 hole and push the tail piece in till the peg stops it, then invert the camera, and No. 13 plate slides into the exposing frame and, still keeping the camera inverted, I pull the tail piece fully out, and press it down into the recess against a focussing screw which will be found there. This brings the plate into true focus for whatever distance the focussing screw is set.

To return the plate when exposed I again invert the camera, and push the tail piece into the peg (which has been left in No. 13 hole), then turn the camera the right way up, and the plate falls back into No. 13 groove in the store box. If, as generally happens, I want the next plate, I put the peg in No. 14 hole and proceed as before; but, if I want a lower number, say, No. 5, I first pull the tail piece fully back and then pull the pointers, which are attached to the leather bands, and which move in a slot at the bottom of the camera, forwords, put the peg in No. 5 hole and proceed as before.

The rule for changing plates is:—*When the exposing frame is empty, the camera must be held the right way up whilst the tail piece is moved. When the exposing frame has a plate in it, the camera must be inverted whilst the tail piece is being moved.*

I fill the holes in the tail piece with coloured wax to correspond with the kind of plates in the store box. For example, ordinary plates, white; extra rapid, red; isochromatic, green; and so on. When a plate is changed the peg pushes out the wax, so that I can tell at a glance what plates have been used and what are left.

The shutter is a disc perforated with two openings, one of which is shaped so as to give equal exposure over the plate, the other so as to give more exposure to the foreground than to the sky. The disc is attached to a drum, round which two cords are wound in opposite directions, and each cord is fixed to a spring. There is a catch on the drum, which is held by triggers. There are four triggers. If the right-hand spring is pulled down and held tight by a screw, it will pull the right-hand cord and cause the catch to press against the lower right-hand trigger. When this trigger is pulled, the catch is released, the disc flies round half a revolution till the catch is stopped by the left upper trigger, and the opening, which gives more exposure to the foreground than to the sky, will have passed across the lens. For the next exposure the right-hand spring is released, and the left-hand spring pulled down and secured by its screw, and to make the exposure the lower left-hand trigger is pulled. In landscape work this opening is used for about eight pictures out of ten, but when the other opening, giving equal exposure over the plate is required, the upper triggers are pulled instead of the lower.

For time exposures the triggers are put out of gear and the disc moved by pulling down the screw. This is a simpler way of actuating the disc than in my first model. I have not tried it yet, but I believe it will work as well, if not better. In the model a rocking lever is used to pull the drum round. This I have now done away with.

I prefer not to use a finder, but to work with a spirit level in combination with the rising front. My experience, when I used a finder, was that I was very apt to get buildings all wrong, but by working with the level there is no difficulty—all one has to do is to keep the camera level and point in the right direction and the horizontal line is settled by the rising front. Usually, of course, it will come about one-third up the plate.

The following appear to me to be the chief advantages of my camera:—

1. *It is very small and portable.* The quarter-plate size, with 4½-inch rapid rectilinear lens is only 7¾ inches high, 5 inches wide, and 6⅞ inches long; equals 265 cubic inches, and yet it carries 25 plates. This is considerably smaller than most automatic magazine cameras which carry only 12 plates.

I believe the new one will weigh about four pounds. It is well balanced, the centre of gravity being under the middle instead of at one end as usual.

2. *It has a full-size ground-glass screen,* which can be carried and used when the camera is on the stand as an ordinary focussing screen. I usually carry this in No. 25 groove.

3. There is a gripping contrivance so arranged that the camera can be easily attached and detached without shaking the tripod.

4. This enables stereoscopic pictures to be taken sufficiently quickly to do most views and some groups by first taking a picture with the left side up, and afterwards another with the right side of the camera up.

5. The front rises both for vertical or horizontal pictures.

6. The focussing can be adjusted from four feet to any distance, and, unless altered for any special reason, the focussing of every plate is automatic.

7. *The plates can be changed at the rate of three a minute.*

8. *Ordinary quarter-plates, extra rapid isochromatic, films in sheaths can be carried together, as well as ground-glass focussing plate, and used in any required order. Any number can be carried up to twenty-five.*

9. The coloured wax shows clearly what plates and what kind of plates have been used, and what are left, so there is no fear of double exposure.

10. *The shutter automatically covers the lens when not exposing, and is ever set.* It will give exposures of any length.

11. *The shutter will give equal exposure over the plate, or more exposure to the foreground than to the sky, as required for each picture.*

12. *The camera is easy to use and works well.* I find it much easier to use than an ordinary camera, whether for hand or stand work.

Even with this first model there are no hitches, except when the plates are too thick. I did not make the grooves sufficiently wide for some of the thicker plates which occasionally come in a box. In the new camera that is rectified, and also the grooves are accurate, which is not the case in the first model.

13. There appears to be a singular freedom from halation. I think this is due to the construction of the camera, by which the light has to pass through the plate some little distance before it reaches any backing.

What I have done with it in the limited time I have been able to give to it I will now show you with the lantern. I think you will agree that the interior of the Cardiff Market, or the Arcade outside our rooms here, is the most difficult, as they had both to be done in about one-tenth of a second. I used *f*-5·65 and very rapid plates for them.

T. E. HEATH.

Our Editorial Table.

CADETT'S "SNAP-SHOT" AND "LIGHTNING" PLATES.

MESSRS. CADETT & NEALL, Ashtead, have sent us samples of their "Snap-shot" (125° Hurter & Driffield) and "Lightning" (140°) plates. Both kinds of plates work to a remarkable degree of rapidity—the "Lightning" especially so—and yield with normal development images of great fineness and brilliancy. It should be mentioned that Messrs. Cadett now pack some of the sizes of their plates face to face with the films uncut.

OPTIMUS OPAL PRINTING FRAME.

By PERKEN, SON, & RAYMENT.

THIS well-known firm are placing on the market an opal printing frame which is calculated to prove eminently useful to all who practise opal printing. The frame is hinged (book fashion) in the middle. In one half provision is made for holding the negative so rigidly that it cannot possibly get displaced, similar provision being made in the other wing for holding the sensitive opal plate, which can be brought into the most intimate contact with the surface of the negative and remain undisturbed throughout, no matter how often the frame is opened up for inspecting the progress of the printing. This perfection of registration will commend itself to the user. The frames are being made in various sizes.

AMATEUR PHOTOGRAPHY.

By W. L. ADAMS. New York: The Baker & Taylor Co.

THIS little volume has not been written for the scientific or practical photographer, but for the class which desires to have a popular knowledge of an art of which every person is now supposed to know something. It forms in a large measure a reprint of popular articles written for the *Christian Union* and *Outing*. We think the author does not do his countrymen full justice in saying that instantaneous photography is but a few years old, and that it was only made possible by the introduction of gelatine plates, for not only have instantaneous street views of New York taken by collodion been reviewed in this JOURNAL nearly a quarter of a century since, but the taking of such pictures has been specially referred to in Snelling's New York publications in 1853. The *brochure*, however, forms pleasant popular reading.

THE NEW CATALOGUE OF MORGAN & KIDD, RICHMOND, LONDON, S.W.

THIS is a most useful and comprehensive price list of all the specialities of this firm, which are now of a very extended nature. Comprehending their argentic gelatino-bromide papers for enlargements and contact prints; enlarging apparatus and materials; dry plates and oil paintings on canvas, with or without photographic base; enlarging on every practicable medium, whether canvas, opal, or paper; miniatures on ivory; platinotype, collotype, mounts, and even frames, all find place in tabulated form in this well-arranged price list.

THE Brighton Enlarging Company, of 57 and 58, Clarence-square, Brighton, are issuing a revised trade price list of enlargements in carbon, bromide, platinum, &c.; copying and negative making; printing in silver, bromide, &c.; and painting in oils and water-colours. The prices appear to be very reasonable. We note with pleasure, as evidence of the progress of trade printing at the Queen of Watering-places, that the Company has an installation of electricity for lighting and drying purposes.

THE Imperial Dry Plate Company, Cricklewood, have issued a booklet containing the formulæ which the Company consider the best to use with their plates, as well as hints regarding the dark room, exposures, taking the negative, toning, &c. The information and hints are in such a form as to be very useful, not only to users of the Company's excellent plates, but also to photographers generally.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 7743.—"Improved Method of Photographing in Colours." J. JOLY.—*Dated April* 17, 1893.

No. 7851.—"Improvements in Photographic Printing Frames or the like. F. L. PERKEN, E. T. PERKEN, A. RAYMENT, and H. HUNTER.—*Dated April* 18, 1893.

No. 8122.—"Magazine Plate-carrier Slide and Changing Box." J. G. REID.—*Dated April* 22, 1893.

SPECIFICATIONS PUBLISHED.

1892.

No. 6243.—"Camera." WILLIAMS.
No. 9721.—"Photography." E. S. & J. S. LAUDER.
No. 12,029.—"Regulating Photographic Shutters." HILL & ADAMS.
No. 13,926.—"Photographic Cameras." PARSONS.

PATENTS COMPLETED.

IMPROVEMENTS IN AND RELATING TO FILM PACKAGES FOR PHOTOGRAPHIC CAMERAS.

No. 8650. B. J. EDWARDS, The Grove, Hackney, Middlesex. *March* 4, 1893.

MY invention relates to film packages for photographic cameras and roller slides, and to means for adapting my improved packages to be used in ordinary roll-holders or cameras.

One object of my invention is to provide a light-tight film package for roller slides, which may be used in existing cameras or roll-holders, and changed in daylight, and which packages will take the full width of film for which such cameras or roll-holders are constructed.

Another object of my invention is to make the film packages interchangeable, so that in existing cameras the empty roller, with its sheath, can be changed and used as a receiving roller.

According to one part of my invention, I provide a film package so constructed that the extreme length of the said package exceeds but a very trifling amount the width of the film to be contained therein, and so mount the roller in a sheath that no light shall be admitted to the interior of the package. To this end I construct my improved packages with special end pieces or caps of very thin material, which also serve as efficient bearings or support for the roller, and also allow of the roller being rotated from the outside of the case.

My improved package comprises a roller on which the film is wound, and a sheath or covering for enclosing the film and protecting the said film from light. The sheath or covering is made of cardboard or other suitable material shaped or folded so as to form a hollow tube having a slit or opening throughout its entire length, through which slit the film is drawn. This slit is made light-tight by binding its edges with strips of velvet or the like. I provide the folded sheath or covering with end pieces constructed of very thin material, preferably of thin sheet metal, which can be very cheaply produced of the required shape by stamping. The bearings I form as follows:—I provide an annular recess in each end of the roller, and I stamp or otherwise form a central circular opening in each cap or end piece, and turn inward the edges of the said openings so as to form flanges which fit into the said annular recesses in the roller and serve as bearings therefor. The outer edges or rims of the said caps are turned or flanged inward to fit tightly over the ends of the sheath

or covering. By this construction I not only utilise the full length of the roller for the film, but I avoid, in a simple manner, all risk of the light finding its way into the covering and so spoiling the film. I construct one or both ends of the roller to form a clutch to engage with the fittings of the camera or roll-holder, thereby enabling the roller to be turned from the outside of the case by the winding key.

In order to enable my improved light-tight film packages to be used in roll-holders or cameras as usually constructed, which are not adapted for being charged or refilled in daylight, and in which the fittings of the discharging and receiving rollers are not of a uniform pattern, I provide a device which I term an "adapter." This device is adapted to fit without turning in the end of my improved spool or roller, and is shaped at its outer end to fit on the usual key or clutch of the receiving roller of the ordinary roll-holder or camera. This "adapter" can be arranged to fit or connect with any kind of clutch, and is removable or interchangeable. By means of this device my film packages can be used in existing cameras and the empty spool or roller with its light-tight case may be used as a receiving roller, the ordinary receiving roller being dispensed with. When the receiving roller is full, it can be removed and an empty spool with its light-tight case put in its place, the "adapter" being changed from the full roller to the empty one.

The claims are:—1. A film package or case having a roller provided with an annular groove in one or both ends, to form a bearing surface or bearing surfaces on which the roller can turn for the purpose specified. 2. A film package or case provided with caps or end pieces having annular interval projections to form bearings for the roller, substantially as described, for the purpose specified. 3. In a film package or case, a roller having an annular groove formed in one or both ends, forming bearing surfaces for the roller, in combination with end pieces having central openings, the edges of which are turned inward and are adapted to fit in the said annular grooves for the purpose specified. 4. The combination with the light-tight sheaf or covering and the roller, of thin sheet metal or other suitable end pieces, having rims adapted to fit tightly on the sheath and central circular openings, the edges of which turn inward and are adapted to enter annular grooves in the ends of the roller, and form bearings for the roller, with or without other fastenings to hold the ends in place, substantially as described for the purpose specified. 5. A light-tight film package or case provided with internal annular bearings for the roller, which enable the roller to be rotated from outside the case, substantially as described. 6. A light-tight film package or case constructed substantially as described with reference to the drawings. 7. In a roller slide a movable "adapter," which enables the rollers to be interchanged, substantially as described. 8. The combination of the light-tight sheath, its end pieces, the roller, and a sensitive film wrapped on the roller, substantially as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 1	Camera Club	Charing Cross-road, W.C.
,, 1	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 1	Peterborough	Museum, Minster Precincts.
,, 1	Putney	High-street, Putney.
,, 1	Richmond	Greyhound Hotel, Richmond.
,, 1	South London	Hanover Hall, Hanover-park, S.E.
,, 1	Stereoscopic Club	Brooklands Hotel, Brooklands.
,, 2	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 2	Bolton Photo. Society	10, Rushton-street, Bolton.
,, 2	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 2	Exeter	City Chambers, Gandy-st., Exeter.
,, 2	Hackney	206, Mare-street, Hackney.
,, 2	Herefordshire	Mansion House, Hereford.
,, 2	Lewes	Fitzroy Library, High-st., Lewes.
,, 2	North London	Canonbury Tower, Islington, N.
,, 2	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 2	Paisley	9, Ganze-street, Paisley.
,, 2	Rotherham	5, Frederick-street, Rotherham.
,, 2	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 2	York	Victoria Hall, Goodramgate, York.
,, 3	Edinburgh Photo. Society	38, Castle-street, Edinburgh.
,, 3	Leytonstone	The Assembly Rooms, High-road.
,, 3	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 3	Southport	The Studio, 15, Cambridge-arcade.
,, 3	Southsea	3, King's-road, Southsea.
,, 3	Wallasey	Egremont Institute, Egremont.
,, 4	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 4	Camera Club	Charing Cross-road, W.C.
,, 4	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 4	Glasgow Photo. Association	Philoso. Soc. Rooms, 207, Bath-st.
,, 4	Glossop Dale	
,, 4	Hull	71, Prospect-street, Hull.
,, 4	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 4	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 4	Oldham	The Lyceum, Union-street, Oldham.
,, 4	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
,, 5	Cardiff	
,, 5	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 5	Holborn	
,, 5	Leamington	Trinity Church Room, Morton-st.
,, 5	Maidstone	"The Palace," Maidstone.
,, 6	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

April 25,—Technical Meeting,—Mr. T. Sebastian Davis in the chair.

The Hon. Secretary exhibited and explained a model of a new hand camera by Messrs. Campion & Delacre. It has a reflecting mirror inside, so that the image can be seen of the size of the original. The principal movements are effected by working a lever at the side of the camera, which first of all uncovers the lens, then covers it up, actuates the shutter, and changes the plate. It was said to be possible to expose a dozen plates in twenty-five seconds in this camera.

"The Manufacture of Gelatine Dry Plates."

Mr. J. Desiré England gave a practical demonstration of gelatine emulsion-making, saying that if no great rapidity was desired, the first process he should describe was a very simple one for the purpose. Sensitiveness depended upon the formula and method of working, as well as many small details. The preparation of an emulsion might be divided into three stages—the mixing, the emulsification, and the washing. The gelatine for the first stage should be of a soft kind, such as Nelson's No. 1, and for adding to the emulsion a hard kind, such as Heinrich's or Drescher's. Having reviewed the stewing, boiling, and ammonia methods of emulsification, he gave the following formula, recommending a temperature of 110° to 120° Fahr., for mixing Nos. 1 and 2.

1.

Potassium bromide	90 grains.
Potassium iodide	3 ,,
Soft gelatine	20 ,,
Hydrochloric acid	2 minims.
Water	1½ ounces.

2.

Silver nitrate	120 grains.
Distilled water	2½ ounces.

3.

Gelatine (hard)	150 grains.

The silver solution was passed slowly into the bromide solution through a plug of cotton wool placed in the neck of a funnel, the wool also acting as a filter, the bulk of the gelatine being added afterwards. The acid obviated fog, which would be caused by the gelatine and bromide of potassium being alkaline. When first mixed, the emulsion should be of a ruby colour by transmitted light, showing that the particles of bromide were in a finely divided state; the colour passed by boiling for an hour or so to violet, blue, green, grey, but the latter should be avoided or the plates would fog. Mr. England then gave the following formula for an ammonia process which, he said, gave great rapidity, and was due to Mr. Henderson, a great authority on the ammonia method:—

1.

Soft gelatine	20 grains.
Potassium bromide	180 ,,
Potassium iodide	3 ,,
Water	4 ounces.

2.

Silver nitrate	240 grains.
Distilled water	4 ounces.

3.

Gelatine	360 grains.

No. 2 is converted into silver ammonio-nitrate with the strongest liquor ammonia, and 1 and 2 mixed at 105–110° Fahr. The emulsion should be placed in a vessel, and in three quarts of water at 130°, and when the water has cooled the emulsion might be considered sufficiently rapid.

Mr. England then recapitulated the various methods of washing, demonstrating the process by squeezing some set emulsion into fine shreds through some mosquito netting into the wash water. After washing for four or five hours in different changes of water, it is melted at 110°, five per cent. of methylated spirit and from one-eighth to one-quarter grain of chrome alum per ounce added. It is then filtered through swansdown, which, tied over one end of a lamp-glass, Mr. England finds a useful filter. He recommended coating with the emulsion at a temperature of 100–105°, and for drying said nothing answered better than the drying box suggested by his father, Mr. W. England, several years ago.

Most of the points mentioned in his address were demonstrated by Mr. England, who was thanked by the meeting. A discussion took place, but no new point of interest was elicited.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

April 20,—Mr. E. J. Wall in the chair.

Messrs. F. B. Shaw and T. J. Honeybourne were elected members.

Determination of Plate Speeds.

The adjourned discussion on Mr. G. F. Williams's paper was resumed by Mr. A. Cowan, who read a reply thereto [see p. 262].

Mr. James Cadett said he had had an opportunity of reading Mr. Williams's paper in print, which began with an attack on the Hurter & Driffield system and finished with a personal attack on a platemaker, of which he (Mr. Cadett) did not know the true motive. Therefore perhaps Mr. Williams would say, as there was a general idea that he was connected with the Ilford Company, and had written in *Photographic Scraps* as "Technique," whether he was in the pay or the employ of any platemaker whatever. He asked the question because there seemed to some animus on Mr. Williams's part. Mr. Williams, in his first paper, condemned the system, but in the second he altered his conclusion, saying, "If these plates" (the plates he had tried) "had ever been submitted to an examination in an instrument of precision, such as we are led to believe the Hurter & Driffield modification of Bunsen's photometer is, then I say, if the system is right, the plates are wrong, and the examiners either do not understand the system or have blundered." It showed a very poor decision on Mr. Williams's part if he was unable to decide where the fault was. If Mr. Williams was unbiassed, he might have suggested that the apparatus was wrong, or that some matter had upset the results which would not destroy the theory. He had said elsewhere that he did not care to accept his (Mr. Cadett's) challenge, knowing that the theories of both of them were so wide apart, but Mr. Williams had never given his view of the theory. Mr.

Williams said he did not believe the statement with regard to the densities, or rather of the opacities, being proportional to the exposure, therefore the theory was wrong. The whole theory of the system was that the opacities were directly proportional to the intensities of the light that produced them. That was either right or wrong, and if Mr. Williams said it was wrong, perhaps he would tell them why. Mr. Williams had pointed out the admission of an error on their part. It was true that in December he and Mr. Cowan had admitted errors of twenty-five per cent. with the standard candle, but that was stated in *Dry Plates* before Mr. Williams's paper appeared. As regards what Mr. Driffield had said as to orthochromatic plates, he wished to qualify what he had told them. He had made no systematic or exhaustive investigations on the subject. In the few instances of orthochromatic plates tested, he had found the speed ascertained by candle to be confirmed in the camera. Having complained of Mr. Williams's tone with reference to orthochromatic plates, Mr. Cadett said he had not conveyed that orthochromatic plates were not orthochromatic. They clearly were so. Last week at the Camera Club Conference, he had attended Captain Abney's and Mr. H. M. Elder's lectures on the speed of plates, and he was exceedingly pleased to find that they both confirmed the general accuracy of the Hurter & Driffield system. Captain Abney was a strong opponent of the system, but it was a pleasure to argue with him. He (Mr. Cadett) could confirm what Mr. Cowan had said as to the system being right. Mr. Williams said the system would probably be thrown up. Mr. Williams was wrong. They wanted figures before them before they gave it up. At the previous discussion Mr. A. C. Edwards remarked of the two plates passed round by Mr. Williams, one of which was developed more than the other, that any one could see that one had had a little more exposure than the other, and asked why Mr. Williams should have forced it. Even among two opponents of the Hurter & Driffield system, they found very considerable divergence. With regard to the Warnerke system, there were two reasons why it was not successful; one was the practical difficulties of making the screen, and the next was that all those who used it found that if they judged the exposure by the last few faint tints, it did not agree with the camera tests. In Mr. Williams's tests he went for the last faint tints and those only. In using the screen we got into that very period of under-exposure which Hurter & Driffield pointed out. We used to get into the habit of including the last five figures, and try and judge by the row immediately preceding them. Messrs. Hurter & Driffield said that, theoretically, the point chosen by them to indicate the speed of the plate was not the correct one; it was a sort of geometrical mean in the densities, but practically it would not be easily found, so that they carried the line to the base, and made a constant. Those who found fault with the figures in the Warnerke system were trying to get at what Hurter & Driffield had got at. In testing plates to-day, they only found a very small period of correct exposure, all the rest was either over or under-exposure. The result was, that unless we took a range throughout the speed, it was quite impossible to tell what the correct speed was. During the last two days he had tried some foreign orthochromatic plates with regard to the Hurter & Driffield system. He found that the period of under-exposure was so enormous, that he practically got two straight lines in the two cases.

Mr. W. E. DEBENHAM said that, with regard to the question of orthochromatic plates, the use of a candle was really equivalent to that of a screen; the light contained some blue, but it was very rich in yellow. If a plate was found which bore the same proportion to candle-light and daylight, it should not be called orthochromatic. Those who have affirmed that they find no difference, should make some conclusive tests, and show them to be similar. His impression was they would come out as from 4 to 10 : 1.

Mr. CADETT did not find that the orthochromatic plates he had tried were very slow in the camera.

Mr. COWAN had cut two standardised plates in half, and taken two medium and two instantaneous isochromatic plates. One of each three was exposed to candle-light without any screen. Upon measuring, the ordinary plate came out 1·15, the medium isochromatic 1·1, the instantaneous ·55, practically double the speed of the medium. Then he had exposed the other three, using the yellow cap and the readings were respectively, ·80, ·775, ·475, so that the three plates practically kept their same relative rapidity with the glass that they did with the candle.

Mr. CADETT had witnessed measurements of orthochromatic plates by the spectrum, when it was found that their sensitiveness to yellow had increased 500 times.

Mr. DEBENHAM understood Mr. Cadett to say that he found the camera not accurate. If by comparison with Hurter & Driffield's tests it was not accurate, then that system must be wrong. Mr. Cadett had spoken of the Warnerke sensitometer giving incorrect results if we took the last few figures. On that point Mr. W. K. Burton and he made some experiments several years ago, proving that if the last few numbers on the Warnerke screen came very much alike they ought to be disregarded, and that they ought to take the point where there appeared to be a decided increase. Messrs. Hurter & Driffield had done a very good thing in carrying that idea out, and showing where the point of departure should come. As regards Mr. Cadett's question to Mr. Williams as to whether he wrote for *Photographic Scraps* as "Technique," he would ask Mr. Williams in consideration of journalistic etiquette not to give any reply to the question.

After some remarks from Mr. J. B. SPURGE, who said he got the same shape of curve with any system, and who promised to develop the subject of his remarks on a future occasion,

Mr. ASHLEY COWAN read the following remarks on the subject:—In Mr. Williams's original paper he mentions that, "when the unreliability of Warnerke's sensitometer became apparent, our plate-makers quickly relinquished the issue of plates bearing any actinometer or sensitometer number, and a pretty general return set in to using the old nomenclature, such as ordinary, medium, instantaneous, drop-shutters," &c. And Mr. Williams further remarks that the description given to their plates by makers of good brands is such as probably fulfils all present requirements; the name fairly indicates the speed, and in the absence of any reliable method is actually preferable to misleading numbers. Now, I think that Mr. Williams, if he always made his exposures according to these names only, would find himself more at sea than if he went by these numbers; for to suppose that plates issued as ordinary or special, or whatever title it may be, by different makers, should of necessity be of the same speed, is out of the question, and, as has been the case this last year, where plates of even the same brands have been probably nearly doubled in speed. It is rather surprising that Mr. Williams (who in the commencement of his original paper) regrets that in photography we have no apparatus for the nicety of measurements such as we have in kindred sciences, should be content to judge his results in an unscientific manner when he can have at his command a system based on scientific principles, and which has taken years of patient thought and experimenting to build up and give as it was freely to the world for the advancement of the science of photography. The fact that the conclusions arrived at by Messrs. Hurter & Driffield are at variance with the ideas of Mr. Williams and other photographers does not of necessity in any way invalidate their system, any more than the old idea that the earth was flat did not in the least alter the fact that it was round all the time. And I hope in the same way we shall have Mr. Williams, when he has gone more carefully into Messrs. Hurter & Driffield's system, and worked it out for himself with the proper instruments, that he will find there is more in the principle than he at present thinks. Mr. Williams, I suppose, will admit that for every plate exposed, on whatever subject, there must be within the limits of the plate and the subject some correct exposure, and I should think he would admit that the more data that can be given to enable the operator to correctly judge that exposure the more nearly will his result approach perfection. Mr. Williams took objection to Messrs. Hurter & Driffield's photometer, and said that he found that he could not read the same with precision within two or three degrees. Claiming perhaps to have made as many readings with this instrument as any one, I must emphatically say that, if readings cannot be made within five per cent. of error, it is the fault of the operator, and not the instrument; only, of course, it cannot be expected that the first time any one reads with an instrument of this sort that they can at once master all the technical difficulties that have to be contended with, any more than if we set a novice to weighing in a chemical balance, and expect him to do it off correctly at once. Mr. Williams will, I should think, admit that when a new system is brought out, and a system which requires a certain amount of experience to work, it is not to be expected that, at the first go off everything is to be perfect. It must of necessity be a work of time to find out and rectify any little difficulties that may be met with, and, if any errors have occurred at the outset, they are surely not sufficient evidence to bring forward against the system itself. Mr. Wilson mentioned that he thought Messrs. H. & D.'s system was correct, within certain limits, but that development and temperature might affect the result. It was for this very reason we recognised the necessity that all who used this system should work with a developer of fixed proportions for a fixed time and at a fixed temperature, and we hope to be able in time to give a numerical value corresponding to alterations in development and temperature. But it must be understood that those who use this system and wish to work to the same standard of speed should carry out all their tests under precisely the same conditions. Dr. Hurter at the Camera Club very ably expressed in the form of an equation the different factors which governed the negative or as he expressed it, R the result.

$$R = I, L, T (S) D, t', \phi.$$

He shows that R, the result, is governed by the following factors:—

First, the I or intensity of the light;
T, time of action of that light;
L, lens which reduced it on to the plate.

These for simplicity we may call (E) or exposure. Then we have the speed of the plate (S):—

(D), development;
(t'), time of development;
ϕ, temperature of development.

∴ We have an equation,

$$R = E, (S), D, t, \phi;$$

So that here we see Messrs. Hurter & Driffield do admit there is control of the negative.

From this equation we know that, keeping all conditions the same, our result, R, must be the same.

And therefore, to get always the same value for S, the speed of the plate, we must keep the remaining factors constant. Then, when we know the speed of the plate, we can find what alterations we can get in R, our result, when we vary either E, D, t, or ϕ. So that here we have a very valuable stepping-stone to enable us to estimate the value by different alterations in development, temperature, etc., what we certainly did not have, before Messrs. Hurter & Driffield gave their valuable discovery to the world.

Mr. P. EVERITT said that the difference of results which Mr. Williams had noticed when compared with Messrs. Cadett and Cowan's might be largely due to the manner of procedure. Mr. Williams, perhaps, had not been accustomed to using Messrs. Hurter & Driffield's instruments, of which Messrs. Cadett and Cowan had had extensive experience. Mr. Williams was in the position of a man with a delicate chemical balance, who was used to weighing with a chandler's-shop scales. A person who judged densities as Mr. Williams had done was in that position. [Laughter.] They must also bear in mind that, if the Hurter & Driffield system was based on the standard candle, it had a variable balance to work on. It did not militate against the system if the results varied. The difference lay in the instruments used rather than in the system.

Mr. DEBENHAM remarked that if Mr. Everitt had been aware that Mr. Williams was one of the earliest experimenters with rapid plates, he would have withdrawn that observation.

Mr. EVERITT did not mean to make the observation with any personal intent.

Mr. WILLIAMS, in reply, said he felt he must not touch upon all the subjects raised, or they would not get away that night. As to Mr. Cowan's remarks

on the jury, what he (Mr. Williams) had said had been misunderstood. His (Mr. Williams's) proposal was that the jury might be selected by those gentlemen who were in opposition to him, and for them to nominate it. He was prepared to repeat his experiments before that jury. He had not the slightest doubt that there was a considerable number of blunders made in the estimation of the speed of plates. The only course open to him was to judge by the plates that came into his hands. As regards the orthochromatic part of his paper, that was at his (Mr. Williams's) option. Mr. Cadett's remarks were extremely weak. He (Mr. Williams) had spoken of crass ignorance or wilful perversion, and he had not backed out of it, and did not mean to alter his phraseology. Messrs. Hurter & Driffield's definition of a negative was wrong and incorrect, and it had been pointed out to them. They had said that we had no control over the ratios of densities, but they were climbing down. With reference to their ten years' experiments, had we not known other people who had given more time to subjects which have proved myths, such as perpetual motion? Mr. Cadett in his remarks said that density and density alone is how we must judge of the rapidity of plates. He (Mr. Williams) said they could not judge of the rapidity of plates by their densities. As to the standard candle, Mr. Cadett admitted its inaccuracy, and said he is investigating a light himself. If the Hurter & Driffield system was perfect, what was the necessity for a further standard light? If the system was correct, any uniform light should do. Then as to the photometer; probably not half a dozen gentlemen present had used it, and could not know the difficulties there were in using it. It was extremely difficult to read densities by it, and you might arrive at any conclusion you liked. One was likely to arrive at different conclusions every time plates were measured, and be too ready to adopt suggestions of any one standing by. The instrument was about five inches in dimension in each direction, and two paraffin lamps were used. It was extremely difficult to read the densities with anything like an approach to accuracy, and after reading them you had to plot them out on a chart [shown] and had to make a straight line come somehow. Personally, he would rather rely on his own estimation. His first articles in THE BRITISH JOURNAL OF PHOTOGRAPHY had been published because he was opposed to the principles of Hurter & Driffield's system, and desired to investigate their investigations. He would answer Mr. Cadett's question. He was not in the pay of any platemaker, nor had he been, and he had no animus in the matter. His motives had been misunderstood. He had a decided belief that the Hurter & Driffield theory was wrong, and the only way open to him at the moment was, when he saw plates speeded by their method, to test them. If they had been correct, he would have adopted the system. He had found discrepancies of about sixty-five per cent., and nothing was said about that; a great deal had been said about the ten per cent. on the two plates he had shown, which proved that manufacturers themselves did not agree on speed. Probably nobody but Dr. Emerson was flabbergasted by the Hurter & Driffield theory until plates speeded according to it were issued. After touching upon other points raised, Mr. Williams said that, if Mr. Ashley Cowan would give the speed numbers correctly, he (Mr. Williams) would adopt the system. He had heard a gentleman say that the Hurter & Driffield method was good for the platemakers, because the users did not know whether the speeds were right or wrong. In conclusion he said :—"I don't believe that light is the sole controlling factor in producing a negative, or that density is to be taken as an indication of rapidity; or that the ratios are unaltered by development, or that a candle is a suitable light when wishing to ascertain daylight densities. When we buy plates, it is for exposing in the camera; but we must not judge of them ourselves, but submit them to this machine and take Hurter & Driffield's speed!"

Mr. FRANK BISHOP said it appeared to him that Mr. Williams's experiments had been singularly unfortunate, as they had been made with plates that had been admitted to have been wrong in speed, and therefore Mr. Williams's arguments were wrong. His firm would give Mr. Williams six of their plates differing in speed considerably, and the same batches should be given to that Association for testing, and this would prove that the speed numbers were right.

After other remarks, a vote of thanks was passed to Mr. Williams, and the discussion terminated.

North London Photographic Society.—April 18, Mr. W. Walker in the chair.—The HON. SECRETARY said that with the fixing bath of ordinary strength he did not find amidol-developed prints lose density, and he showed a print which had been treated as follows :—After exposure the print had been cut into halves, one of which was developed with amidol and the other with eikonogen as equally as possible. The print being then cut into quarters, two of them, one by each developer, were left in the fixing bath for half an hour, and the others for one hour. After washing, the print was then mounted, and no sign of reduction was apparent in any part. Mr. F. HART then gave a demonstration on *The Chemical Treatment of Prints after Fixing*. He said the treatment referred to had for its purpose the elimination of hyposulphite of soda from the prints by chemical means instead of by the prolonged mechanical washing, which latter method was uncertain in bringing about the desired result, and generally brought about an undesired result by deteriorating the brilliancy of the prints. He had demonstrated his process to his fellow-members of the Society some years ago, but, in compliance with a request, he had pleasure in bringing it again before them; the more so, as only recently had he ascertained its usefulness in the manipulation of the gelatino-chloride and bromide papers, which had come into use in recent times. He had brought prints on albumenised, developed bromide, and printing-out gelatino-chloride papers. After fixing they had been washed in three changes of water, for two or three minutes in each water. He had a bottle of the third washing water with him, which he would presently show was well charged with hypo. The tray into which he was now about to put the prints contained a solution composed of thirty minims of his hypo eliminator (a special preparation of hypochlorite) to ten ounces of water. An iodide test paper, prepared with iodide of potassium and starch, dipped into this bath, was coloured a deep blue, caused by the production of iodide of starch. This paper, being then put into some of the third washing water just mentioned, was deprived of the colour, showing the presence of hyposulphite of soda in the water. The prints were then placed in the bath for five minutes. A test paper was not then so deeply coloured by it as at first, showing that the hypo in the prints had attacked the iodide in the solution, and rendered it less powerful to produce iodide of starch. The bath was then poured off and another of the same strength poured over the prints, in which they were left for another five minutes. A test paper then dipped into this bath turned the same deep-blue tint as the one dipped into the fresh solution, showing that there was then no hypo left in the second bath. The prints were then removed to a bath composed of twenty minims of strong ammonia to five ounces of water. The ammonia bath combines with the remaining eliminator, and there are left small quantities of chloride of sodium, ammonium, and sulphate of soda only in the solution, which are all removed by the final rinsings, and traces of which are of no more harm than the natural salts of ordinary tap water. After remaining in the ammonia bath for five minutes, the albumen prints were rinsed in two or three changes of water, and were then ready for mounting. The gelatine prints can be put into an alum bath for a short time before the final rinsings. The whole process takes about thirty minutes. Mr. BISHOP: The action of the hypo dissolves the unaltered chloride of silver and produces a double hyposulphite of silver, which is redissolved by the hypo, and is then perfectly soluble and can be washed out. If instead of washing out you eliminate the hypo which holds the silver in solution, it would seem that the silver must be dropped in the process, and this left in the print would be deleterious. Mr. HART: Not exactly so. The first action of the hypo is to produce hyposulphite of silver; this, in presence of an excess of sodium hyposulphite, forms the double hyposulphite of sodium and silver—a salt soluble in water. Now, in adding the eliminator, the hyposulphite is first converted into sulphate, and the trace of silver into chloride in presence of sodium chloride, and then the ammonia bath takes up the traces of silver chloride which is cleared away in solution. Mr. PARFITT: Under the ordinary process of washing, is there no way of ascertaining if there is any hypo left in the print? Mr. HART: You cannot very well arrive at it without destroying the print; you can test the washing water by letting the prints drip into water, and then generate hydrogen from that by pure zinc and hydrochloric acid, allowing the resulting hydrogen to impinge on lead paper. If the paper is discoloured, you know you have sulphur coming off, and by inference the solution contained sodium hyposulphite. Mr. BISHOP usually tested the washing water with the permanganate of potash test. Mr. HART: That is not a delicate test, as any oxidisable organic matter found in water will act on the permanganate. In answer to questions, Mr. Hart said that his process was a safeguard against blisters, and that it could be used for negatives as well as for prints. He had used it now for just upon thirty years with uniform success. As a word of warning, in conclusion, he would say, When you know that your print is free from hypo, see that the card you are going to mount it on, and also the mountant, are above suspicion.

North Middlesex Photographic Society.—April 24.—Mr. J. Matthews read a paper on *Retouching*, dealing with the subject not so much from the technical side as from the art point of view. He exhibited on the screen a number of slides from untouched negatives, and went fully into their defects, showing how a high light should be strengthened here, a shadow toned down there, and an unpleasant expression modified in another place, and then showing another slide from the same negative, after retouching, from which the practical value of the hints given could be seen. He stated, incidentally, that he preferred Faber's pencils to work with, and found he could do all he required with Nos. 2 and 3. He also went fully into the subject of matt varnishing and colouring on the back. The award for the best picture taken at Strand-on-the-Green was gained by Mr. H. Smith, and that for Waltham Abbey by Mr. S. E. Wall. The next meeting will be on May 8, when a demonstration of the carbon process will be given by the Autotype Company. Visitors are welcome.

Hackney Photographic Society.—April 18, Mr. J. O. Grant in the chair.—The Hon. Secretary invited members of the Society to join the new Central Club. Mr. T. J. Jones was nominated for membership. From the question box: "How to intensify an under-developed hydroquinone negative?" Mr. S. BECKETT said: "Use acidified mercury chloride, followed by cyanide of silver and potassium." The CHAIRMAN said he would use mercury chloride, followed by ammonia; had not found negatives fade. "How to strip a film without enlarging?" The HON. SECRETARY thought alum would prevent expansion after stripping. Mr. R. BECKETT suggested methylated spirit. Work was then shown by Messrs. J. S. Beckett, R. Beckett, Sodeau, T. H. Smith, Moore, Perry, Nunn, Dean, and Cross. Owing to some discussion having ensued at the previous meeting respecting the power of getting density with amidol, Mr. Sodeau was called upon to demonstrate that density was easily obtainable. The Hon. Secretary had requested some negatives to be brought up, having received varying exposures unknown to Mr. Sodeau, and the latter, with amidol, used dry, and twenty per cent. sulphite soda solution speedily and successfully obtained plenty of density. He said, in over-exposure he would use more amidol, and advocated, too, the use of citrate of soda (twenty per cent. solution), half-drachm to the ounce.

Putney Photographic Society.—Mr. H. Faulkner in the chair.—Mr. S. HERBERT FRY delivered a lecture on the *Sandell Plate*. Mr. Fry said it would not be necessary to take up the time of the meeting by demonstrating the development, as the process presented no special features as compared with any ordinary plate. The "Sandell" plates were made of two kinds, the "General" and the "Especial," the former having two films, the latter three. Each film was of a different speed, the slowest being nearest the glass in each case. For most purposes the "General" would meet all requirements; the "Especial" was necessary only for very difficult subjects, such as dark interiors, with windows opening on a bright light, where the shadows would require exposures hundreds of times longer than the best lighted parts. In manufacture the glass plates are first coated with an extremely thin film of the slower emulsion, which is allowed to become quite dry before the rapid films are added, each in turn being allowed to dry before the next is applied. The films were thus not in chemical or even mechanical contact with each other. Mr. Fry explained that the action of the films would be as follows :—The rapid

film would receive the first impression of the image through the lens; in case of prolonged exposure this film might be correctly exposed for the deepest shadows, and more or less over-exposed for the other parts; the developed film would therefore show full detail and correct density for the shadows, the other parts would show the usual symptoms of over-exposure, being practically clear glass in the highest lights. Now, as regards the second film. Each being very thin, the light will penetrate the first and act on the second, and the latter, being slower, will probably be about correctly exposed for the half tones; on development the shadows would be found to be nearly clear, and the sky probably somewhat lacking in density. To the third film somewhat less light will have penetrated, and, being slower than the others, all parts of the surface except the high lights will be under-exposed, and therefore develop up more or less as clear glass, whereas the high lights will have full density. When the three films are now considered as a whole, it will be found that the resulting negative will have full detail in the shadows due to the first film, being backed in these places by the clear glass of the second and third. The second film will give detail and density in the half tones, the first helping it as regards detail, and the third as to density in case of it having been perhaps a little over-exposed. The third film will give the required density to the high lights, the first and second having lost most of it owing to over-exposure, but will, on the other hand, retain detail. Obviously, the two extremes to be guarded against are exposures so short that the first film is not sufficiently acted upon, or so excessively long that even the last film is over-exposed. The first contingency is the most likely to happen, although it is claimed for the plates that they are as rapid as any in the market. Over-exposure is almost impossible, as the latitude with the triple and even with double film is simply enormous. As an example, it was mentioned in the course of the discussion which followed the lecture, that three plates had been exposed by a member of the Society on the same subject, one receiving one-twentieth, the other one, and the third twenty seconds' exposure, the range being 400. The three plates were developed in the same developer, and gave very presentable negatives. Mr. Fry stated that, in modifying the developer, even this remarkable range might be exceeded without materially affecting the resulting negatives. It might at first sight appear that there would be little or no advantage in using these plates for very short exposures, as probably only the rapid outer film might be brought into action. This was, however, not the case, as the entire absence of halation gave a roundness and vigour to the image which could not be obtained by any other plate to the same degree, even when backed in the most effective manner. In order to take full advantage of the qualities of the plate, it was in contemplation to use so rapid an outer film as could not possibly be worked on any ordinary plate, as such a film could not by itself be made to give the necessary density by any known developer, the difficulty of obtaining density being at present the obstacle which limits the speed of plates coated with only one emulsion. Mr. Fry gave the formulæ sent out with the plates, and remarked that they also appeared to work very well with others in general use. The particular formula had certain advantages, among others that it did not soil the hands; it was well worth a trial, and he urged its adoption. The development did not present any special features. It might with advantage be carried on tentatively, starting with a somewhat weak developer and increasing the strength as required. By this method the top film was kept free from fog, and progress could be more readily judged. If the developer happened to be too active, the image on the first film might flash up and fog over as usual with over-exposure; but this by no means meant that the negative would be a thin or poor one. Development should be proceeded with until the necessary density was obtained, and this could be judged by transmitted light in the usual way, and the worst that would be found to have happened would be that the outer film might be slightly veiled over; but this would not affect the printing qualities of the negative in any other way than slightly retarding the operation. It was necessary to use a strong fixing bath —eight ounces of hypo to the pint of water was recommended. Mr. Fry exhibited specimen prints and some of the negatives from which they were taken, both "General" and "Especial," and they fully bore out the claims made. The interiors, many of which were taken under extremely trying conditions, were entirely free from every trace of halation; full detail was given in the deepest shadows and highest lights, and the half-tones and gradation were excellent. There was also a roundness and relief which are too often absent from prints from ordinary negatives. Snap-shots, showing people and animals in rapid motion, yachting, wave studies and scenes from the seaside full of life and animation, clearly showed the capacity of the plates as regards speed; their sharpness proved beyond argument that the shutter had been used at a high velocity, and their technical excellence was a tribute to the high character of the other qualities of these plates.

South London Photographic Society.—April 17, Mr. H. G. Banks (Vice-President) in the chair.—Mr. Moss reported that, in using Mr. Warnerke's developer for gelatino-chloride paper, he found that xylonite dishes were dissolved by the acid, and at the same time discoloured the pictures. Mr. H. G. Banks exhibited a number of slides illustrating the scenery on the Pennsylvania Railway. Mr. John A. Hodges, President of the West London Photographic Society, apologised for not being able, owing to an accident to his slides, to deliver his lecture on *North Wales* in its entirety, but brought others illustrating other photographic fields. He opened his lecture with views of north Somerset and north Devon. Dunster he considered to be one of the finest places for photographic work. After several views in the village and district, he described the villages of Porlock, Lyumouth, and Lynton, and introduced his hearers to the beauties of East Lyn about Watersmelt and Rockford. Ilfracombe and Clovelly were also illustrated. Mr. Hodges reminded his hearers that it was not necessary to go far to get pictures. He illustrated this by showing views of Hampton Court, Kew Gardens, Strand-on-the-Green, Kew, Burnham Beeches, and Stoke Pogis, and some figure studies. Haddon Hall was next shown. The photographer was allowed for a small fee of 2*s.* to hire the keys of all the doors there, and photograph to his heart's content. The Vale of Llangollen and Dolgelly contained some very fine views, in which foliage predominated. He believed the secret of taking such views successfully was to give a long exposure, and showed a view that had had two minutes' exposure at *f*-22, the sun shining at the time. Barmouth he recommended to them with not much time to spare, and was a capital centre. Bettws-y-coed and neighbourhood received some attention. In conclusion, Mr. Hodges suggested that Societies should join with each other in their excursions.

Tooting Camera Club.—April 14, Mr. Anderson (President) in the chair.—The report of the Sub-Committee, *re* headquarters, was read to the General Committee, and after some discussion it was decided to submit the matter to the ordinary meeting, which was done, and, after being thoroughly debated, unanimously adopted; so that, within a week or two, as soon as the necessary alterations can be completed, the Club will be in exclusive possession of a large meeting room capable of holding one hundred persons, a good-sized dark room, and a corridor fitted with shelving and containing plenty of room for lockers. An adjoining flat roof will also be found useful for printing and camera work, as likewise the meeting room itself, being exceptionally well lighted. The rooms will be at the service of the members at all times. The same Sub-Committee, viz.:—Messrs. Beckett, Child, and Dollery, were asked and undertook to carry out all the necessary arrangements. Messrs. Alexander, Buchanan, C. Sorrell, and Nock were elected active members, and Messrs. Fraser, Mellhuish, Morden, and Newman honorary members, making a total of eight new members for that night.

Croydon Camera Club.—April 19, debate, *What is the best System of Judging?*—This was opened by the President, and after a discussion, it appeared that the opinions expressed were decidedly in favour of the mark system. The medals awarded at the late Exhibition were presented to Messrs. White and Hallum.

Greenwich Photographic Society.—April 5, Mr. W. Ellis, F.R.A.S., in the chair.—Messrs. C. Churchill and G. S. Criswick were appointed delegates to the affiliated photographic societies. Messrs. Graham, A. Haddon, T. Lewis, and C. Churchill were appointed to form an excursion committee. Mr. G. S. Criswick, F.R.A.S., then delivered a most interesting lecture on *Star Charting by Photography*, illustrated with lantern slides prepared by himself. This apparently abstruse subject was treated so skilfully by Mr. Criswick that it was of unique interest to those present. It may be of interest to amateurs and professionals alike to know that, for the stellar survey which is at present being carried out, an aggregate of no less than 22,400 negatives will have to be supplied by the various observatories at work. At the close of Mr. Criswick's lecture, a very hearty vote of thanks was accorded him. Mr. S. Herbert Fry gave an exhibition of pictures taken on Sandell plates, which evoked considerable discussion, Mr. A. Haddon producing results obtained on ordinary plates, by backing, which he justly claimed were quite equal to anything turned out on Sandell plates.

Woolwich Photographic Society.—April 13, Rev. S. Chettoe, M.A. (President), in the chair.—Mr. W. John Belton gave a successful demonstration on the *Paget Printing-Out Opals and Lantern Plates*. He toned several plates during the evening which were generally admired.

Ashton-under-Lyne Photographic Society.—April 13, Exhibition of Lantern Slides.—A vote of thanks was given to Mr. Charles Lord for his present to the Society of a framed 20 × 14 enlargement of one of his Swiss views.

April 22.—The members of the Society, numbering seventy ladies and gentlemen, had their first ramble of the season, to Marple. They were met at the station by Mr. Joel Wainwright, a resident of that delightful neighbourhood, who conducted the party, through private grounds, to some of the oldest buildings, and most beautiful scenery, for which Marple is noted. He made the ramble very interesting by his description of the places of historic interest, interspersed with much humour and poetic language. The party took a great number of views, and finally finished up the afternoon, by Mr. Wainwright's kind invitation, at his residence, "Finchwood," where he had provided tea and other refreshments on the lawn. After partaking of these good things, the party were photographed in front of the house. There were thirty-six cameras in the company, and over 150 plates were exposed during the afternoon.

Birmingham Photographic Society.—April 18, Mr. G. F. Lyndon in th chair.—Five new members were elected. A set of slides lent by the Chelten ham Society were shown. Especially fine were a series of interiors of Glou cester Cathedral, beautifully chosen, and splendidly executed. A number o hand-camera seaside studies were also very good.

Derby Photographic Society.—April 18, Mr. A. B. Hamilton occupyin the chair.—The Chairman announced that two delegates were required for the Photographic Society of Great Britain in connexion with the affiliation scheme. Messrs. R. Keene and T. A. Scotton (Hon. Secretary) were elected. Mr. R. Keene was then called upon to give a paper entitled *A Six Days' Photographic Tour through Derbyshire*. This tour took place between twenty and thirty years ago, when photography was very much different from what it is at the present day, the party having to take with them a huge cart, with rope attachment, and which they had great difficulty in pulling about from place to place. Commencing at Rowsley, where the Midland Railway then terminated, the route taken was by Baslow, Eyam, Hathersage, Castleton, Miller's Dale, and back to the starting-place. Mr. Keene had to illustrate his paper by 170 lantern slides, most of which had been taken on this excursion. These were very beautiful examples of his work. Mr. C. B. Keene officiated at the lantern.

Gosport Photographic Society.—April 11, Mr. T. E. Williams, Vice-President, occupied the chair. Mr. R. E. Froude read a paper on *Experiences of a Kodak with Continuous Films*.

Newark Camera Club (Newark, N.J.).—April 10.—The following Officers were elected for the ensuing year:—*President:* Mr. Thomas A. Hine.—*Vice-President:* Mr. J. M. Foote.—*Executive Committee:* Messrs. William Archibald, Harry W. Smith, William A. Halsey, Charles Leroy, Frank S. Olds, A. C. Munn H. C. McDougall, J. M. Foote, Fred A. Schuetz.—*Treasurer:* Mr. C. G. Hine —*Secretary:* Mr. D. S. Plumb.

Newcastle-on-Tyne Photographic Association.—A monthly meeting of the Newcastle-on-Tyne and Northern Counties Photographic Association was held on April 11 in the Meeting-room of the Art Gallery, Newcastle. Mr. H. G. Ridgeway (Vice-President) was in the chair, and there was a large attendance of members.—The outdoor meetings for the present year were fixed as follows:—May, Steward-le-Peel; June, Fountains Abbey; July, Richmond; August, Alnwick; September, Seaton Sluice and Seaton Delaval. Mr. WILLIAM PARRY read a paper on *Retouching*, and a discussion followed.

Rotherham Photographic Society.—April 11, Dr. Baldwin (President) in the chair.—Three new members were elected. Mr. Leadbeater (Treasurer), in a paper on hand cameras, considered such apparatus as the premier plate spoiler, and said he should like information as to the proportion of really good negatives out of total plates exposed. When understood, the hand camera was a most interesting and enjoyable companion, and had been one of the best advertisers of modern photography. Hints on construction and use of hand cameras, and also on plate and film development, were given.

Society of Amateur Photographers of New York.—April 11.—The following Officers and Directors were elected for the ensuing year. *President:* Mr. R. A. B. Dayton.—*Vice-President:* Mr. L. B. Schram.—*Directors:* Messrs. C. Van Brunt, R. L. Bracklow, R. H. Lawrence, F. C. Elger, E. Warrin, H. S. Mack, H. A. Smith, A. F. Schoen.—*Treasurer:* Mr. C. C. Rommage.—*Recording Secretary:* Mr. T. J. Burton.—*Corresponding Secretary:* Mr. W. F. Hapgood.—*Secretary:* Mr. T. J. Burton.

FORTHCOMING EXHIBITIONS.

April 28–29	*Crystal Palace. The Executive, Crystal Palace, S.E.
,, 28–29	*Photographic Society of Philadelphia. Hon. Secretary, R. S. Redfield, 1601, Callowhill-street, Philadelphia, U.S.A.
May 4–6	*Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Exchange Morgan's multiplex background for studio accessories, children's principally.—Address, PARKINSON, photographer, Warrington.

Exchange cabinet rolling machine, plate glass bed, for good cabinet lens, background, or studio camera.—Address, C. H. HATCH, Alderley Edge.

Wanted, half-plate camera, McKellen or similar pattern, in exchange for Marion's embossing press complete.—Address, W. H. HUNT, 73, Trafalgar-road, Peckham, S.E.

Wanted, 12×10 camera lens, modern make globe enameller, stereoscopic outfit or hand camera. Exchange tricycle by Singer & Co., Coventry, almost new.—Address, J. ASTON BRIGGS, Whitby.

Exchange tricyle, Beeston Humber, worth 5*l.* or 6*l.*, for 10×8, 12×10, or hand camera; machine in good condition, and easy driver.—Address, R. H. BLYTH, photographer, Ilfracombe.

Wanted, good whole-plate field camera, reversible back, with three or six slides, ease and stand, in exchange for 10×8 camera (Fallowfields) and two slides. Difference cash.—Address, WHITE, High-street, Lewisham.

Will exchange quarter-plate camera, Kinnear pattern, latest improvement, three double slides, three folding tripod, for half-plate camera, Kinnear pattern, and three double slides, and tripod in good condition, approval.—Address, J. K. SMITH, Little London, Rawdon, near Leeds, Yorks.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

MR. TEAPE AND THE SANDELL PLATES.

To the EDITOR.

SIR,—Referring to Mr. Teape's letter in your last issue, I am glad to note that he continues to find the "Sandell" plates less subject to halation than the other plate against which he tested it. We are at one upon that head, and when my critic consents to abandon the pseudo-scientific or magnesium-wire method of testing, and instead makes negatives upon the plates, for which purpose they are intended, I think we shall be in accord again in the finding that for all practical purposes a multiple film gets rid of the defect of halation. There is no test so convincing, and I may add so useful, as the test of making a negative upon the plate under trial. There is none so liable to mislead as the semi-scientific test. But, whatever test be adopted, development should be effected so as to make the best of each competing plate.

Regarding the "tentative" development, I am quite doubtful whether Mr. Teape and I mean the same thing. Sixty-five minutes, as mentioned in his letter, is slow development, not tentative. By tentative development I mean that I begin with a sufficiently weak and restrained solution, which I gradually increase in energy by adding a concentrated developer, and I take care to only make the solution sufficiently energetic to produce an image of proper density. This will never take more than one-third the time quoted by Mr. Teape, and seldom so long.

I do not think I need trespass further upon your space. Mr. Teape concedes all I ask, viz., that the multiple film gives less halation than a single film. It is therefore a step in the direction of progress.—I am, yours, &c., S. HERBERT FRY.

April 24, 1893.

To the EDITOR.

SIR,—In reference to Mr. Teape's letter in your last issue, you will perhaps allow me to make an observation or two. I have not the pleasure of Mr. Teape's acquaintance, therefore do not know what measure of accuracy to expect from him; but I must beg of him, in again quoting or experimenting with "Sandell" or any other make of plates, to be somewhat more specific in his description. He should have known, I think, that "Sandell" does not sufficiently describe the plate when spoken of in connexion with halation experiments. Would he think me honest if, in writing or speaking of Messrs. Wratten's plates at a Society meeting, I asserted they were not rapid on the strength of exposures made on their "ordinary" plate? There is far too much of this culpable carelessness current, sir. The offenders forget their words appear in print and are liable to befool a greater circle than their immediate listeners.—I am, yours, &c., J. T. SANDELL.

Thornton Heath, April 24, 1893.

[We can so readily testify to Mr. Teape's care and fairness as an experimentalist that we are sure he would be the last to willingly convey a conscious inaccuracy. The correspondence here terminates.—ED.]

ART IN PHOTOGRAPHY.

To the EDITOR.

SIR,—Last week's edition of this JOURNAL contains, under the heading "On Things in General," the following two questions:—"If there is no fine art in photography, how is it that it is possible to produce by photography a scene, a view, or a representation that no artist can tell by simple inspection whether it is an engraving in one class, or a sepia or monochrome painting in another? Secondly, if a painter of repute took pains to learn photography, would or would not some of his results be more artistic than those of the photographer with no art education?"

In answer of the first question I say that, in about thirty years, the time I am connected with photography, I never have seen a *photograph* which could not be recognised as such, or mistaken by an artist for an engraving, or a sepia, or monochrome painting.

To the second query I reply that, by arrangement, by posing, &c., an artist would be able to improve a representation, but would never be able to make *photography* more artistic than a photographer without art education.—I am, yours, &c., F. B.

SUGGESTIONS FOR AN EXPERIMENT.

To the EDITOR.

SIR,—If it has not yet been tried and reported upon, I beg to suggest an experiment which may prove interesting, and perhaps instructive, to users of dry plates.

Take two plates, coated one with slow, the other with rapid emulsion. Place them in contact, film to film; expose, as follows, in the camera, under conditions similar to what would be used for a Sandell plate:—

(*a*) Present glass side of rapid plate for exposure.

(*b*) With a second couple expose glass side of slow plate.

(*c*) After exposure, separate the plates and develop.

A further variation might be made by using three plates on thin glass—or, better still, three celluloid films—coated each with a different emulsion, slow, medium, and rapid, the medium being sandwiched between the other two. Experiments could also be made with orthochromatic plates.

I have not myself the time at present to make experiments, but I throw out the above suggestion for others to use if they see fit, and trust they will give the photographic fraternity the benefit of any knowledge acquired.—I am, yours, &c., DUNCAN C. DALLAS.

5, *Furnival-street, London, E.C., April* 15, 1893.

DETERMINATION OF THE SPEED OF PLATES.

To the EDITOR.

SIR,—The above gives such a lot of jottings that I look in vain for a critique to the point from "Cosmos." I prepared my own dry plates at

home for five years (5 lb. a batch), therefore know from experience that fresh plates are more sensitive than older ones. The difference in the first two or three weeks is sometimes remarkable; there is also a difference in the plates first coated and those done last, also each corner of the drying room imparts a different character to the plate. Well, I can't see the way out of the dilemma—that a once tested plate is condemned to bear the once given test numbers. Kindly excuse one who only expects possibilities, and is content to remain—Yours, &c.,

April 21, 1893. AUDACIOUS OPERATOR.

To the EDITOR.

SIR,—In their article in this week's BRITISH JOURNAL OF PHOTOGRAPHY, Messrs. Hurter & Driffield write that, after making five experiments, I have satisfied myself that all their hundreds of experiments go for nothing, and that their conclusions are erroneous. That, however, is far from being a correct description of the opinions I have formed. Messrs. Hurter & Driffield's investigations covered a wide field, and they have done a service to photography which I should be the last to underrate. They have investigated matters which badly need elucidation, and have made an excellent beginning towards placing on true scientific bases such matters as the connexion between exposure and density, &c. I may add also that I fully appreciate the value of Messrs. Hurter & Driffield's system of experimenting, and have not hesitated to employ it in my recent experiments. Their original paper described almost the first attempt to make matters clear in the branch of photographic science dealt with, and it has been a most valuable contribution towards that end; but it is very improbable that every conclusion which the two experimenters arrived at, in a new and difficult line of investigation, will prove to be beyond criticism, and it would be but a poor compliment to them if photographers simply swallowed the paper as a whole, and abstained from pointing out what appeared to be doubtful features in the reasoning, or felt any hesitation in otherwise testing their results. After carefully studying their paper, my greatest doubts have been, firstly, in regard to certain theoretical questions on which there was some discussion last year in THE BRITISH JOURNAL OF PHOTOGRAPHY; and, secondly, as to the correctness of some of their conclusions on what they consider a matter of secondary importance, viz., the influence of development. Their conclusions on that subject are laid down very broadly in the original paper, and quite without qualification. They claim to have shown conclusively that in development the photographer has "no control whatever over the gradations of the negative," and the following expressions occur in the paper:—"The ratio of densities is given by light alone, and is not affected by time of development." "This ratio we find is altogether unalterable." "These experiments all confirm the statement that the gradations of a negative as expressed by the ratios of the densities, are independent of time of development, cannot be effected by alterations in the composition of developers, and are almost identically the same whatever developer is employed." Now, these are opinions which I believe my experiments have shown will require serious modification. In fact, Messrs. Hurter & Driffield scarcely seem to insist that the ratios are independent of the time of development, but admit the existence of a "lagging stage," and only express the opinion that, after sufficiently prolonged development, their principles will be found in all cases to apply. That may be, but how can it now be maintained that the ratios are "independent of the time of development?"

The principal subject which engaged my attention in my recent experiments (four out of the five being wholly directed to it, except that the effect of time of development on gradation was in one instance examined) was a comparison of the action of two pyro developers of widely different composition, and I found in every case that there were very great differences between the gradations produced by one developer as compared with those produced by the other. In the fifth experiment the actions of several species of developers, mixed in normal proportions, were compared, and, as I implied in the article, did not show results which differed very greatly from what might have been expected on Messrs. Hurter & Driffield's principles; but, as my object was *not* that of "simply opposing their views at all hazards," I thought I ought to publish an account of the experiment, as any results which help us towards forming correct opinions on these matters are not without value. I certainly expressed an opinion that, on other plates than the "Ilford Ordinary," greater variation in results might possibly be shown, and that opinion is now greatly strengthened, owing to an advertisement in yesterday's BRITISH JOURNAL OF PHOTOGRAPHY, in which Messrs. Marion & Co. announce that, in the case of two of the developers experimented with, viz., eikonogen and amidol, it is found that *their plates* require less than normal exposure, and that the actinograph number may be taken from one-third to one-half higher when these (among other) developers are employed. There is a trifling misprint in my article which it may be well to mention. In summing up the conclusions I had formed, I wrote—or intended to write—"On the whole, the experiments show," &c., but the last two words are printed, "experiment shows," making it appear that I was referring only to plate E.

My previous remarks will, perhaps, explain why I do not find the first table given by Messrs. Hurter & Driffield, in their last article, very instructive. I have described experiments made almost solely for the purpose of comparing the action of two developers, and they give a table in which is compared the densities of all the strips developed with *one only* of the mixtures, simply showing that strips which have had similar treatment have similar gradation; there are also added the densities of the strips produced in an experiment on which I had laid very little stress, and Messrs. Hurter & Driffield consider that the ratios of the gradations of all the strips agree fairly well. Considering, however, that the figures on the first line vary between thirteen per cent. and thirty per cent., and also that there is great irregularity in the amount of reversal, I do not see much evidence of uniformity in the gradation. The sources of error mentioned by Messrs. Hurter & Driffield might, of course, account for great differences in gradation between strips cut from different plates, especially as it was never intended, when making the experiments, that the strips used in one should be compared with those of another, but such differences might tell either way.

To return to my article, I think any reader of it who compares the results given by developer No. 1 with those of No. 2, or examines the various ratios of plate D, will admit that gradation—at any rate, over a wide range—may be much influenced by the method of development, and if so, the statements given in Messrs. Hurter & Driffield's original paper require modification. In fact, these principles already appear to be undergoing modification. We now have the idea accepted that a "lagging stage" exists, and that being admitted, it is clear it can be no longer maintained that the alterations in density which occur during the progress of development may, as stated in the paper, be accurately represented by simply giving successively increased values to the factor γ of Messrs. Hurter & Driffield's two formulæ. It really appears to be scarcely contested that gradation over a wide scale of exposures *may* be modified, but it is doubted whether any alteration can be made by means of development in the small range constituting the "period of correct representation." To settle that point, as I stated in my article, far more elaborate experiments than mine would be necessary, and I do not think the published experiments of Messrs. Hurter & Driffield dispose of the question; but it seems improbable that that part of the scale, and that only, should be invariable in the ratio of its gradations. In any case, other parts of the scale are also interesting, for those "extraordinary" photographers who sometimes make errors in exposure are, I believe, far more numerous than Messrs. Hurter & Driffield appear to suppose, and it is important to most of us to find how we can obtain the best possible results on a wrongly exposed plate. I am sure, at any rate, it is to hand-camera workers. The experiments which Messrs. Hurter & Driffield intend to make as to correcting under or over-exposure will certainly, like all others of theirs, be very interesting.

My supposed oversight in describing the No. 1 mixture as excellently suited for developing under-exposed negatives, and not noticing that others which I had used were equally good (a questionable point), may be easily explained. My statement was *not* that it was excellent for the purpose, but that it was far superior to No. 2, a point on which there can hardly be a difference of opinion. The proposed method of saving a much over-exposed plate by stopping the development at an early stage and afterwards intensifying, is regarded by Messrs. Hurter & Driffield as an impossible one, because the intensification would, at most, only double the densities, and that in the instance given would be an insufficient increase; but they overlook the fact that, as Mr. Chapman Jones has recently pointed out, the process may be repeated more than once. There is also another possible alternative, viz., reproduction of the negative.

In conclusion, I may say that my state of despair is not quite so deep as Messrs. Hurter & Driffield suppose, and in writing that development seemed likely to remain a mere rule-of-thumb matter, I did not mean that I was without hope of that unsatisfactory state of things being at last remedied. That hope is much strengthened by learning that Messrs. Hurter & Driffield will endeavour to come to the rescue, and are not therefore deterred, as I feared they would be, from further investigations by the belief that nothing more remained to be discovered. They are not, I presume then, still of opinion that nothing can be changed by varying the composition of the developer, or time of development, except the value of the simple factor γ.—I am, yours, &c., H. J. CHANNON.

Woodlands, Lewisham, S.E., April 22, 1893.

THE TOOTING CAMERA CLUB.

To the EDITOR.

SIR,—I think that it is my duty to call the special attention of photographers who may reside in the neighbourhood of Balham, Streatham, Wandsworth, &c., to the announcement made in this week's report of the Tooting Camera Club, viz., that we shall hereafter have our own meeting and dark rooms, situated in High-street, Tooting (near the tram terminus), being both central and convenient of access.

Few of the London clubs have the same facilities as we shall soon be in possession of, and photographers who would like to share the same, but are unacquainted with any of our members, should write to me at the undermentioned address.—I am, yours, &c., J. F. CHILD, *Hon. Sec.*

Harzville, Leigham Valley-road, Streatham.

"OPEN HOUSE."

To the EDITOR.

SIR,—The Society of Amateur Photographers of New York desire to extend the hospitality and use of their rooms to all amateur photographers who intend visiting the World's Fair at Chicago, and who will pass through New York during the coming summer.—I am, yours, &c.,

T. J. BURTON, *Secretary.*

Society of Amateur Photographers of New York, 113, *West Thirty-eighth-street, New York, April* 15, 1893.

"MUTATO NOMINE," &c.

To the EDITOR.

SIR,—The following fragment of a fable which has come into my possession may, at the present moment, interest a portion of your readers.

THE KING AND HIS PETS.

"There once lived a good-natured king who delighted to entertain all the animals which roamed around his palace; so from time to time he in turn invited them to his mighty dwelling-place, and feasted them right royally with rare viands, garnished with silver and with gold. And all were exceeding glad, except some of a very wonderful sort that mostly went on three legs and had each but one eye. These, having for a while enjoyed full share of the good fare, yearned for still better, and, moreover, they became wroth and forward that they were not, while in his glittering palace, even as was the king himself. And so, said they, 'although it be garnished with gold and silver, we will not eat of his food unless he bow the knee to us.' Therefore they stayed without in the wilderness, and, a blight falling upon the land, the fruits of the earth were scanty, and it came about that——"

Most provokingly the MS. breaks off at the most interesting part. Your readers may, however, possibly find profitable entertainment in trying to supply the missing words.—I am, yours, &c.,

HECTOR MACLEAN.

34 *Newmount-road, Croydon, April* 18, 1893.

GELATINO-CHLORIDE *VERSUS* ALBUMEN.

To the EDITOR.

SIR,—My experiences with the gelatino-chloride papers are as follows—I find no difficulty in the manipulation up to the finishing of the prints; I then find the surface has such an affinity for specks and dirt adhering to it, that it takes much longer time to touch and finish up than albumenised paper; but any speck is easier removed with spirits of wine than water, which destroy the surface. With a bar burnisher it is impossible to avoid spoiling some cards, as they get scraped like enclosed copy—not the ordinary "scratch." This alone makes me throw the paper aside meantime.

With the gelatino-chloride papers I obtain a more brilliant print from a negative if wanting in contrast or density than with albumenised paper. That is the only advantage I find unless there is any on the score of permanence, which time will tell.

I have also used the ready-sensitised paper to some extent. The great drawback to it is the rapidity with which the prints spoil that is made on it. The same mottled marking soon appears on the print that shows on the paper when it is kept any time and printed. The mottling more readily develops when prints are put in a show-case, or where they have a chance of damp and are soon spoiled.

I think there is nothing yet to beat the "home-prepared" albumenised paper for good results.

I have carefully read all that has been written on printing papers in the JOURNAL, and would be glad to see more on the subject from workers. I only write in the interests of the profession.—I am, yours, &c.,

April 20, 1893. B. B.

[Experienced workers do not find any difficulties with gelatino-chloride papers such as those met with by our correspondent; but, for the benefit of professional photographers, we should be glad to open our columns to an exchange of views on the subject.—ED.]

THE CAMERA CLUB PAPERS.

To the EDITOR.

SIR,—As from comments in your valuable JOURNAL there appears to be some misunderstanding in regard to the publication of papers read at the Camera Club, will you kindly allow me to state that, although all rights are reserved as regards copying, the public are not debarred from access to the papers, inasmuch as the full Conference *Journal* will be published by Messrs. Harrison & Sons as usual, and all important papers from the ordinary monthly issues of the Club *Journal* will be issued separately in pamphlet form (by the same publishers) available for subscribers.—I am, yours, &c., G. DAVISON, *Hon. Sec.*

Camera Club, Charing Cross-road, W.C., April 24, 1893.

BEARD'S REGULATOR.

To the EDITOR.

SIR,—I regret that I cannot answer Mr. Walker's questions regarding Beard's regulator, as I have no recollection of its structure, unless it was the one that got a medal at Falmouth a number of years ago. It had a spindle through a flexible diaphragm. There was a weight on the top of spindle, and a valve at its lower end. It was almost a facsimile of one that a Mr. Broughton, of Fountainbridge, near Edinburgh, had patented many years previously. They were used for some time on the street lamps in Glasgow. Before taking out a patent for my regulator, I satisfied myself that the keyed cock was superior to a valve, as the former will last a lifetime.

Regarding the anti-friction cock, although I have them on the apparatus I use myself, it is not patented yet, although I have got permission that they may be used wherever the Glasgow is used. I will send Mr. Walker a drawing when I get it patented.—I am, yours, &c.,

Airdrie, April 24, 1893. WILLIAM BIRRELL.

AMIDOL.

To the EDITOR.

SIR,—Will you kindly allow me space in your next issue to reply very briefly to a remark by "Cosmos" in last week's "Jottings" respecting amidol.

He refers to a statement by Mr. Peal, of Ealing, that exposure can be reduced two-thirds the usual duration if amidol is used to develop, and asks for experimental evidence in support of that statement.

Mr. Peal will, doubtless, answer for himself, and I must offer him my apologies for attempting to reply to a question addressed directly to him; but, as I have publicly for several months been making an identical claim on behalf of amidol, I may, perhaps, be excused for interfering in the matter.

Having had a fairly extensive experience of the properties of amidol, I can fully confirm Mr. Peal's opinion, and have also had confirmation of the statement from several professional photographers in various parts of the country who have taken up amidol in preference to pyro. To put the matter simply, the claim for amidol is that, if under ordinary conditions the necessary exposure (using pyro) is, say, three seconds, an exposure of one second will give an *equally good result* if amidol is used to develop.

You *can* do it, "Cosmos," but don't take my word for it; give it a fair trial, and report the result.—I am, yours, &c., L. E. MORGAN.

17, *Philpot-lane, London, E.C., April* 25, 1893.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

PHOTOGRAPH REGISTERED:

Abraham Flatters, 6 Penshaw.—*Thirty photographs of cotton fibre.*

RUDD & CO.—The Convention group at Edinburgh was taken by an Optimus rapid rectilinear.

"DRY PLATES" for April contains an article by Mr. Cadett on "The Fixing Bath" of much practical value.

R. CHILDS.—The formula for the caramel backing solution is given at page 221 of the JOURNAL for April 7.

ROCKS.—It appears to us that the bottom of the picture is so poorly lighted that it is under-exposed. Could you not manage to throw a little more direct or reflected light upon it?

W. E. W.—Either the prints were developed with iron which was not removed, or they were acid when placed in the fixing bath. Anyhow, they show want of care in the manipulations.

J. GRAHAM.—1. We are of opinion that the combined bath will yield quite as permanent prints as the other. 2. The lens you mention will answer well for architectural work in addition to the other properties.

STAFFS.—Unless you have made the views copyright in the usual way, you have no redress against the lithographic piracies "made in Germany." If you had a copyright, you could proceed against any one selling the piracies.

T. R. (Bombay).—A difficulty is frequently experienced in obtaining density in some brands of extra-rapid plates. But by increasing the proportion of pyro considerably, and slightly the bromide, the trouble can generally be surmounted.

X. Y. Z.—We think that by substituting for the small lens C a triple achromatic, such as is employed as an eye-piece in the better class of opera and field glasses, there would not be any fringes of colour apparent. It would be worth while trying this.

R. R. C.—We are uncertain as to the nature of the effects desired to be produced, therefore cannot aid you. Bearing in mind, however, that the angles of incidence and of reflection are equal, you will be enabled to construct a multiple reflector, if it be this at which you aim.

D. E. GODDARD.—This week's report of the London and Provincial Photographic Association's meeting, and Mr. Cowan's paper in reply to Mr. Williams, published in another part of the JOURNAL, continue the subject of the determination of plate speeds.

J. P.—The markings on the negative look like hypo, which has recrystallised out through imperfect washing. You might try the effect of removing the varnish with alcohol, and of refixing in strong hypo, but we are not very hopeful that the negative could be saved in that or any way.

R. E. C. (Innsbruck).—So far as one can judge from the print, the negatives are much over-exposed. If all have received approximately the same exposure, treat them as being over-exposed when developing. Evidently the Alpine light has misled you. Still, with care, the negatives need not be lost.

ORTHO.—Instead of seeking for one of the aniline colours for giving to the prints the appearance of old engravings on Indian paper, try the effect of a decoction of coffee, strength according to the tint desired. None of the coal-tar colours occur to our mind at the moment that would answer so well as the coffee.

TISSUE.—When the bichromate bath becomes discoloured and frothy, as you describe it, it should be discarded and a new one made. It is not necessary to strengthen it as in the case of a silver bath, neither is it desirable to use the bath until it becomes in the state referred to. Bichromate of potash is cheap enough.

H. WADE.—1. The simplest way to add to the density of carbon transparencies is to treat them with a solution of permanganate of potash—say, ten grains to the ounce of water. 2. See answer to R. Fortune. 3. The ordinary sulphate of copper of commerce is the kind employed in making the bath for electro deposition.

B. BROWN, M.D.—In your preliminary experiments, confine yourself to low powers, say an inch or an inch and a half. The arrangement of the apparatus, as shown in the sketch, cannot be improved upon. Do not attempt objects with much colour till some little insight on the work has been gained. "Ordinary" plates to begin with.

W. E. PATERSON.—There may be two reasons why the enamel collodion dries with a crapy texture: First, the employment of a pyroxyline of an unsuitable kind; second, using solvents containing too large a proportion of water—*i.e.*, not strong enough. With a suitable sample of pyroxyline, and methylated ether of s.g. ·715 or ·720, and methylated alcohol of 66 o.p., a good collodion for enamelling paper prints will be obtained. For this purpose the presence of the mineral naphtha will do no harm.

M. L.—1. All the processes mentioned are capable of giving good results. As you have failed with them, you might employ the plan of placing a mirror at an angle of 45° with the lens when taking the negative. 2. The Kallitype process has answered well for portraits in this country. 3. Schirm's flash-lamp may, we believe, be obtained from Mr. Romain Talbot, Berlin. 4. Mr. Slingsby, of Lincoln, and many other portrait photographers, employ the flashlight very successfully in the studio. Messrs. Marion & Co. will supply you with information on the subject.

J. HIBNS.—Steel facing of copper plate is an electrotyping process, and its object is to enable a larger number of fine impressions to be obtained from the plate than could be obtained from the bare copper. In fact, by this process, the copper plate becomes almost everlasting. A coating of iron of extreme thinness and great hardness is deposited on the engraved plate, which prevents wear of the copper in printing. When the iron shows signs of wearing through, the coating can be taken off, leaving the copper in its original condition, and a new one deposited as at first.

T. O. J. says: "Can you tell me of anything that I can add to a solution of gum Arabic, which my hands use for spotting prints, that will keep it from becoming sour. I know that carbolic acid will answer the purpose, and I am using it, but the girls complain that they cannot use the lips for drawing the brush to a point with that in it."—A small proportion of alcohol will answer quite as well, and it will make the mucilage more palatable. Methylated spirit will answer, but perhaps young ladies will protest against its use. Anyhow, a very small proportion of the pure spirit will suffice.

C. MACER asks if the electric light, arc light, can be used for printing on the Ilford Printing-out paper; and, if so, what would the exposure be?—The light could be used, but it would necessarily make the printing very expensive in comparison with daylight, which costs nothing. The exposure will, of course, be dependent upon the power of the light used and the density of the negatives. From a commercial point of view—and it is upon this, we imagine, our correspondent's query is based—the thing may be considered as impracticable, except, perhaps, in an extreme case occasionally.

R. S. J. writes: "I have often seen it stated that professional photographers generally sensitise their own paper, because, on it, they get better results than amateurs do on what they buy ready-sensitised. For some time past I have been sensitising my own paper, using a fifty grain bath, and I much prefer it to that bought ready-sensitised; but I am much bothered at times with dark marbled-like markings on the paper when it is taken off the bath. One or two sheets will be so, and then all the others will be clear. What can be the cause?"—If the bath is allowed to stand in the dish, a scum forms on the surface, and, unless this is removed with a strip of blotting-paper, it will be taken off by the albumen paper. Skim the bath before floating the paper.

P. SEVILLE writes: "Can you tell me how to prevent the black spots which are on the enclosed photograph. It is printed on Ilford P.O.P. They make their appearance in the first washing water and by no after-process have I been able to get rid of them. One photographic chemist recommended to filter the water through a very fine flannel, but it made no difference. I have tried constant running water whilst washing them, but still spots appear. If the prints are allowed to lie still in the water for a moment, I have sometimes noticed a black deposit on them, which I have immediately removed; but every print so attacked has been quite spoiled. From this cause I have had spoiled as many as forty vignettes in one week. If you can suggest a remedy, I shall be exceedingly obliged to you."—The spots are due to particles of foreign matter, which coming in contact with the paper reduces the silver. These particles must be either in the water or on the surface of the print when it is immersed in it.

ROBERT FORTUNE writes: "Would you please answer the following questions? 1. After having developed a carbon print upon a sheet of collodionised glass, can you tell me how to dissolve away the collodion film without injury to the carbon print? 2. Can you tell me where to get a price-list of the copper plates, press, &c., necessary for photogravure? 3. Can you give me the formulæ for etching upon glass, commonly called a 'dull bite?' It is done by suspending the glass in the vapour of certain chemicals. I think it is a mixture of hydrofluoric acid and ammonia, but cannot say for certain. 4. Can you tell me where to get bitumen or asphaltum which is sensitive to light, and what is the solvent used after exposure to dissolve the parts which are still soluble?"—In reply: 1. Before the collodion can be removed, the print must be taken off the glass. Before applying the collodion, talc the glass; then, after the print is developed, squeegee a thin sheet of gelatine upon it, and allow to dry. Remove the picture, and clean the collodion off with a mixture of ether and alcohol. 2. Any dealers in printer's materials, such as Hughes & Kimber's, Winston's, and others. 3. Place some fluor spar at the bottom of an ebonite dish, moisten it with sulphuric acid, and place the glass to be etched over it. 4. Any wholesale chemists' Turpentine, to which sometimes a little benzole is added.

CATALOGUES have been received from G. W. Wilson & Co., Aberdeen, and W. Banks & Co., Bolton.

PHOTOGRAPHIC CLUB.—May 3, *Lenses for Copying*. 10, Members' Open Night. Saturday outing, May 6, Eynesford.

MESSRS. ARTHUR SCHWARZ & CO. point out that we omitted to print their name as agents for Dr. Andresen's chemicals in their last week's letter about settlement of, the dispute between the manufacturers of the amidol.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—May 4, Technical Lecture of the Series—*Developers*, Mr. E. J. Wall, 11, Paper by Mr. W. H. Harrison, *Is the Present Construction of Photographic Studios Wrong in Principle?* 18, Monthly Lantern Night.

THE CENTRAL PHOTOGRAPHIC CLUB.—The Hon. Secretaries of the Central Photographic Club (Messrs. W. Fenton Jones, 12, King Edward-Road, Hackney, and C. H. Oakden, of 51, Melbourne-grove, East Dulwich) are open to receive applications for shares in the Club Company. The shares are 5*l.* each, 2*l.* 10*s.* being paid on allotment. All other communications relating to the Club should be sent to those gentlemen, and not to Mr. Thomas Bedding, who is no longer Hon. Secretary *pro tem.*

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—Meeting held in the rooms of the London and Provincial Photographic Association, Thursday, April 20, Mr. Robert Beckett in the chair. Two applications for assistance were considered by the Committee.—In one case a loan of 5*l.*, together with a further sum in instalments, was granted. In the other case, the Committee instructed the Secretary to refer the applicant, who was a foreigner, to the consul of his own country, and to state that his case was one which the Committee did not see their way to relieve. The Rev. H. G. Morgan and Mr. J. G. Hudson were accepted as subscribers, and Mr. Walter D. Welford was elected a life governor. The Secretary reported on the fact that the proceeds of the Sandell Exhibition had been devoted to the Benevolent, and announced that Mr. Sandell had expressed his willingness to loan the whole of the pictures from that Exhibition, and to supply a number of catalogues gratis to any provincial society that would organize an exhibition in its own town and give the proceeds to the Benevolent Association. The following subscriptions and donations were acknowledged:—Rev. H. G. Morgan, 5*s.*; Atticus, 10*s.* 6*d.*; *Photographic Review of Reviews* Charitable Fund, 2*l.* 2*s.*; Hastings and St. Leonards Photographic Society, 2*l.* 2*s.*; *Photography* Prize Competition, 6*s.*; Mr. J. G. Hudson, 15*s.*; Mr. Thomas Bedding (THE BRITISH JOURNAL OF PHOTOGRAPHY), 10*s.* 6*d.*; and Mr. R. Hayward, 7*s.* 6*d.*

*** Owing to exceptional pressure on our space this week, we have been obliged to hold over several Society reports, letters, articles, and other interesting matter. We trust our numerous friends and correspondents who have been disappointed at the non-appearance of their communications will exercise their patience, for the reason given.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1722. Vol. XL.—MAY 5, 1893.

FOCAL PECULIARITIES OF WIDE-ANGLE LENSES.

Every one who is accquainted with the most elementary principles of optics as affecting photographic lenses knows that a deep meniscus lens will not, unless it be stopped down to a considerable extent, give an image at the focal plane any part of which is sharp, and that, the more pronounced the meniscus form is, the smaller will have to be the stop or diaphragm requisite to minimise the spherical aberration by which sharp definition is prevented. This applies, not alone to a single meniscus, whether achromatised or left uncorrected for colour, but is also the case when two such forms of lenses are mounted together so as to form a wide-angle, non-distorting objective.

When an objective of this class, single or compound, is focussed with its largest available aperture, say, for example, *f*-15, upon any suitable object, so as to produce the sharpest image of which it is capable under the circumstances, and a very small diaphragm is then inserted, disappointment is apt to be experienced at the small gain in sharpness that has resulted.

It is a common habit with those who employ lenses of this nature to focus with the largest diaphragm supplied, and then use one much smaller for making the exposure. For this there is a certain excuse which is plausible although not valid, viz., that a wide-angle lens of short focus admits an insufficiency of light to permit of any focussing being effected with a small stop, and that hence the largest one must be made to serve the purpose both of arranging the subject on the ground glass, and also of focussing; and it is reasoned that after this has been done the sharpness will be increased by the insertion of the small or working stop.

But it must be borne in mind that, when working thus, there are two focal planes situated at a certain distance apart, the one for the largest stop being closer to the lens than when the smallest one is employed. Hence a readjustment of the focus is imperatively demanded between the focussing with the large and the exposure with the small diaphragm. A clever casuist may say that, if he makes the image sharp with the larger aperture, the reduction of the aperture cannot make the image less sharp, seeing that the same rays by which the former was produced are utilised in the production of the latter. To which we reply, that we deny the *acme* of sharpness in the first case, on account of the amount of spherical aberration present, for, be the focussing effected with the utmost care, there are still transmitted rays which cross the axis at a greater distance than the mass of those by which the image is formed, and it is only when the lens is aplanatic (which no wide-angle deep meniscus ever is) that all the rays cross the axis at one point. We repeat what has already been said, that, in order to obtain the extreme of definition when employing only those attenuated rays transmitted by the small diaphragm, the focussing screen must be placed in the plane at which they cross the axis, and which, as we have said, is at a greater distance from the lens than is the case when the bundle of rays is larger.

Practice supports theory in this. We have just made a series of careful tests relative thereto, and have employed for the purpose a wide-angle deep meniscus combination of the most recent construction, and bearing an honoured name. The solar focus is eight inches, and the largest stop equals *f*-16. We focussed upon the meshes of a piece of rather fine network, such as that employed for window curtains, using a Ramsden eyepiece carefully adjusted and attached to the ground glass of the camera. The camera was thirteen feet distant from the network, which was erected so as to be backed by the sky. Having got the greatest sharpness capable of being obtained with the stop mentioned, we marked on the camera the stage to which it had been extended, and then "turned on" the *f*-32 stop and focussed again. There was a very marked increase in the definition of the lace, which was exceedingly crisp and sharp, the meshes being as if cut with a finely pointed graver. Another mark was now made on the camera. The *f*-16 stop was then made to supplant the *f*-32 one, and the image again examined, revealing now a serious falling off in sharpness. This was repeated several times, and established the fact that for the apertures mentioned there were two focal planes. On measuring the distance apart of one mark on the camera from the other, it was found to be three-sixteenths of an inch.

We have entered into this matter somewhat at length in order to enforce advice we have repeatedly given, and which is to the effect that, while the largest possible aperture of the lens is by far the most convenient to make use of when arranging the subject on the focussing screen, it is of vital importance where the highest degree of definition is desired that the focussing be effected when using the same stop as that by which the photograph is to be made.

When the lens partakes more of the aplanatic character than the deep meniscus that we have been describing, the same amount of difference in the focal planes does not exist, and we have seen lenses of the "rapid" class in which the focal plane with the full aperture and that with the smallest stop showed no marked difference between them. Lenses of this type, however, are not capable of including an angle of view so great as those of the deep meniscus form. Just observe the axial excellence of definition of the highest type of

planatic lens that is known—the object-glass of an astronomical telescope; by no amount of stopping down can its defining power be improved, but, on the contrary, it rather deteriorates. In it the amount of spherical aberration left uncorrected is practically non-existent. The external form of such a lens when made of ordinary optical glass is that known as crossed, which, while right for axial rays, is hostile to the transmission of oblique ones, for which purpose we must have recourse to lenses of meniscus form. The deeper the meniscus form the better is an extremely oblique ray transmitted, and hence the necessity of the deep meniscus for wide-angle lenses, which, on account of the aberration of sphericity, renders a small stop imperative.

It is no fault in the construction of such objectives as we have been speaking of that there is the difference spoken of between their foci when using a large stop contrasted with a small one. It is an optical necessity of their construction. We have known of more than one who made a speciality of copying fine line engravings of large dimensions who adjusted and focussed with a large stop on account of the superior illumination, and then inserted a small one, and who, failing to get the sharpness desired, blamed the lens, and laid it aside, whereas the fault lay with themselves in not knowing how to use such a lens aright. We hope that, from a perusal of what we have written, they will be able to do so in future.

A writer on the subject of focussing, eight years since, said: "To focus with the working aperture, as some writers recommend, is not only useless, unless the lens is imperfect, but it is practically impossible with the small apertures required for the rapid plates now used." We have adduced sufficient evidence to show the utility of the course recommended, and have only to add that if, owing to the feeble light transmitted through the smallest stop, correct focussing is not possible with its use, this can be ensured by the expedient of focussing with a large stop, and racking the camera out the extent necessary, and which has been previously ascertained by experiment, to ensure absolute definition by the small or working stop. Photographers should study the peculiarities of each lens they employ.

GUMS AND GLUES.

The query put by "T. O. J.," and replied to in our last, suggests the usefulness of a few hints on the use of gums and gelatines in their more mechanical aspects, so to speak, in relation to photographic manipulations. Acacia gum is so largely employed for the purposes referred to in our correspondent's query, that it is not surprising he has met with the commonly experienced difficulty. Any one feeling similarly troubled may with advantage act upon our suggestion of the use of a little alcohol, the best way of adding which preservative is in dilute solution in water, a thicker gum mixture being then made to avoid undue thinning. If alcohol be added direct, it will cause clots to form which will not readily redissolve. In making "gum water," which perhaps is done in every studio in the country, there are some minor precautions to be taken which will obviate the acidity or sourness for a time at least. First may be mentioned the advisability of dissolving the gum in perfectly cold water. Hot water is generally used, and the solution, in consequence, invariably decomposes in a day or two, especially in hot weather.

Those who have not adopted this method will be surprised at the difference in smell even when first made; there is an actual fragrance about the cold solution which is entirely absent when heat is employed. Then, again, it is quite unnecessary—a useless addition to the expense, in fact—to use, as some do, the powdered gum. Nice clear, clean, pale lumps should be chosen, though the kind sold under the technical name of "sorts," which includes white and coloured pieces, is quite as good, though not so pale in solution. An excellent plan to adopt is to make a quantity at once, and then place it in small bottles made quite full, and then well corked and kept in a cool place. So prepared, it will keep fresh quite a long time. There are many substances that can be added to act as preservatives, which are quite out of question, when the gum water is to be used for spotting, on account of their taste. Of the least objectionable, sulphate of quinine stands foremost, so very small a quantity being required; indeed, we doubt whether the bitter would be noticed. Gum water made very thick is a most useful and handy mountant, but its great drawback is the liability to cause a greasy appearance in the print wherever the finger is laid and pressed upon the gummed surface before mounting. It is stated that this effect may be got rid of by adding sulphate of alumina in solution, three per cent. of the weight of the solid gum being added.

An excellent substitute for gum water is made from milk; the caseine is precipitated by acetic acid, well washed till freed from acid, and then dissolved in a saturated solution of borax. We believe we are correct in saying that a solution of gum arabic or acacia was the first mountant used in dry mounting. We remember seeing it in use at Disderi's establishment in Brompton about twenty-five years ago, and some prefer it to this day on account of the ease with which it is made to adhere under what would be unsatisfactory conditions for other materials Perhaps, where it is prepared, it might for this purpose be better to use the formula given to us by a label-manufacturer in which gelatine plays a part. It is as follows:—One pound of gum arabic, one and a half pounds of gelatine, one ounce of sugar candy, six pints of water. The gelatine to be first soaked in a little water, and then melted in the rest of the water in which the gum and sugar candy have first been dissolved. The difficulty of dry mounting is that, if there is not complete adherence, the print may blister when heated by burnisher or hot process. Some blisters, however, that appear when first mounted may go down in the hot press.

Where a small pot of gum is handy for occasional instant use as a mountant, "gum water," as gum-arabic solution is usually termed, is a decided favourite; but we strongly advise a mucilage of tragacanth gum. This is strongly adhesive, and is free from the objectionable tendency of "greasing" the print where pressed by the finger, the effect not being due, of course, to grease; yet the appearance is just as though some oleaginous matter had been spilt there, and it has been a puzzle to many a one who has only occasionally used the solution. The drawback to the use of tragacanth is the great tendency it possesses to go mouldy. Many substances have been recommended to prevent this, the most successful being the essential oils—oil of clove, for instance. It has been stated that boric acid, which is so admirable a preventive of mould in many cases, will answer; but our own experience entirely negatives the assertion. We left a small pot of tragacanth, to which we had added boric acid, lightly corked in a free draught of air, and it was covered with mould in a fortnight. Salicylic acid preserved another sample for a much longer period, and a mixture of thymol and the latter chemical kept the mixture pure and clean till it dried up to the consistency of horn. The smell of thymol would to

some, perhaps, be objectionable, though others consider it very fragrant. We have left ourselves no space to refer to glues or gelatines in photography, and will therefore consider their properties in a future article.

A Large Negative.—Messrs. Werner & Son, of Dublin, have recently taken direct from life a negative 64×38. It is, we understand, to be exhibited at Chicago. Possibly it is the largest direct negative ever taken.

Silver Medal Awards at Philadelphia.—This country has secured a liberal proportion of the silver medals awarded at this great American Exhibition. The names of the fortunate artists are George Bankart, Leicester; John H. Gear, London; William Gill; Colchester; Karl Greger, London; Edgar G. Lee, Newcastle-on-Tyne, R. H. Lord, Cambridge; W. P. Marsh, Bognor; Charles Reid, Wishaw; Ralph W. Robinson, Red Hill; F. Thurston, Luton; G. West & Son, Southsea; W. Clement Williams, Halifax, and W. W. Winter, Derby.

The Royal Academy Exhibition.—The Royal Academy opened its doors to the public on Monday. It is surprising how comparatively few photographers consider it worth while to visit its annual Exhibitions, considering there is always something to learn therefrom. As usual, several of the pictures in the present collection are greatly indebted to photography. Especially is this the case with portraits. Of course, this is not mentioned in the catalogue. Just now, in addition to the Royal Academy, several other picture exhibitions are open. There is the New Gallery, Royal Society of British Artists, Royal Society of Painters in Water Colours, and others, all of which might be profitably visited by the majority of photographers.

"At Last, Colour Photography."—This appears on some pictures exhibited for sale at a printseller's shop in one of the leading thoroughfares of the City. The pictures are in colours produced mechanically, are very indifferent, and the announcement is certainly misleading to the general public. This is proved by the fact that on two occasions we heard persons discussing the merits of the pictures as if they really were photographs taken in their natural colours. One remarked, "They have been trying at it for years, and now they have got it," adding, in reply to a comment as to the mediocre character of the work, "Yes; but, now that they have found out the way, they will soon make improvements upon it." The public have so often been told that the discovery of taking photographs in natural colours has been made, that "at last" some are easily misled by the above announcement.

Success of the Eclipse Expeditions.—It is gratifying to astronomers to know that the two English expeditions—the one to the West Coast of Africa and the other to Brazil—have both been successful in their photographic work. A few days back Dr. Ainslie Common, secretary to the joint Eclipse Committee of the Royal Astronomical Societies, received a telegram from Mr. Taylor, who had charge of the Brazil expedition, saying that the negatives taken with the chronograph and with both spectroscopes have been developed, and that they are quite successful. It will be remembered that similar success, with like instruments, on the West Coast had previously been announced. Expeditions from other countries have also been, for the most part, highly successful. It is not always the case in these events that the weather is as propitious as it was on this occasion. The results will certainly be of great value to astronomical science.

Stripping Negatives.—A question was put at a recent meeting of one of the metropolitan Societies as to how to strip a negative from the glass without the film expanding. The replies given were, however, not very definite. Now, if the negative be developed with pyrogallic acid, and is afterwards well alumed, the film, when removed, will have very little tendency to expand. If, however, expansion does occur, the film can at once be brought back to its original dimensions by immersing it in alcohol. Indeed, in some cases, when very strong spirit is used, it can be reduced below its original size. When extreme accuracy as to size is imperative, it is advisable to protect the film from expansion while it is in a moist condition, either by coating it with a thick film of collodion or with gelatined and indiarubber paper. Then, when the stripped film is dry, the protecting medium can pe removed. Details of each method of working will be found in our ALMANAC for 1889. Both methods are worked commercially when stripped films are required.

Portraits and the School Board.—At the meeting of the London School Board last week, the question was asked by whose authority certain "hideous pictures" had been placed in the new Board-room. The reply was that the architect proposed to insert in the lunettes of the Board-room the effigies of Archimedes and other ancient personages, and it was suggested that "portraits" of persons who were, or had been, on the Board would be preferable. Had the architect's idea been carried out, there is little doubt that the portraits of "ancient personages" would not have been so closely criticised as likenesses as are those that have been substituted. However, the living prototypes can scarcely feel flattered by the portraits that are to hand them down to School Board posterity being designated as "hideous pictures." Many board and committee rooms are adorned by portraits of former members; but they are usually in the form of oil paintings or enlarged photographs, and not as "hideous pictures."

American Appreciation of English Art Work.—It is satisfactory to find that the works of some artistic photographers in England appear to be highly appreciated in America. The pictures sent by Mr. George Davison to the Philadelphia Exhibition were too late in being delivered until after the work of judging had been accomplished. This delay was occasioned by Custom-house red-tapeism, which surrounds with difficulty so many things that enter the United States. If, however, Mr. Davison has received no expression of opinion from the Judges, he is being awarded a not stinted amount of panegyric by the press, in fact the eulogiums on his work are of the highest order. The *Public Ledger* ranks Mr. Davison as the foremost exponent of the art side of photography in England, his work being now seen for the first time in America. From this paper we learn that it is Mr. Davison's custom to produce only one good print from a negative, so that each of his pictures is as unique in its way as a painting produced by an artist in colour. This is a trait in Mr. Davison's working of which we were not previously aware. The exhibits form a special loan collection, and are not entered for competition. Many of the examples are made without a lens through a pinhole aperture.

REDUCING OVER-PRINTED GELATINE PROOFS.

For many years a perfect method of reducing over-printed albumen prints without spoiling the tone has been a *desideratum*, and, so far as I am aware, up to the present time has not yet been achieved. The mere reduction is a matter of the greatest ease by a variety of methods, but these, without exception, act more or less injuriously upon the colour of the gold-toned image, and rob it of the charm that rendered the "photographic purple" such a popular tone.

With gelatine prints, however, the case is somewhat different, whether the image is the result of printing-out or of development, since the tone is almost invariably free from that warm tint that marked the albumen print, and which is so difficult to maintain under the action of reducing agents. The neutral black or cool grey tones of the modern gelatine print are, in fact, little, if at all, affected by such agents, except so far as lowering the strength of the image may affect its depth. This is especially fortunate, since the difficulty of stopping development at exactly the right point, as well as of judging the correct depth in the dim light of the dark room, is far greater than in examining the gradually progressing image of a direct print in feeble daylight.

In his anxiety not to overdo the development, the operator is apt to err on the reverse side, and to discover when too late that the print is spoilt by under-development; but, in the presence of an

efficient means of reduction, he may with safety, and even with actual advantage, allow the development to proceed beyond the depth desired, and then, after fixing, and in a good light, proceed to reduce it at his leisure, and with every power not only of carefully judging the right depth, but also of stopping the action instantly when the proper point is reached. A further advantage may also be claimed, namely, that the process of reduction also serves the additional purpose of clearing the whites of the print, and removing developing stains, usually a separate operation, so that it can scarcely be said that the introduction of systematic over-printing and reduction adds anything to the labour involved.

It is scarcely necessary to remark that there are a large number of different methods by which the reduction can be effected, but in making the selection of a perfect one, I should decidedly give the preference to one that consists of a single solution, that is to say, one that removes the excess of density in one operation, instead of requiring the application of a second solution to complete the process. Of the first class, the mixed solutions of ferridcyanide of potassium and hypo, or of ferridcyanide and sulphocyanide of ammonium may be mentioned as types, while the second class is represented by such applications as weak hydrochloric acid followed by hypo. So far as the actual reduction is concerned, nothing can excel the compound solutions containing potassium ferridcyanide, but they possess an unfortunate tendency in the direction of yellow stain—slight, it is true, but still sufficient to mar the beauty of an otherwise perfect print. Alum and hydrochloric acid—the ordinary clearing solution for negatives and prints—exercises a powerful reducing action if long applied, and is free from the tendency to stain, unless, indeed, it be applied to a very imperfectly washed print containing unremoved hyposulphites. But it has the disadvantage of converting a portion of the image into chloride of silver—a portion at least of which must remain in the print unless removed by a second solution.

However, by adding to the acid solution sufficient chloride of sodium to saturate it, it is converted into a one-solution reducer, the solvent action of the chloride of sodium sufficing to hold the small quantity of chloride of silver formed in solution, and to allow of its removal by simple washing. The solution as I have employed it is made as follows:—A hot saturated solution of common salt is made, and when cold, to each ounce of it two ounces of alum and half an ounce of hydrochloric acid are added. This solution acts slowly, but with great regularity, and its action is complete just when the print appears of the right depth. All that remains then is to wash thoroughly to remove the soluble salts and free acid.

Another reducing solution which is to be preferred in some respects to that of alum and hydrochloric acid is one composed of a soluble hypochlorite. This will be preferred by many, because it acts also as a hypo eliminator, perhaps the safest there is, since it converts any hyposulphites remaining in the prints into the least injurious compounds. Its chief fault as an eliminator consists in its reducing action on the image, but this ceases to be a fault when it is the effect sought. The hypochlorite may be used in the form of *eau de Javelle* or "Labarraque's Solution," formulæ for the making of which will be found in the pages of the ALMANAC, or it may be purchased in the form known as "Ozone Bleach;" these all consist of solutions of hypochlorite of sodium or potassium, not pure, it is true, but sufficiently so for the purpose in view, or the pure hypochlorite may be employed, though at a much higher cost.

The action of the hypochlorite upon the image is to convert it into chloride of silver—not hypochlorite—oxygen being at the same time disengaged; any hyposulphites remaining in the print from the fixing are, at the same time, converted into sulphates, and, in the case of the silver salt, eventually into chloride. Here, again, the necessity exists for some means of removing the chloride of silver thus formed; but this is easily effected, in the manner already described, by the addition of salt. In fact, in making up the reducing solution, it is only needful to substitute saturated solution of salt for plain water, adding sufficient of the hypochlorite to confer the desired energy.

The above are undoubtedly the best reducing solutions I have met with in the course of some years' experience, but it may happen that such a solution has to be made up in an emergency, when possibly the materials given above are not available. Nitric acid, however, finds a place, or ought to do, in every photographic laboratory; take a couple of drachms, say, of strong nitric acid, and dissolve in it a saltspoonful of salt, or, at least, let the strong acid take up as much as it will, and then dilute it with water to the requisite strength. This forms a complex solution, in which, in all probability, nitro-hydrochloric acid exists; at any rate, it converts the image into chloride in a far more perfect manner than hydrochloric acid, and is much to be preferred. It must be followed, however, by a fixing solution; but for this purpose I should strongly object to hypo, on account of the washing required after it. Considering the small trace of chloride of silver to be removed, a strong solution of salt, or, better still, of sulphite of soda, will be quite strong enough, and the products of decomposition, as well as the salts themselves, are far more easily removed than in the case of hypo. W. LINDSAY.

THE PICTORIAL MODIFICATION OF PHOTOGRAPHIC PERSPECTIVE.

[Society of Arts.]

EVER since I invented my system of reflected electric light, which I had the privilege of exhibiting in this room many years ago, and put aside for a time my palette to join the ranks of the photographic profession, I have been made to realise as acutely as any one the limitations, impossibilities, and shortcomings of photography. Not only have I felt them limiting my ambition while trying unconventional posing, but because of them it has often been painfully irksome to have to explain the restriction of my powers to a class of sitters whom I may fairly describe as the non-photographic type. These sitters—and most of them, I must confess, are of the fairer sex—are prone to lament that their hands (which they always try to hide), to say nothing of their heads, waists, and so on, come out much too large. Others, again, fancy themselves much taller and slimmer than they optically, or perhaps I may say, architecturally, really are, and I have always been compelled to admit that they are right—that is to say, visually right, artistically right—and that photography in their case could not do justice to one's visual impression. The invention which it is my privilege to submit to your notice this evening is, therefore, the outcome of necessity, and meets a great want, which all leading men in the profession, and many amateurs, have long and keenly felt.

THE "TRUTH" OF PHOTOGRAPHY.

On few subjects, I venture to submit, has there been of late so much discussion, so much debate, and so great a confusion of ideas as on that of the question of the truth of photography, and the value of its services to art, which latter have been most generously and freely admitted by the greatest masters of the brush amongst us. But, now that we are attempting to correct figure, portrait, and landscape photography, I think the time has arrived when we may usefully attempt to analyse it, and appraise it at its actual value; the more especially as I am convinced, from careful observation of the work of some of the best draughtsmen and painters of to-day, that the close study of photography is ruining their judgment, and vitiating their appreciation of the beautiful. Eloquent proofs of the baneful effects of the new creed, that photography cannot lie, appeal to us on every hand. Take up, for instance, the current number of the *Century Magazine*; here we find a draughtsman of the first rank permitting himself to draw horses in action as no other man has ever drawn them, as, I venture to add, no human eye has ever seen them. Obviously he has studied instantaneous photography, and honestly believes that he is taking a fearless and conscientious new departure in pictorial art in the cause of truth, oblivious of the fact that the camera registers a section of an action immeasurably more minute than the eye of a man can chronicle and convey to the brain, and therefore he depicts what he has never seen—depicts what is, to all practical purposes, an untruth; a state of affairs of which no human cognisance has, or can be naturally taken. Similarly, we see portraits nowadays painted under a like influence; time was, about half a century ago, when artists, obeying the behests of fashion, painted heads, hands, and feet absurdly small. Photography, no doubt, is responsible for the reigning reaction. The tendency of town dwellers—the professional class, artisans, tradesmen, &c.—who get little exercise for their whole bodies, and use their heads and hands only in the struggle to earn a living, is to beget a large-headed, small-bodied race; while those who, from early youth, get plenty of exercise—the privileged classes, the aristocracy, the agricultural labourers, and even the miners—are noted for their more symmetrical or classic proportions, and their well-poised, small heads.

We see at the Royal Academy, the Salon, and elsewhere, portraits disfigured by enormous heads, hands, and feet, looking for all the world as though their outlines had been traced from an enlarged photograph originally taken with a short-focus lens. We see figure pieces intended to carry us back to classic times, which would be delightful and perfect but for something which takes away their individuality, which makes them too familiar, almost vulgar; what is this something? It is, that we instinctively recognise in the figures the type of the modern town-bred model, or of the sedentary professional race, perhaps members of the artist's own family. It is not, however,

given to every painter of classic subjects to so appreciate and adore that perfect harmony of a classic form as to be able to be true to, and resist the deterioration of, his ideal through the constant contemplation of his models and the baneful influence of optically distorted photography.

Optical Truth and Visual Truth.

Science protests that photography cannot lie. Well, optically, it cannot. I have been trying to put my argument into a nutshell. I may not have succeeded, but here it is for what it is worth—"Optical truth is not visual truth." This may seem very much like a paradox, but the dictionaries are so singularly unaidful to me in my dilemma, that, for the sake of argument, we must let it stand for the present. The force of the statement is, however, one which the future must speedily recognise.

Optical truth, then, as far as photography is concerned, is the result of a mere mechanical impression on a plate, which is sometimes more wonderful and beautiful than anything the human hand could fashion; but which, on the other hand, is sometimes so brutal in its fidelity, and microscopically vulgar, as to give one a very disagreeable surprise.

Visual truth is a very subtle quality. Its appreciation depends on the observer's artistic sense and powers of comparison. I would go as far as to claim it as an hereditary quality which different people possess in different degrees.

There is a great distinction between it and optical truth, or the truth of the camera. The camera focusses every spot at the same instant, without favour or prejudice, uninfluenced by natural selection. The impression on the brain, on the contrary, is affected by all these things. The eye focusses only one portion of an object at a time, and, whilst the rest of such an object is within the diffused vision, the impression on the brain depends on the temperament and the more or less artistic environment of the observer, the brain instinctively and unconsciously recognises the quality of distance. In portraiture we have to please the family, the relatives, and the friends of the subjects—those, in short, who are most familiar with their appearance; and, in their case, the visual truth is the outcome of loving and friendly contemplation. The first essential for a successful portrait-painter is that he should be sympathetic, possess a great deal of the milk of human kindness, and love his fellow-man. These are the gifts that will enable him to approach his sitter in the family spirit. When he paints a portrait, say, of a sweet old mother, he unconsciously tones down and modifies the optical truth, and, guided by the visual truth, he accentuates the air of distinction and spiritual dignity which his own refinement enables him to see and appreciate. But the photographer, though he be a born artist, and ever so appreciative of these qualities in his sitter, is cribbed, cabined, and confined within certain limitations and poses. It is almost useless for him to study the work of the great portrait-painters, for the moment he copies an unconventional pose, say, with hand or foot extended towards the camera, he produces a libel, and I defy any one to judge of the actual size in proportion to the body of the extremities of a sitter when thus brought forward in a photograph.

It has been advanced by some that this distortion can be overcome by a long-focus lens at a long distance; but, although it does partially reduce it, the conditions are unnatural, and the portrait loses that subtle yet powerful effect which makes one see the sitter in one's very presence, what one might call a "speaking-likeness" effect, to obtain which it is essential the point of sight, whether optical or visual, should have been within a conversational distance. A long distance immediately suggests a theatrical effect, unsuitable for the portraiture of private people. Whether this view is correct, or would only occur to one having the knowledge and practice of these distances or points of sight, is perhaps open to discussion.

I will now give you a number of pictorial illustrations by magic lantern, showing the difference between optical and visual truth, produced without changing the lens in front of the camera or the distance from the sitter. I will also show you the wonderful possibilities of this new power by a single humorous illustration, using a photograph of Mr. Marshall P. Wilder, that quaint American humorist, for my subject. I will also take a portrait by my light in an unconventional pose, and correct before you its inevitable distortion, and afterwards give you, as well as I can, a scientific explanation of my invention.

The Problems to be Solved.

Before I had brought my invention to its present state of adaptability, I found I had to solve five problems:—

1. To reduce locally the size of a head or hand, or other portion of a figure, and to do it symmetrically, so as not to change the character or symmetry of a head or the expression of a face; or, in the reduction of a hand or waist, to reduce, if desirable, the width only, and thus give a slender instead of diminutive effect.

2. Having solved this first problem, how to find a way to make a number of corrections in one negative at the same time, and with such simplicity and rapidity as not to call for special skill or training, or materially lengthen the time usually occupied in focussing during adjustment.

3. To shorten or to lengthen a portion of the whole negative right across without distorting the rest, such as lengthening the waist or skirt of a lady's dress, or, in the case of a landscape, to vertically enlarge the middle distance or horizon while reducing the depth of foreground and sky.

4. To obtain with each lens a variable degree of the modification of the dimensions of the parts corrected, so as to avoid the necessity of employing a great number of lenses to form a working set.

5. To find a readily fashioned refracting medium, so as to enable one to make at will eccentric alterations, or even distortions, especially suitable for the purposes of caricature.

The first problem I solved by the interposition in front of the sensitive plate of a supplementary lens. Although I claim this interposition as part of my invention, the abrupt ending of the curve of an ordinary lens would not only throw a shadow or dark zone upon the negative, but the abruptly broken-off lines and shades on the outside of the zone would not tally with those on the inside. I therefore (and this is the germ of my invention), continually vary the curvature of my lens until it reaches the plane—in other words, where the circumferen e of a plano-convex lens would otherwise stop—it flows or graduates into the reverse or concave curve, or, if plano-concave, *vice versâ*, and thus gradually merges by a wavelike line into the plane, with the result that the dark zone before referred to, consequent on the use of an ordinary lens, is replaced by a perfectly natural gradation, leaving no evidence whatever of the correction having been made.

The second problem I solve by providing a number of small lenses, each constructed on the above-described principle, and means of invisibly and adjustably supporting them in the pencil of rays.

In problem 3, to enlarge a portion only, such as the distance of a landscape, or to lengthen portions, such as the skirt of a figure, I interpose a plate of glass, a portion only of which is of a cylindrical form, flowing gradually into a plane.

I solve the fourth by so arranging these lenses in the cameras as to be readily moved backwards and forwards, thus varying the amount of the reduction of any part by change of focus. About a dozen corrector lenses will thus be all that are required to form a working set for ordinary portraiture.

To solve the last problem, I have found a readily fashioned refracting medium; but, as it requires considerable artistic skill to use it, and there are many difficulties to be overcome in its practical use, I am not in a position yet to bring it to your notice. It is embodied, however, in my patents.

The Uses of the "Corrector" Lenses.

It is easily seen that to use these corrector lenses requires no special training, only an eye for natural or visual proportions. That it is readily abused and dangerous in the hands of the stupid and ignorant only proves its wonderful pliability and adaptability in the hands of an artist, and instead of there being any drawbacks to its use, such as an increased time for exposure of the plate, on account of passing through more glass, the fact that the rays of the image are converged upon the parts rectified increases the brilliancy of the image, and it is found that the time of exposure is actually decreased.

This new power has many possibilities, which you can readily imagine. I prefer at present to hide from you other evidences of its versatility in the domain of caricature, wishing only to advance the cause of that which is the more beautiful and true. In this I have been encouraged by Sir Frederick Leighton, than whom we have no greater exponent of the beautiful in form, and who on a recent occasion, when visiting my studios to investigate this invention, expressed not only his surprise, but his delight, at the startling artistic gain, and the consequent visual veracity of the images I am enabled to produce.

Experts in optics are apt to have no sympathy or ear for the claims of art, and some will, doubtless, declare that optical truth is the only truth, and any correction a distortion. I was, therefore, doubly pleased, when I brought this invention before the Camera Club the other evening, to receive the congratulations and praise of its President, Captain Abney, the most advanced scientific expert in photography of the day. Unfortunately, he is prevented from being here this evening by an accident.

In conclusion, I would point to the examples I have shown you, and ask if they do not furnish an irrefutable proof of my assertion that "optical truth is not visual truth."

Hereafter we shall be able to make pictures which will not only tell us the visual truth—the real truth to our minds and hearts—but also tell us something of the individuality of the photographer, thus raising one branch of photography another step towards becoming a fine art.

H. VAN DER WEYDE.

DISCUSSION.

The Chairman said that, in listening to Mr. Van der Weyde and seeing his results, and especially in seeing how he put his lenses on the plate of glass, one was forcibly reminded of Columbus and the egg, and wondered that no one had thought of it before; but all strokes of genius came out in that way, and the greatest simplicity often displayed the greatest genius. He was very glad that a landscape photograph had been included among the lantern slides, because he had no doubt that many present had seen Vicat Cole's "Royal Windsor," and no photographer could ever take Royal Windsor like that. He had looked at the place itself, and tried to imagine where one could get a view of it like that, and he was quite sure that the painter had etherealised it, and produced a picture which no camera could give. There had been, in fact, an alteration of the middle distance, and that the camera was powerless to do, unless with the aid of some such device as had been described, which he thought was destined to ally landscape photography more nearly to art than ever it had been before.

Mr. Traill Taylor said that they all knew Mr. Van der Weyde's great abilities, and must acknowledge the exceedingly successful way in which he had sophisticated these portraits. It was not a subject for a scientist, but for an artist, for an artist did not care whether a picture was truthful or not.

Mr. W. E. Debenham said that it was not necessary to say how much they were all interested in seeing these results, but those who felt as he did must protest against it being asserted that the instrument used was an optical corrector; it was, as had been said, a sophisticator, and he protested strongly against the expression that optical truth was not visual truth, and maintained that images obtained in this way were not visually true. The two expressions, optical truth and visual truth, were, in fact, interchangeable. There were three objects in using an arrangement of this kind, one being to change the character of the perspective. Now, photographic perspective was simply a representation of objects larger in proportion as they were nearer; in fact, as they appeared to the eye. If one stood near a long building, and looked at it sideways, the near wall might appear half as high again as the wall at the other end; but no one would call it a distortion to represent it so, and every painter would so paint it, just as it was seen, and as a photograph would give it. If they saw trees in the foreground, and in the middle distance, a near tree might appear perhaps three times as high as a tree in the middle distance; the artist recognised that, and it was so accepted. But, in representing single-figure pictures, artists had not been in the habit of representing the advanced portion of a figure larger in proportion. Now, pictures appeared to be for the most part judged, not by the beholder's knowledge, and by comparison with the original subject, but by comparison with other pictorial representations of similar subjects to which he was accustomed. A Chinaman was perfectly satisfied to see objects which he knew to be of one size represented of one size, although at different distances; they were accustomed, in buildings and in a general sense, to see nearer objects represented larger than more distant ones, but they were not accustomed to see single figures painted in that manner, and therefore, when a photograph showed a protruding hand larger, and one in the opposite direction smaller, it was said that photography distorted. It was said that a man's boots were not twice as large as his head, and so on. Of course, it would be an extraordinary position for a photographer to choose, and no artist would choose such a pose, but, if it were adopted, the true representation would be exactly as the photograph gave it. However, as people were not thoroughly accustomed to perspective in single-figure pictures, there was something to be said in favour of a sophistication to this extent, which brought the picture more in accordance with what they were accustomed to. The second point was that this contrivance enabled the photographer to make pictures more in accordance with the conventional ideal. It was said that sitters complained that their waists and heads were too large; he was not now speaking of perspective effects, when one portion of the body was nearer the camera, but of waists and heads generally being too large. Too large for what? Simply for the conventional ideal according to which they had been accustomed to see them painted, which, as Mr. Van der Weyde had told them, was considerably too small. Photography had, to a great extent, cured painters of that fault, and there had always been some too great and too genuine to pander to fancy and fashion in that way; but, at all events, it was very common to paint heads and waists too small, and hands also; and an arrangement of this kind enabled the photographer to satisfy those who wanted rather a conventional ideal than a truthful representation. Again, it was said that mountains appeared too small and insignificant; that, being objects of interest, they filled the mind and gave the idea of being larger than they actually were; but, if that were so, why should waists and heads, which were not objects without interest, be made smaller? In both cases it was simply a question of what would be most effective or pretty, not what was most in accordance with truth. Painters had been in the habit of flattering, it paid them to do so, and no doubt many sitters would be better pleased. If this plan enabled photographers to flatter vain women by making their heads and waists appear smaller than they were, no doubt it would be commercially successful; but do not let them lose their self-respect by flattering their sitters, in word as well as action, telling them that these smaller heads or waists were in accordance with optical, or visual, or any other truth, when it was simply in accordance with a conventional ideal. Optical and visual truth were essentially one.

Professor C. Roberts-Austen, C.B., F.R.S., said that he had no knowledge of photography, but he did not like to let a paper of such extraordinary interest pass without a word. It seemed to him that the author had guarded himself against any charge of inaccuracy by saying that optical truth, so far as photography was concerned, was a merely mechanical operation. It had been known for a long time that our impressions were not to be trusted—that seeing was not believing—nor could they believe altogether what they only felt. If they crossed their fingers and rubbed their nose, they would feel quite certain they had two noses; and a sophisticator, if it was to be called so, was, in such cases, absolutely necessary. His wife happened to be an artist, and he had heard her say, with reference to a figure, that it was not high enough, that it ought to be eight heads high, or whatever the number was. He did not like to think that what they had heard was mere sophistication. It seemed to him that the author had shown how, by taking thought, they might add cubits to their stature.

Mr. T. R. Dallmeyer said that it appeared to him that one of the remarks in the paper was a mere truism, viz., that photographic perspective and visual perspective were not the same. Photographic or optical perspective was a science, but the way in which they saw things was dependent on psychology, which was not a science, and he did not believe it ever would be. Although photographic perspective was a science, it did not correspond with what they saw in the physiological sense. He had been much interested in these experiments, though it could not be called anything but a clever device. The only case in which photographic perspective and psychology agreed was when the images were entirely on one plane; then they were identical. They knew that the best results in photography were when the whole image was as far as possible on one plane. Before this device (which would, doubtless, be largely employed for portraiture), it appeared to him that a man exercised his skill as a photographer in arranging the sitter in one plane wherever it was possible, and cases in which the feet or hands came forward were the exception. He was not an artist, but, from an artist's point of view, he should think that this flattering device was an exceedingly useful one, and would probably become very popular; but it was not at all true. He must insist on that, because he thought Mr. Van der Weyde rather misunderstood Captain Abney the other day. He welcomed, as they all did, any scientific application of an optical nature, but he felt quite certain that he did not mean to convey that the results thus obtained were of an order which could be classed as scientific. As to landscape, the only example shown was one copied from another photograph, a portion of which might be lengthened or exaggerated, according to the psychological view of the individual, and it certainly looked very much better; but he did not see how this method would work in actual practice. If they took the case of a tree cutting the horizon, and applied this method to it, the middle of the tree would bulge out. There were only certain subjects on which the process could be used, and it appeared to him that an immense number of these correctors would be required to produce the desired effect in a landscape.

Mr. Van der Weyde said that there were two reasons why this method was valuable; one, because it enabled them to give a better suggestion of true proportion than an ordinary photograph would, if one part of the object came forward; and that was a solid, artistic reason. The other was that it enable them to please their sitters. But these two reasons should not be mixed up. There was no reason to decry the whole thing because it might be abused. He remembered very well, in early youth, when looking at photographs of people he knew well, that it always struck him how large their heads looked. The impression generally conveyed was not that conveyed by the photograph, and he contended that, as a rule, the head should be slightly diminished in order to give the natural impression. In taking a lady playing a violin, it was very difficult to avoid distortion, and an unnatural pose had to be adopted.

The Chairman said that they would all agree that they were indebted to Mr. Van der Weyde for one of the most interesting papers they had had on the subject of photography. With regard to visual truth, he had long had very great doubts whether there was such a thing at all. He was quite certain that, if he and Mr. Van der Weyde both looked at the clock at the end of the room, they would receive very different impressions; his short sight would only enable him to see a blur where his friend would see the face distinctly. Visual truth, therefore, was a thing that no artist could attempt to arrive at. In the work to which he referred before, there was no visual truth at all; it was a purely artistic work from beginning to end. He concluded by proposing a hearty vote of thanks to Mr. Van der Weyde.

The vote of thanks having been carried,

Mr. Van der Weyde, in acknowledging it, said that he agreed with much that Mr. Dallmeyer had said, but he could not agree with much that Mr. Debenham had advanced, and he thought that gentleman had ignored portions of the paper which he (the speaker) considered were conclusive as to the necessity for an instrument of this kind. A picture should

always give a suggestion of the impression on the brain, and if it did not do that it was not a picture, but merely an optically true photograph. This instrument helped one to do more, to make an optical representation of it; it gave a better suggestion of what they had seen than had hitherto been possible, especially in the case of portions of the figure which came forward.

THE INFLUENCE OF THE HAND CAMERA.

[London and Provincial Photographic Association.]

The spirit of exaggeration is one of the necessary evils attending the development of photographic civilisation. For years hand-camera workers have been pushing to the front, and striving to make the general photographic public decent and respectably minded citizens. But the dawn of reason has only just arrived, and, though tardily admitted, the *raison-d'être* of the hand camera is now recognised. It is possible for the veriest fanatic to now address an ordinary society upon what, in his opinion, are the points of hand-camera work, that is, he can now do it without the sneers and quiet scoffs of the old-timers. So that, in venturing to address myself to the decent and respectably minded body of men that compose the London and Provincial Association, I feel that, whatever the criticism may be, it will be just and generous. Above all things, I am sure you will fight, when the time comes, with interest in, and appreciation of, the hand camera itself. The battle hitherto has been between a small body of earnest men determined to advance, whilst opposed to them were thousands of skirmishers, who were too busy with other things to pay much attention to the invading force. The battle-cry of one was, "We are here, and we've come to stay," answered impatiently by the skirmishers, "Tut, tut! run away, little boys, and play," or "Bother these folks, what can they do? what rubbish to trouble us!" The first sign of the dawn of reason I detected some time ago, when I heard that a member of the London and Provincial Association had actually agreed to look at a hand camera, and it was thought to be a reasonable supposition that, ere long, he might actually handle the monstrosity. And now—well,

"Do I dream, do I doubt,
Or is visions about?"

Of course I mean *visions* of hand cameras. I hope you will correct me if I am wrong, but I believe you actually have men now who *use* a hand camera. What has happened to the poor London and Provincial Association? Has it been having too much "spirits" of late?

I said at the commencement that exaggeration is necessary nowadays. If a man wants to sell his camera, he asks *5l.* 10*s.* for it, so that he can get *4l.* 10*s.* by "reduction in the camera." You may perchance imagine I am on the same tack, that I am claiming (or, rather, shall claim directly) a good deal too much for the influence of the hand camera, so that I can climb down a little to appease your wrath, and yet get pretty well all I wanted to. Personally, by the conviction of experience, I believe all I say. You may not; that is your fault. In a few years' time they will be accepted as facts.

The influences of the hand camera run in several directions. For convenience' sake I have classified them into two

Photographic,
Mental or physical.

By an "influence of the hand camera" I mean some power or incentive towards improvement, in which the hand camera has been the sole—or, at least, principal—factor. To make a definite start thereto, I claim that it has been of considerable use in improving photographic materials, apparatus, &c.

Speed of Plates.

Much interest has of late centered round the great efforts of some of our platemakers to obtain the maximum rapidity of emulsion. The makers would hardly do this unless to supply a want; that must be admitted. The point is, from what does the demand spring? I allege from the hand camera. But it may be said, instantaneous photography in the ordinary camera must not be overlooked. Certainly not, nor the fact that the reduction of exposure in a studio of portraiture, especially baby and child studies, for dimly lighted interiors, and for portraiture by artificial light, is a convenience the desirability of attainment of which, no doubt, has helped in the same direction. There are possibly other causes which I have not enumerated. I admit their power, but deny their importance as compared with the requirements of the hand-camera worker. You may mass all these factors in a lump, and still the hand camera towers above that lump as a mountain to a molehill. The increased speed of plates is due to the hand camera, and, whatever weight other considerations may have added, they have only been as a single black pin is to a full box of white. It is there certainly but it does not make us buy the box. If there be any gain to photographers by the increase of plate speed, to the hand camera the credit must be placed.

Apparatus.

In several directions the influence may be seen. In order to diminish the enormous disparity in bulk and weight between the ordinary and the hand cameras, the former have been cut down in every possible direction. A hand-camera worker grumbles at the unnecessary weight of his 10×8 ordinary. Result, improvements and new patents galore. The necessity of reducing the shutter to small dimensions, in order to go inside the limited space of a modern hand camera, has brought upon the market a number of small and ingenious shutters. Possibly some of these and other improvements in apparatus, such as lighter tripods, dark slides, and the use of aluminium, would have arrived in due course. But we've got them *now*, and the hand camera did it.

Small Work.

Although it cannot yet be said that the day of small work has arrived, yet I claim that we are now appreciating quarter-plate prints very much more than we did. This has been a gradual growth truly, but a *résumé* of exhibitions during, say, the last two years would certainly prove the existence of the growth. In the old days the reports were something like this: "Mr. Blank shows a frame of snap-shots, which, as such, are very good." "As such," indeed; that is where the blind bigotry crept to the front. It was usual in those days to term them "snap-shots." Never mind if evidences of composition, careful treatment, and individuality were visible in the prints—that did not matter. They were snap-shots—no more, no—well, I cannot say no less, as no further degradation of photography could be then imagined. They were taken in a hand camera, and that damned them for all time. But now—they are snap-shots no longer, but prints the same as the rest. The influence has carried us towards the recognition of merit in the smaller sizes of prints, so much so that ordinary quarter-plate and 5×4 are constantly represented.

I'll admit that we have not yet reached rock bottom on this question, for, undoubtedly, small work does not receive its full meed of recognition; nor can it be said that hand-camera work is yet free from enemies. Even now, some puffed-up, unmitigated egotist of the high-art school waxes wroth occasionally, and provides padding for one of the photographic publications. He is usually one of those to whom photography must mean "art" or nothing. Well, we hand-camera workers do not suffer very much; I presume we have the proverbial duck's back. Anyway, Mrs. Artist Partington has no broom capable of keeping back the tide of the hand camera. Personally, I consider any man, who believes that photography is entirely concerned with art, science, or, indeed, any *one* branch, to the exclusion of every other, may safely be written down an ass. Hobbies may be ridden to the death, but they must not be allowed to order all others off the road.

Increase of Photographers.

Another very powerful influence is that of increasing the number of photographers. I don't think it can be denied that the principle of "You press the button, we do the rest," has increased th number of workers considerably. Many hundreds of the outsid public, to whom the very mention of a camera, tripod, lens, &c., would have frightened into fits, have bought a hand camera, to do "button-pressing" for themselves. Many of these must have been seduced into our ranks; for the step, from having "the rest" done by some one else to the doing of it themselves, was one of the easiest transition. Upon this point let me not be misunderstood. I cannot claim that all these "button-pressers" have become photographers (this is a terse way of putting it), but certainly a good many have been so pleased with their new hobby that they *have* made the plunge.

Better Posing of Figures.

This is another influence I claim. Of course, I know full well that all good photographers pay, and have paid, every attention to this matter; but my point is that the hand camera has stimulated effort in the same direction amongst the lesser workers. Let us suppose a case, of Smith, a half or whole-plate man, and his friend Brown, a snap-shot man. Smith is a careful worker of several years' experience, whilst Brown is but a beginner. Upon a comparison of results, Smith finds that in all his pictures there is too much staring at the camera if he introduces figures in the scene. He finds in Brown's shots, poor though they may be either artistically or technically, that, at all events, every one is not rooted to the spot, looking at the camera, and having the appearance of plaster-of-Paris images plumped down into the landscape, wishing they hadn't come, and wondering how they ar

going to get out. He takes the lesson to heart, and improvement in this respect follows. I am not saying this without authority, for I have seen the change in the work of many of my friends.

Illustrated Journalism has benefited considerably by the hand camera, as witness the reproductions of shots in the *Pall Mall Gazette*, the *Westminster Gazette*, and other up-to-date periodicals. The hand camera gives the power of depicting life and incident, which to the ordinary camera are impossibilities. This leads me to my last point in this section, but it is in no way least. Indeed I would lay considerable stress upon it. It is the influence of

Life and Character Studies.

As photographers we ought, I really believe, to feel a considerable amount of shame at the neglect of such a fine opportunity. If so be a hundred years hence it may be asked what has photography done, is the reply to be that it has produced pictures (at least the art photographer calls them so, though the painter will in no wise admit the fact), and pictures only? Certainly not. We can point to its use in astronomy, microscopic, medical, and many other directions, including the preservation of historic buildings and spots of interest. But will it not be asked at once, "Why did you not with the ample means at your command preserve for us the dress and fashion, the characters and incidents, the every-day life and bustle of the street?' Are we to answer that we sat at the feet of art masters who taught us so much about the diffusion of focus, the rules and canons of art, the composition, light and shade, freedom of treatment, idealism, realism, impressionism, and a few more "isms," that we either had no time, or were afraid to descend to such commonplace work as the life and character of the present century? I trust not, and sincerely hope a better account of our duty can be given. Here with the hand camera we have the opportunity of portraying for posterity life, life with its joys and sorrows, its sunshine and shadow, its comedy and pathos. The hand camera can in many cases do this better than the artist, and at all events we can do very much more in a given time. I have on many occasions fallen foul of photographic survey work, especially when any limitations of size or anything else debar hand-camera prints. Because that means the exclusion of life and character, which I firmly believe will have much more interest for future generations than these old mills, river banks, abbeys and castles, churches and public-houses (interior and exterior of each, of course), wandering brooks, &c. These may be stamped with the individuality of the artist; they may have clouds skilfully printed in from another negative; they may show the stream from the artist's house looking south, from the west, from the east, with the artist's house in the distance, and from round the corner; they may be sharp all over or sharp nowhere, but there is no life about them. Certainly, a farm labourer, say, may be introduced into the stream picture, but he will have his best go-to-meeting clothes on, be gracefully posed, and wear an expression upon his face a conjunction of care whether the cow is likely to get into the field, if this operation will keep him later at work, and whether he'll get a copy of the print. We may also be able to show studies of natives taken in the studio, with impossible backgrounds and sitting upon papier-mâché rocks, or standing in the street spruced up for the occasion, carefully posed, erect and manly, wondering what would happen if the show "bust."

After all, is there no art in the portrayal of life and movement? Is there no art in depicting the emotions and feelings by the expression upon the countenance? Are we to shut our eyes to the pathetic or humorous side of living nature? Must all art consist of dead tree-trunks, printed in clouds that run over the trees and landscape as if they were not quite sure just where they ought to be, and streaks of sunlight caught on the spree?

Must we produce representations of nature in an intoxicated state, or, as Captain Abney expressed it, "makes one perfectly sick to look at?"

No, good army of hand-camera workers, let not your hearts be troubled by this high art falutin. Keep steadily on the way of life and character, which is one of the hand camera's strongest directions of work, and the future will bless you equally with those who portray nature rubber-stamped with their own originality or eccentricity.

I have wandered slightly from my subject, but the influence of the hand camera is, and must be still more, felt in the direction of immortalising the men and women of to-day.

Mental and Physical Influences,

I now come to a somewhat more difficult subject to tackle, viz., the influences, physical and mental, of the hand camera. I don't expect you will agree with me upon some of the points at all, for the reason that, until a man has become a really earnest worker of some experience, these influences can hardly be understood. The hand camera, to my mind, exercises a considerable power of education, both mentally and physically. At all events, I have so found it. As the two points are so interweaved one with the other, it will be necessary to treat them together. The directions I refer to are principally increased speed of artistic perception, improving the vision, and quickness of action and decision. It is, perhaps, true that the class of work principally undertaken by each worker will make this point of lesser or greater importance. One who goes in for street work or rapidly moving objects will benefit more in these respects than the landscape worker. I still hold the opinion that successful hand-camera workers are born rather than made. Nevertheless, I cannot lose sight of the educational power of actual practice, for, speaking personally, the hand camera has quickened my thoughts and actions to a not unimportant degree. Speed in work and thought in these go-ahead times is not to be sneered at, and I do positively assert that I can work at greater speed, think, and decide more quickly than before using a hand camera. Take the question of focussing rapidly, and, to illustrate it best, let it be tried on a full-size focussing screen upon an approaching object. A few trials will prove how much more quickly it is possible to decide when actually sharp, and to fire the shutter, than it was at first. The whole question of thought and action following therefrom is quickened. To illustrate this, let me mention another capital test, that by electricity at the Aquarium, a test of vision and action. A pistol is held in the hand and a disc is watched. At a certain time a definite object passes this disc, and the task is to quickly fire the pistol, an electric arrangement of a black band registering the time that elapses between seeing the object and firing the pistol. Take any ordinary photographer (he must not be a shooting man, however), pit him against an experienced hand-camera worker, and the difference in the fractions of the second will be startling. Nay, further, let the hand-camera worker first try after a month or two's absence from the camera, and then, second, after he has been with it in the streets that day. He will be struck with the improvement. I therefore claim that the hand camera so improves our vision, our thoughts, our actions, in the direction of speed as to materially alter even a man's character. He decides and performs the result of the decision more quickly. He becomes sharp, prompt, and decisive, and past hesitations vanish. The hand camera therefore has considerable influence in altering the mould of the man.

I am ready to admit that the second division of influences may not appear of very much account, but am, nevertheless, convinced that, even if that is so, it is because I have not the ability to put these considerations before you properly. They wander afield somewhat from photography into other domains of study, with which I cannot claim much acquaintance as yet.

In conclusion, I claim for the hand camera the following points:—1, Increasing speed of plates; 2, Improving apparatus generally; 3, Causing greater attention to small work; 4, Increasing the number of photographers; 5, Naturalness of posing; 6, Aiding illustrated journalism and the study of life and character; and 7, Improving mental and physical action.

The paper is no weak-minded, cover-all-the-ground sort of attempt, but may almost be termed a fighting one. It is not hedged in with "buts" and "perhaps" and admissions or concessions, so as to prevent discussion or criticism. I have said what I believe and what I am prepared to defend from any honest enemy. And in that spirit I offer it to-night in the words of Hamlet,—

"Our thoughts are ours; their ends none of our own."

W. D. Welford.

RETOUCHING.

[Richmond Camera Club.]

I am given to understand that you expect of me something more than a lecture, and will not be content with less than a demonstration. You prefer to see things done rather than talked about, and I will try to make my paper as practical as the nature of the subject admits. It must, however, be remembered that retouching is emphatically not a demonstrative art. Good retouching is essentially modest and retiring, its very existence is unsuspected by many who admire the results produced by it, it is the Cinderella of the photographic arts, and its lot is generally to work without recognition or acknowledgment. I do not suppose I can act the fairy prince and raise it by anything I can say to-night to honour and esteem amongst amateur photographers; but I should be glad if I could, at least, cause you to consider whether a very useful, and in portraiture I might almost say an indispensable, art is not neglected more than it deserves to be. My own experience gives me grounds for assuming that it *is* neglected by amateurs, because, although I have met with amateur photographers excelling in many branches of photography, I have never met with an even passably good amateur

retoucher. The professional photographer, on the other hand, is very fully alive to its advantages, and is generally supposed to love it "not wisely but too well." How is this neglect to be accounted for? Are amateurs deterred by the apparent difficulty of the work, or do they look askance at retouching as an illegitimate tampering with the truth of a photograph?

The Degree of Skill Required.

If you examine carefully the work of a really competent retoucher on a head that has required clever treatment, it is quite possible that you may feel a little discouraged at the evidence it shows of a high degree of skill, which it is perfectly evident must be difficult to acquire. It must seem to the average amateur photographer that the time and patience necessary to attain such great proficiency would not be worth the while, and that he would do better to confine himself to landscape and subjects where want of retouching is not so apparent. But, after all, the proper study of mankind is man, and I suppose there never was an amateur, however ambitious, but who cast longing eyes on portraiture. Luckily, retouching is an art that pays good returns for small investments of time and thought spent upon it. A very little skill, if supplemented by intelligence, can be made of great use, and I feel perfectly sure that the most casual amateur would not find that any time given to learn the rudiments of the art was spent without result. If you are careful and resolute not to put any work on a negative you do not know will be an improvement, however little work you are able at first to do will be of advantage to your picture, even if it is confined to removing obtrusive defects or blemishes on the skin, or mending up neatly mechanical defects in the negative. Even such humble work as this will often make a negative satisfactory that could not be acceptable without it. If you learn how to get a suitable surface on your negative to work upon, and a properly pointed pencil to work with, you can get thus far without much difficulty; and I hope to-night to be able to teach so much to everybody here who cares to learn. As soon after as sufficient delicacy of touch is acquired to, if necessary, work on the negative so finely that the touches do not show when printed, further progress can be made towards retouching a head more completely. I have, besides, heard of conscientious photographers being deterred from practising retouching by an exaggerated respect for the truth of a photograph. But the inviolable truthfulness of a photograph is an unconsidered idea; an average photograph is, in fact, one mass of inaccuracies, and its irregularities are only too apparent to any one examining it with the slightest care.

In comparing a photograph with the object presented by it, the most noticeable variation of the photograph from the object, as seen by the eye, is generally its failure to render colour. This we are, of course, prepared for, and, I am sorry to say, even retouching cannot make good the omission, and for this reason we are not concerned with it to-night.

Modification of Tone by Retouching.

There are, however, other particulars in which photography seriously falls short of an ideal expression of the object photographed, and in most of these retouching can render very material assistance. Take, for instance, the modification of tone by colour, and this, in itself, is sufficient to prove the utility of retouching. Colour exercises a seriously disturbing influence in the rendering of tone by a photographic plate, and no object, in which there is a great diversity of colours, can be rendered in a photograph in its proper relation of tones.

In a photograph, reds and yellows will be represented much too dark, while the colours at the other end of the spectrum, the blues and violets, will be lighter than they should be. The introduction of isochromatic plates has lessened this fault, but the correction has only been partial and incomplete.

An engraver rendering an oil painting, or an etcher working from nature, is able to put aside colour altogether, and to express his subject by the proper relation of its tones to one another. If he gets a red or a blue together, it makes no difference to him; he expresses them simply as tone values, and according to their depth and intensity as seen by the eye. In a photograph everything is distorted by the influence of colour: a red and a blue together send their relative tones flying wide apart, and so exaggerated and untrue that the merest novice in retouching could see the inaccuracy, and to some extent correct it. Consider for a moment the effect of the colouring of the human face on a photograph.

Here we have an object with such varied colour and tone that it is almost impossible to get a passably truthful representation on a photographic plate. Take a fair subject with a high colour and a freckled skin, and, if you want to make a bitter and implacable enemy for life, show your subject the result untouched. Every freckle and imperfection in the skin that in life are not noticeable, and in the reduced size of a cabinet or carte photograph could not be seen at all, stand out harshly and obtrusively, and the unfortunate subject looks as if a charge from a shot had been distributed over his or her face. The glowing colour in the cheeks, again, which in life would be a charm, is rendered in the photograph as a shadow, and gives an unnatural hollowness to the cheeks and a sunken appearance to the face; the hair, again, being a warm tone, is sure to be rendered darker than it should be, while the eyes, if blue or cold grey, are lighter.

The effect in extreme cases is horrifying, and in all cases inaccurate. A photograph is often described as "justice without mercy," but this should only be when it is retouched, in its untouched state it is generally "justice without mercy" with the justice left out. Of course, I have put here an extreme case; some of us may be fortunate enough to keep through life the bloom of youth on our complexions, and preserve a skin unsullied by freckles or blotches, but we should then feel all the more keenly the flagrant injustice of representing the face blotched and uneven by the variations of colour in the skin unseen by the eye. An interesting illustration of the effect of colour on the skin was reported in the photographic press some months ago, when the photographs of a sitter in the earliest stages of fever revealed indications of the disease on his face long before they could be detected by the eye.

But even if there was no colour to deal with, although the tonality of photographs of most subjects would be much improved, it would be very far from perfect. It may be possible to make a negative from a subject in monochrome in which the tones shall have true value, but it is extremely difficult, and depends on the exposure being timed with great accuracy, and the development being carried on with the greatest skill. If it is under-exposed, the tone will be hopelessly extended and grades lost at both ends of the scale, some being smothered in the shadows and others lost in the lights.

Again, take the form of an object in its simplest expression as shown by its outline. Here we have no colour to confuse the form, and the shape does not depend on gradations of tone, but even under these simpler conditions we are not sure of getting an accurate representation by photography.

There is the distortion of the lens to be taken into account, and in an object having much depth the front or part nearest the lens will be of an exaggerated size compared with the part more remote, especially when the lens used has not much depth of focus.

Most Negatives Improved by Retouching.

I have reminded you in this way of some of the shortcomings of a photograph, because, unless it is clearly seen how imperfect a photograph must necessarily be, there is no excuse for meddling with it. But, whether you photograph landscape, figure, or portrait, you will seldom take a negative that could not be considerably improved by intelligent retouching.

For portraiture, indeed, it is absolutely indispensable, and the professional portrait photographer owes his very existence to it. Before it was understood that a negative could be worked upon, freely and successfully with a lead pencil, portraits were almost invariably taken of small size, generally of full length with tiny heads too small to show the imperfection, and photographs of this period are generally found to have been clumsily posed full length, *carte-de-visite* size.

The advent of retouching brought an immense extension of business to the photographer. Now large heads are generally made in almost the other extreme, and there is not a photograph sent out by any photographer of repute that is not from a negative that has been through the hands of the retoucher, and generally to its great advantage.

An Example.

Let me draw your attention for a moment to an example I have here. It is not an extreme case, but it will serve. It is a negative I picked out from only a few I looked through, and is an every-day subject with the retoucher.

The lady is not suffering, as at first sight she appears to be, from the ravages of some fell skin disease. You will notice she has rather a pleasant, smiling expression, not appropriate to one in pain. It is, in fact, nothing half so serious; she has merely been out in the sun, or has used the wrong soap—the one that is not matchless for the complexion—and has got a few freckles. Slight imperfections, barely apparent to the eye, but which are maliciously rendered by the lenses as great blotches and splashes having a perfectly horrifying effect. I have retouched the negative and made another enlargement from it, and I think you will agree that it is not only a more pleasing portrait, but also much more convincing as a likeness. The retouching is not flattery, it is an act of simple justice. I will willingly acknowledge that, like all useful things, the practice of retouching can easily be carried to excess; it must be confessed that it is often used in such an illegitimate manner as to call down upon the art sharp and well-deserved criticism. A fashionable photographer will think nothing of carving away a substantial piece of a lady's waist if it is not in the same proportion as that of a figure on a fashion plate. He will straighten a nose, as a matter of course, if it happens to be a little too *retroussé* or pronouncedly Roman, tint grey hair, and entirely eradicate wrinkles and marks of age of all kinds.

The Materials Necessary.

The cost of the materials necessary for retouching need deter no one from commencing. A 1*d.* pencil, or, if price is no consideration and you are inclined to be luxurious, say, a 4*d.* Faber or Hardtmuth, some arrangement in the shape of a retouching desk to support the negative, and a little medium, that can be made up for a few pence, is all that is absolutely necessary. The pencils I generally use are Hardtmuth IIH or HHH leads in screw holder. These or Faber's best pencils are very even and free from grit, and take a very fine point without breaking. They may be obtained in almost any number of H's according to hardness, and perhaps a beginner would find it easier to get on with a rather harder pencil at first; but a softer pencil saves time when the touch has

become light enough to use it. When you have got the right sort of pencil, the next thing is to get the right sort of point on it. This is one of the first difficulties of the beginner. An extremely fine point is absolutely necessary for such delicate work, and it is worth taking pains to obtain. I make a point about an inch or rather longer, tapering down regularly from the thickness of the lead to the sharpness of the finest pointed needle. The quickest way to sharpen is to rub down first with fine sand paper, and finish on a piece of ground glass or opal glass. The gelatine or varnished surface of a negative is too smooth to work upon, and offers no bite to the pencil; it is necessary to prepare it in some way. To my mind, the most comfortable surface to work upon is obtained on a good hard varnish, by grinding the surface with pumice powder. This gives a luxurious surface compared to the usual surface given by a medium.

The varnish must be fairly tough and well baked after negative is varnished. The grinding down must be done with some care, or there is a danger of scratching or cutting a hole in the negative, especially if the pumice is not fine and free from grit.

A little of the pumice should be taken on the tip of the finger and rubbed carefully on the parts to be worked upon. With a little practice any surface can be obtained to suit the subject, from a rough surface with a tooth like drawing-paper to a fine surface that will only take the pencil in light, fine strokes. I much prefer this surface to any other I have tried, but it has, unfortunately, a serious drawback, the density of the part rubbed down is very slightly increased. In retouching a face, the very slight increase in density is generally imperceptible, and when the negative is thin may be a positive improvement. When the face to be retouched is already on the dense side, it is better to use a medium.

There are a number of suitable mediums sold for the purpose. The medium I generally use is made of one drachm of powdered resin to two ounces of turpentine; it is very easy to make, and answers as well as any other.

The disadvantage of mediums compared with a surface prepared with pumice is that they are generally more or less tacky, and tear off the fine point of the pencil, and the bite cannot be regulated so conveniently. However the surface is prepared, it will not take the pencil freely enough to bring up quite transparent places in the film to the density of the lights, and when very transparent places have to be dealt with, such as holes in the film, dust spots, and other similar defects, it is best as well covered with the pencil as possible, and strengthened to full density with water colours mixed to match the tint of the negative stippled on neatly with a fine brush.

A retouching desk is required to support the negative in a convenient position while retouching. The desk should be firm, and capable of being arranged at an angle so that the light may be reflected through the negative from a reflecting surface arranged beneath. Desks sold for the purpose generally have a mirror for reflecting the light; but, unless the light is very weak, it is reflected too strongly by a mirror, and white paper makes a much better reflector, and has more mercy for the eyes. A good desk will be fitted with frames to hold different-sized negatives, and a hood to screen the eyes of the retoucher from light other than that passing through negative.

When we have these few requisites, we are ready to commence.

The Usual Method of Retouching.

I propose now to show you, as well as I am able, the usual method of retouching a portrait head with pencil, and afterwards I propose to call your attention to retouching methods more suitable to landscape photography.

It is a very difficult matter to illustrate portrait retouching to an audience, and I am trying a novel way. I have here a negative bromide enlargement of a head to life size. That is, an enlargement made from a positive transparency instead of from a negative. It is a choice subject, from a retoucher's point of view, and I am sure that the need of retouching is perfectly obvious to everybody who can see it. I am afraid I should exhaust your patience if I tried to retouch it in anything like a finished manner; but, if you can bear with me for a few minutes, and imagine it is the negative of a small head, and that you are looking through, instead of on to, it, I will show you how I should commence it. When it is necessary to retouch a landscape negative, the need for working upon it is generally from the same causes that call for retouching in a portrait, viz.:—

The modification of tone by colour, the defective rendering of gradations of tone through under or over-exposure of whole or parts of the negative, or faulty development, distortion by the lens, &c.

The method of working is, however, different in landscape; it is generally necessary to deal with larger surfaces, the delicate niggled work of the pencil must be exchanged for something broader.

The most useful retouching when broad patches are required to be lightened or darkened, such as an under-exposed foreground against an over-exposed distance, is done on the back or the glass side of the plate with the stump, or with coloured varnishes, or with colour applied with the brush. There are great advantages in working on the back of the plate; there is no risk of spoiling the negative, as any work put on, if not satisfactory, can be wholly removed or can be worked upon or corrected by scraping with a knife; and, besides, the retouching, being separated from the printing surface by the thickness of the plate, prints softer and permits of rather coarser working. Suppose we have a tree trunk in the foreground which is rather under-exposed, and which, before the distance and denser parts of the negative are printed, has darkened into a black stripe without shape or rotundity, it is an extremely easy matter to work upon it from the back of the negative and make it print as light as desired to bring it into proper tone with the rest of the picture. This can be done by coating the back of the negative with matt varnish, or covering it with *papier minérale* (a transparent paper sold for the purpose) and stumping a tint over it with a lead. If, however, it is necessary to make a very decided alteration, sufficient density cannot be got with the lead, but with tinted varnish a black object can be modified to numberless tints—to white if necessary.

The varnish may be made up with collodion and thinned with ether, and tinted to the required density with a few drops to the ounce of a strong solution of aurine. Pour it over the back of the plate so as to cover the part to be modified, and as soon as it is dry scrape it away where it is not required. The same plan may be adopted to help parts of a negative too dense to print.

Take, for instance, the gleam of sun on water. Very frequently the negative will print with a hard, white, chalky light, omitting altogether the delicate tones that approach the high light. Although they are apparent in the negative, the picture would be over-printed before they were printed out. If, however, the negative is varnished all over, the back with a suitably tinted varnish, and the varnish over the light removed by scraping with a knife, the difficulty would be overcome. This method of treating a negative is extremely simple, and I think can be used with great advantage and effect by every landscape photographer. I do not mean in order to make poor negatives presentable, but there is hardly a negative produced that could not be made more truthful and more beautiful by judicious and intelligent retouching. It puts in our hands a power akin, although remotely, to that of the painter, who can arrange the tones of his picture according to his feeling and judgment.

Ernest C. Morgan.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 8340.—"Improvement in Lenses." H. Bate.—*Dated April* 25, 1893.

No. 8420.—"Improvements in Photographic Cameras." J. W. Wilson.—*Dated April* 26, 1893.

No. 8541.—"An Improved Apparatus for Changing in Daylight Photographic Plates from a Light-tight Box to the Dark Slide of the Camera, and *vice versâ*." E. Barnard.—*Dated April* 28, 1893.

No. 8624.—"An Improved Washing Apparatus for Photographic Prints." W. M. Simpson.—*Dated April* 29, 1893.

SPECIFICATIONS PUBLISHED.

1892.

No. 7567.—"Photographic, &c., Materials." Christy.

No. 9819.—"Photographic Cameras." Beck & Clarke.

PATENTS COMPLETED.

Improvements in Apparatus for Taking Instantaneous Photographic Pictures.

No. 10,353. Georges Philibert Charles Maroniez, 101, Rue Faidherbe, Boulogne-sur-Mer, France.—*March* 4, 1893.

My invention has for its object improvements in apparatus for taking instantaneous photographic pictures, the movement of the shutter and the changing of the sensitive plates or surfaces being effected by a single movement of a knob or handle.

The apparatus consists of a box or camera forming a dark photographic chamber, provided with a lens adjustable by a rack and index, so that the exact position and focus can be determined beforehand.

Behind and against the front of the camera is a shutter in the form of a disc, revolving always in the same direction. It is provided with two opposite openings, which pass in turn in front of the opening of the lens, and it is mounted upon an axle having a toothed wheel, operated by a coiled spring, which can be wound up with a key when required, so as to afford a considerable number of exposures.

At right angles to the diameter of the disc on which the openings are made, and at its circumference, two catches are arranged which serve as stops. For this purpose they act in combination with an escapement or anchor piece pivoted in the upper part of the camera.

This escapement is held back in its normal position by a spring, one of its teeth being down and the other up, so that the first engages with and holds one of the stops upon the disc, and prevents the latter from turning.

When, by the action of a bar or pusher moving longitudinally and provided with a tappet, the escapement is turned on its centre, the tooth described is released from the disc, which makes a semi-revolution, uncovering the lens as it does so. The other tooth of the escapement, which is now down, then stops the other stop upon the disc, but when the pressure upon the pushing bar is released it is returned to its normal position by a spring, and the escapement takes its original position, the second stop upon the disc being released, but being immediately caught by the other tooth of the escapement, where it is held in readiness for another exposure, and so on as often as may be desired.

In order to change between each exposure the sensitive surface, which may be either glass plates or films of any convenient size, they are contained in frames or discs of thin metal slightly concave to give elasticity, and having their edge turned over to hold the plate or film.

These frames are arranged one behind the other in the back of the camera, and are all pressed forward by a spring. They are supported below by two guides, allowing a slight amount of play, and the front frame is pressed against two pieces of metal, which project very slightly above the ends of the guides, and have their projecting ends rounded.

In the middle of the upper part of the camera is arranged a longitudinal bar or spindle, turning in bearings, and having upon its front end a toothed pinion gearing with a rack upon the pushing bar already described, so that, immediately after the shutter has operated, the pinion and spindle are made to make a quarter of a turn.

The spindle carries two curved teeth at right angles to each other in end view, and one somewhat in advance of the other, the forward tooth, which, in its normal position, is inclined downward and curved to the left, serving to release the front sensitive plate and frame. For this purpose it is combined with a stop at the end of a flag spring, which presses it down, and against which, in this position, the top edge of the first or front frame presses.

By the revolution of the spindle by means of the rack, the front tooth rises to the left, and, having made an eighth of a turn, comes against and presses up the spring and stop, pushing the latter into a recess in the top of the camera, so that the top of the front frame is released, and being pushed forward by the spring at the back, and by an angular spring described presently, falls forward (turning upon its lower edge), and, guided by two curved guides in the body of the camera, falls flat upon the bottom of the latter, where it is held by two springs in the sides.

At the same time that the forward tooth upon the spindle has moved up, the corresponding back tooth has moved down, and prevents the next frame from falling forward.

When the pressure upon the pusher bar is removed, the spindle is brought back to its original position by a spring, and the next frame is pressed forward and held in position ready for a fresh exposure.

The back tooth upon the spindle operates a wedge-shaped piece at the end of a flat spring, which tends to force it down. This piece has a notch, into which the said back tooth engages, and raises the wedge into the recess at the top of the camera. When the tooth is lowered, it releases the wedge, which is forced down by its spring, its edge entering behind the frame which has just been exposed, and driving the upper edge of the latter forward so that it falls over as already described, even in case the camera is inclined somewhat backward.

Inside the camera, at its right and left sides, are two vertical springs of thin steel metal split into strips of different lengths, the thickness of, say, three superposed frames being left between their successive ends, which are bent somewhat outward, so that the frames as they fall easily press them back, but are afterwards prevented from rising from the bottom, or being displaced, even if the camera is turned in any direction. An opening in the bottom allows these exposed plates to be removed without disturbing the others.

The pushing bar is provided at its end with a spring cam, which, at each operation, advances a ratchet wheel one tooth, the wheel having a number of teeth corresponding with that of the plates, and having an exterior index hand which can be brought back to zero by a button, and indicates automatically the number of plates exposed.

The pusher bar itself, which actuates the entire mechanism, is of brass, having a rack cut in it to fit the toothed pinion on the spindle, and it is also provided with a pall which in its forward movement actuates the escapement. This movement is so arranged that the escapement is released after the first part of the stroke, during the remainder of which the teeth upon the spindle disengage a frame as described and cause it to fall to the bottom of the camera, the two movements being in succession and not simultaneous.

The pusher bar is operated by a cam having an exterior thumbpiece which can be worked without shaking the camera. By turning this thumbpiece a quarter of a turn, the cam is turned and forces forward the pusher bar, which starts the escapement and the spindle. A safety catch prevents the thumbpiece from being accidentally moved.

When the pusher bar is brought back by its spring, the whole of the parts take their original position ready for a fresh exposure, and all the required movements are made with great rapidity by a simple pressure upon the thumbpiece, so that a large number of exposures—say, twenty a minute—may be made without interruption.

From its simplicity of construction and operation, only a simple pressure upon the thumbpiece being required, the apparatus may be safely used by persons inexperienced and without knowledge of photography.

Improvements connected with Photographic Cameras.

No. 8067. Samuel White Rouch, 180, Strand, London.—*March* 18, 1893.

Instead of the narrow piece made removable, which was detachable from the baseboard which folded over so as to protect the focussing glass, as described in my patent (No. 1448, April 11, 1878), I now make this removable narrow piece much broader, so as to extend nearly from side to side of the baseboard, and have it attached thereto, so as not to be removable, but to slide in and out within defined limits by means of a rack and pinion. The front of the camera, by which the lens is carried, may, as in my former arrangement, be attached to this travelling and adjusting piece at either of its ends, so as to provide for either a short or long extension by the bellows body of the camera to provide for the including of wide or narrow angles of view; and, whereas the former narrow adjustable travelling board had one rack only, my improved one is fitted with two—one at each side—thus ensuring steadiness and parallelism of motion.

Attached to the back of the camera is a repeating back adjustment (already known in some other cameras), by which, instead of one single picture the full dimensions of the camera, two of smaller size may be taken side by side.

To provide for the increased raising and lowering of the lens in the camera, the front slides in grooves at each side, and at its bottom ingress of light to the camera is prevented by a folding gusset arrangement of leather or similar material attached respectively to the solid front of the camera and the movable lens-carrying front, by which arrangement light is totally excluded, even when the movable front is considerably raised.

This camera may be used for the production of either enlarged or reduced pictures from any negative or cliché by the following means:—It is erected on an elongated table or base, and, its front being removed, the front of another, although not necessarily similar, camera is inserted thereon, by which both are thus attached together. This latter, to permit of the facility of extension, has two independent bellows bodies, each fixed to the central frame. An enlarging or reducing lens is fixed in any convenient place in the latter camera, which has an independent ground glass on which to focus the enlarged or reduced image, and the means for holding the negatives or cliché.

After the camera has been focussed, and to prevent its being thereafter removed or disturbed, a quick-threaded screw, acted on from the side, jambs the adjustment and renders it temporarily rigid.

Improvements in or relating to Apparatus for the Exposure, Separation, and Storing of a Pack or Series of Photographic Films.

No. 2566. Joseph Thacher Clarke, Boston, Massachusetts, United States of America, at present residing at 3, College-road, Harrow, Middlesex.—*March* 25, 1893.

The chief purpose of my invention is to provide an apparatus, of the type customarily described as a "changing box," by means of which a pack of sensitised films or like flexible sheets may be exposed in connexion with an ordinary photographic camera, and may thereafter be transferred *seriatim* to a light-tight receptacle, where they are stored in another pack or series. Certain features of my invention—notably the differentiating indicator wheel, the interlocking pressure board, and the means for attaching the selecting devices to their supports—are, however, directly applicable to photographic film-changing apparatus of other types, such, for instance, as a self-contained hand camera. This adaptability will be readily understood from a description of my improved changing box for photographic films, and will, moreover, be especially referred to hereinafter.

My invention is more particularly intended for the manipulation of films notched upon two of their sides and arranged in alternate sequence, as described in Letters Patent, No. 23,315, of 1892. A pack or series of such notched films may be exposed, separated, and stored in my improved changing box without the intervention of carriers or sheaths, and without previous separation of the films by the photographic operator. Means by which similarly notched films may be selected and separated *seriatim* from a pack or series have been described by me in Letters Patent, No. 11891, of 1890, where they are referred to by the numerals D 12, and the separating device which I employ in my present invention, is, in principle, identical therewith.

My improved changing box consists of two receptacles. The first of these (which will hereinafter be referred to as the dark slide) contains the pack of unexposed films, and is provided with a rebate or with catches for attachment to ordinary photographic cameras, in the same manner as are the double backs which are in every-day usage for the exposure of glass dry plates.

The second receptacle (hereinafter called the receiver) is adjoinable to the dark slide, face to face, by a light-tight fitting, and serves to store the exposed films which are transferred thereto.

The faces of both dark slide and receiver are closed by light-tight shutters which may be withdrawn for the respective purposes of making the photographic exposure, of transferring the films from one receptacle to the other, and of removing the exposed films. The dark slide has an opening at its back to permit of the insertion of the pack of unexposed films, together with a spring follower or backboard serving to press the films forward against the selecting and separating devices which hold the foremost sheet in register.

For the purpose of making an exposure upon the foremost film in the dark slide the procedure is as follows:—This receptacle is attached to a photographic camera in the same manner as an ordinary double back; the shutter of the dark slide is withdrawn; light is admitted to the camera lens in the customary way, and the shutter is replaced. The dark slide is then detached from the camera and adjoined, face to face, to the receiver, being held in an approximately horizontal position, face downwards. The shutters of both dark slide and receiver are withdrawn together, and the film-separating mechanism is operated by means provided for this purpose upon the outside of the case. This releases the exposed film and allows it to fall into the receiver. The shutters are thereupon replaced, and the receptacles separated. These operations may be repeated as many times as there are unexposed films in the dark slide. When it is desired to remove the exposed films for the purpose of development in the photographic dark room, this may be readily done by withdrawing the receiver shutter.

Improved Photographic Magazine Changing Box for Plates and Films with Roller Slide Shutter.

No. 6355. Carl Grundmann, Leipzig, Saxony, German Empire, Nicolaistrasse 41.—*March* 25, 1893.

This magazine changing box is provided with a plate-changing device which renders it possible to use the same, as other ordinary dark slides, direct with the camera, and also allows the same to remain fixed to the camera during the changing of the plates, that is, while transporting the exposed front plate to the rear.

The changing of plates is greatly facilitated by employing my invention.

A further improvement relates to the arrangement by means of which the slide or shutter, which serves for exposing and also for changing the plates, moves in a semicircle round the box forming the plate magazine, and for that reason does not protrude from the apparatus during the use of the same.

It is, furthermore, very advantageous to employ a light-tight bag fixed to the

box for temporarily holding the plate during the changing, as the folds close to the box when not in use.

A great saving of space and a very compendious form is the result.

The connexion between the box forming the magazine and the attached bag is formed by two slots made in one of the side walls, one of the slots being towards the front near the shutter, the other to the rear of the last plate, both slots being protected by the bag.

The exposition and changing of plates is carried out in the following manner :—

After fixing the changing box to the camera, the safety spring attached to the lid is pressed down and bolted, and a roller-slide shutter moved in the direction towards the bag.

In this manner the front plate is laid free to be exposed, and at the same me the frames, which carry the plates or films in the box, moved so far forward by means of the pressure of a spring that the front frame will be in the focus of the lens and in the position which the shutter has previously occupied.

If the shutter is moved in the opposite direction to the aforedescribed, when the exposition is ended, the front frame, with the exposed plate, will be simultaneously pushed through the forward slot into the bag, from whence the same can be moved by hand through the rear slot into the changing box behind the other plates.

By means of a ruby glass let into an opening of the lid, the succession of the frames, which are provided with consecutive numbers, can be observed.

Improvements in Photographic Apparatus.

No. 9535. James Douglas Lysaght, 7, Crescent, Queenstown, co. Cork, Ireland.—*March* 25, 1893.

My invention applies more particularly to that class of photographic apparatus known as hand cameras.

It provides a means for accurately focussing the image previous to exposure.

To accomplish this, I provide a plane mirror, preferably silvered on its upper surface, to reflect the image projected by the lens on a piece of ground glass inserted in the top of the camera. This mirror is attached to a plate which slides in grooves on a frame in the same manner as the sliding stage of a microscope, being actuated by a rack and pinion. The frame is so constructed that it forms an angle of 45° with the ground-glass screen.

To obtain a suitable chamber or hood to enclose the ground-glass screen, I provide two flaps or doors, hinged to the top of the camera—one of these doors is fitted with side wings. When in use for focussing, these doors or flaps are raised by rods, to be hereafter described, and form a focussing chamber, the width of aperture of which is capable of adjustment.

To enable the operation of focussing to be effected in the most satisfactory manner, I provide means, to be hereafter described, to open the stop or diaphragm of the lens to its fullest extent at the same time that the doors of the focussing chamber and mirror are raised.

To accomplish these combined movements, I connect the pinion that actuates the mirror by means of a train of wheels to a vertical slide furnished with a rack. At the upper end of this slide suitable rods are fitted connected with the flaps of the focussing chamber.

A lever handle outside the camera connected with a toothed wheel inside in gearing with the train of wheels above mentioned actuates the apparatus.

The stop or diaphragm of the lens is moved as follows :—I attach a roller to the shaft carrying the wheel and lever handle ; to this roller one end of a cord or chain is attached, the other end being secured to the knob or projection from the stop, this stop or diaphragm being preferably that known as the iris. A spiral or other spring fixed between the side of the camera and the knob of the stop serves to bring it back to any required position. An adjustable pin or screw permits of any degree of adjustment of size of aperture.

For use with my invention I prefer that form of exposing shutter known as the roller blind, fitted as close as possible to the sensitive plate or film.

The claims are :—That one movement of the lever handle in one direction raises the mirror and the doors of the focussing chamber at the same time, opening the stop of the lens to its full aperture, thus enabling an accurate focus to be obtained by means of the usual rack and pinion attached to the lens or camera, and the reversal of the handle lowers the mirror, closes the doors of the focussing chamber, and returns the stop of the lens to any prearranged position.

Improvements in Photoographic Camera Shutters.

No. 9820. Conrad Beck, 68 Cornhill, London, E.C., and Joseph Thacher Clarke, Boston, Massachusetts, United States of America, at present residing at 3, College-road, Harrow, Middlesex.—*March* 25, 1893.

Our invention relates to photographic shutters of the type described in Clarke's Specification, No. 20,852, of 1890, in which the movable plate or shutter, revolving in one direction only, is of a circular shape, with a single exposure aperture, the size of this aperture being increased or diminished by a secondary or auxiliary semicircular fan or stop attached to the face of the main shutter disc in such wise as to obscure a greater or less portion of the aperture thereof. With an auxiliary stop of this nature, the exposure aperture in the shutter disc may be varied from the narrowest radial slit to a concentric zone extending to a length of 180 degrees.

In shutters of this type, the exposure aperture, whether narrow or wide, has hitherto been so arranged as to pass immediately in front of the lens on the shutter being set in action : the auxiliary stop, *i.e.*, the semicircular obscuring plate attached to the main shutter being moved, in the act of increasing the aperture, in a direction contrary to that in which the shutter disc is revolved.

It has been found in practice that this arrangement does not give the greatest possible latitude of exposure, inasmuch as the shutter disc, when released, revolves with a gradually accelerating motion. Thus the narrowest available slit, being immediately adjacent to the lens aperture, was passed in front of the lens at a slower speed than was any portion of the zone situated at greater distance from the lens. It is obvious that the result of this acceleration has been to decrease the variability and range of the effective photographic exposure, which was thus not directly proportionate to the aperture displayed in the shutter disc by pushing aside the auxiliary stop from the zone.

Our present invention not only obviates this disadvantage, but profits by that very acceleration in the rate of travel which has been observed in the movement of the circular shutter disc. We obtain this advantage by so constructing the auxiliary semicircular obscuring plate that it is moved, in the act of increasing the aperture, in the same direction as that in which the shutter disc revolves. According to this arrangement the narrowest available slit is situated not immediately adjoining the lens aperture, but at a distance of one hundred and eighty degrees therefrom. In other words, all that portion of the aperture zone which is obscured by the auxiliary stop has to be passed across the lens before any light is admitted. Thus the largest possible aperture is passed across the lens at the slowest average speed, whilst the narrowest aperture is passed across the lens at the most rapid speed. By this method of constructing the obscuring plate that acceleration in the motion of the shutter disc, which has hitherto been a drawback, is rendered actually advantageous.

The change in the operation of the obscuring plate involved in our present invention naturally leads to certain alterations in the details of the shutter. As no time exposure is possible without the introduction of an entirely independent detent, the secondary or retaining click, with its lifting apparatus, described in the before-mentioned Specification, No. 20,852, of 1890, is omitted. It has, furthermore, been found economical and otherwise advantageous to replace the screw cap attachment, which was at first employed for the purpose of holding the obscuring plate against the shutter disc by a light spring clip of thin metal affixed to and revolving with a shutter disc, and capable of exercising sufficient pressure upon the two plates to prevent their relative position from being unintentionally altered.

A New Maoazine Camera.

No. 6243. Samuel Dickinson Williams, Moorlinch House, Clytha Park, Newport, Monmouthshire.—*March* 28, 1893.

According to my present invention I form my camera with a double bottom, that is to say, with a platform stretching about half the length of the camera, and raised parallel above the floor thereof so as to leave a space between sufficient to enable a sensitised film or sheet to pass along. The films or sheets or other sensitised surfaces, hereinafter referred to for brevity as films, are packed and rest with their edges downwards upon this platform, and are maintained in this upright compact order and position by means of spring pressure applied at the front and on top. On the sides of my camera I arrange a system of wheels or pulleys with endless chain bands or cords passing over them, and I connect the pulleys and bands on one side with similar pulleys and bands on the other side by cross pieces or carriers bearing spring hooks, clips, or grippers. The system of pulleys and bands occupies on each side of the camera a rectangular-shaped position or approximating thereunto, so that when set in motion the above cross pieces travel in continuous rotation right round the body or pack of films as they rest or stand on the platform, that is to say, starting at the back, passing under the platform, then round the front, over the top, and on the back again. The spring grippers take hold of the bottom edge of the film, but I prefer to use films with holes in at the bottom edge into which the spring hooks or grippers carried by the cross pieces engage at the proper moment, by being made to pass over a ledge or guide piece situated at the required point on the inside in the back at the bottom of the camera. The continued motion in the same direction of the travelling band enables the cross piece thus to carry the film under the bottom of the platform and up into a vertical position in the front, when, having arrived thereat, the spring hook or gripper is again made to pass over a corresponding ledge or guide situated at the required point on the inside in the front at the top of the camera, and thus becomes disengaged, leaving the film in the front in proper position for exposure, the spring pressure at the front and the springs at the top of the films adjusting same in their place and preventing the front film from becoming deranged in position.

I prefer to furnish my system of pulleys and bands with four of the cross pieces referred to, as by that means I am enabled to have a film which has been already drawn from the back, always waiting at the bottom of the camera ready to be drawn up in front. I provide for the separation of the films or sensitised sheets, in order that the hooks or grippers of the carriers may take to one and one only each time by the following device. At the end of the platform which supports the general body of the films, I arrange on a suitable shaft a screw consisting of a cam-shaped thread with knife edges, such thread being of a pitch just fine enough to admit only one thickness of the film or sheet which is being used, the travel of the thread beginning from nothing increases by reason of its cam shape so as to gradually insert itself automatically between the last film at the back and the general body of the films, and at the same time by reason of the natural angle of the thread pushes the film so separated outwards and over the edge of the platform, where it is in a position to become engaged by the hooks or grippers of the cross carrying pieces. For the protection of the body of films during exposure of the one in position, I arrange in front of the general body of films a dark curtain, or flexible dark slide, or screen, working on rollers mounted upon or in conjunction with an endless band, which forms a sort of skeleton or hollow frame alternating with the dark slide in such a way that for a certain travel of the rollers the dark slide is behind the film when in position for exposure, and for a certain further or reverse travel after exposure, the dark slide is withdrawn therefrom to a position in front of the film, and the skeleton or hollow frame aided by the spring pressure referred to permits the exposed plate to join the general body of the films, and the next movement brings another film up in front, but at the same time the screen rollers have also made a further travel and brought the dark slide into position behind it. The screen rollers are geared with the system of pulleys and driving bands, so that the motion derived therefrom connects the screen in a manner suitable to produce the effects required. I arrange my camera with suitable shutter mechanism, and this also I connect by contacts or gearing, or other mechanical connexion, with the shaft of the screw cam or system of pulleys and screen rollers, so that, when a film is

about being changed after exposure, the fact of the same being done shall automatically set the shutter, I arrange a suitable spring catch for releasing the same by hand either for instantaneous or time exposure, or, where necessary, I omit such device for independent working and make the continuous travel of the system of pulleys and cross carriers, or the general action of the mechanism as described; set the shutter and release it as fast as the films are brought into position. I arrange a driving band on a driving wheel or pulley on the side of the camera gearing into the system of pulleys and cross carriers, or I drive the general movement from the screw shaft by suitable gearing, from which it will be seen that the continuous rotary motion of the driving handle and the general arrangement and mechanism as described will enable the films to be exposed in rapid succession until the charge of films or sheets in the camera be exhausted.

Improvements in Photographic Cameras.

No. 10,167. John Featherstonehaugh Parsons, Siddington House, Kingsdown-parade, Bristol.—*March* 25, 1893.

This invention, which relates to photographic cameras—more particularly hand cameras—has for its objects to obviate certain disadvantages appertaining to cameras as hitherto constructed and fitted.

According to this invention, in its relation to the use of films, the latter, instead of being, as heretofore, in a continuous roll, are separate, and each film is carried on the face of a mount of cardboard, paper, or other suitable substance, to which it is attached. The mounts carrying the films are piled on end, and at the base they are separately hinged to a common foundation of tissue paper or other suitable pliable material. The pack of mounts and adhering films thus arranged in book form is placed on a shelf in the camera, and a spiral or other suitable spring is brought to bear on the back of the pack, which thereby tends to advance towards the lens, but is restrained by a stop situated at each side of the camera. When an exposure has been made, the said stops are operated so as to release the foremost film of the pack and to retain the rest. The camera is then tilted forward, and the released film descends on its hinge, face downwards, until it is arrested by the spring of an indicator. The operator then turns a rod by which a vane, arm, or frame, is brought to bear on the back of the mount and forces it past the indicator, by which latter the descent of the film is indicated to the operator. The film descends to the floor of the camera and is detached at the hinge from the rest of the pack, which, under the influence of the spring behind it, has advanced to the extent of the thickness of a mount. After exposure of the now leading film of the pack, the actions above described are repeated, and so on for each until the whole pack has been exposed.

When, at any time, it is desired to take out a film or films from the camera, a slide in the latter is opened, and the film or films removed without waste of film, such as is entailed with the use of rolled films, and without disturbing the unexposed films.

According to this invention, in its relation to the use of sensitised glass plates, the latter are arranged in a pack of frames or cases placed on end and hinged at the base, which is inclined, by webs of paper, parchment, or other suitable material, to a common foundation. The pack of frames or cases carrying the plates is placed with the inclined base downwards on a correspondingly inclined part of a carrier in the camera, the longest frame or case being in front, that is, facing the lens. To the carrier is attached one end of a spring constantly tending to draw the carrier towards the lens. A rod, furnished with suitable restraining stops, prevents, at the will of the operator, any forward motion of the carrier. The stops are so arranged that, when one plate has been exposed, and is allowed to fall on its hinge, the plate immediately behind it is prevented from descending with it. As each plate is used and lowered, a holder, connected to a spring, acts in conjunction with the stop rod, and holds the plate on the bottom of the camera, where they lie, face downwards, one exactly over the other, a result due to the inclined base of the pack and the inclined part of the carrier, which is advanced to the extent of a plateholding frame or case at each change of plates. The changing is effected by one manual motion only.

This invention consists, further, in an improved shutter for the lens. The shutter is composed of two sliding plates so shaped as to present, when moved apart, a diamond-shaped aperture. The plates, which are contained between guides, are normally kept closed by a spring of indiarubber or metal. To open the shutter, pressure is applied to the outer ends of two hinged levers, which, on being pressed inwards at the said outer ends, and consequently forced apart at the inner ends, cause the plates to recede from one another and from before the lens. With this form of shutter no setting is necessary, and instantaneous and time exposures are made without altering the shutter or the motion by which exposure is made. Moreover, light is first admitted at the centre of the lens, which is also the last point of closure.

Mr. Edward A. Rice has sent us a sample of his "Reliance" retouching medium, and which, after giving it a trial, we find to quite bear out the name that has been given to it, for it gives a responsive surface to the touch of the pencil, whether applied with a hard or a delicate pressure. It dries quickly, and is ready for use within two minutes after application.

An Automatic Rocker, invented by Messrs. Pittar & Thompson, is ingenious. Two small pans are balanced on a pivot, in such a way that, when one is filled by the stream of water flowing in, the weight causes it to oscillate, and the water to flow out, the other pan now taking its place. This reciprocal action imparts movement to a balanced false bottom in a tray adjoining, and on which is laid the negative to be washed. Old photographers, who were acquainted with the washing machine of Cornelius Hanbury, will recall the similarity of the means for effecting the oscillation, but this one differs in certain respects from the one of former times.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 8	Camera Club	Charing Cross-road, W.C.
,, 8	Darlington	Trevelyan Hotel, Darlington.
,, 8	Dundee Amateur	Asso. Studio, Nethergate, Dundee
,, 8	Norfolk and Norwich	Belt Hotel, Norwich.
,, 8	North Middlesex	Jubilee House, Hornsey-road, N.
,, 8	Richmond	Greyhound Hotel.
,, 9	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 9	Derby	Smith's Restaurant, Victoria-st.
,, 9	Great Britain	50, Great Russell-st. Bloomsbury.
,, 9	Hackney	206, Mare-street, Hackney.
,, 9	Manchester Amateur	Lecture Hall, Athenæum.
,, 9	Paisley	9, Gauze-street, Paisley.
,, 9	Rochester	Mathematical School, Rochester.
,, 9	Stockton	Mason's Court, High-street.
,, 10	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
,, 10	Leytonstone	The Assembly Rooms, High-road.
,, 10	Munster	School of Art, Nelson-place, Cork.
,, 10	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 10	Southport	The Studio, 15, Cambridge-arcade.
,, 10	Stockport	Mechanics' Institute, Stockport.
,, 11	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
,, 11	Camera Club	Charing Cross-road, W.C.
,, 11	Cheltenham	
,, 11	Glossop Dale	
,, 11	Hull	71, Prospect-street, Hull.
,, 11	London and Provincial	Champion Hotel, 15, Aldersgate-st
,, 11	North Kent	Gravesend.
,, 11	Oldham	The Lyceum, Union-st., Oldham.
,, 12	Bristol and West of England	Rooms, 28, Berkeley-sq., Bristol.
,, 12	Cardiff	
,, 12	Croydon Microscopical	Public Hall, George-street, Croydon
,, 12	Halifax Camera Club	
,, 12	Holborn	
,, 12	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 12	Maidstone	"The Palace," Maidstone.
,, 12	West London	Chiswick School of Art. Chiswick.
,, 13	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

April 28,—Mr. J. J. Briginshaw in the chair.

The Influence of the Hand Camera.

Mr. W. D. Welford read a paper on this subject [see page 279.]

Mr. R. P. Drage thought that, although some hand-camera workers might secure nine or ten pictures out of twelve exposures, they were only a drop in the ocean, and that as regards the wasting of plates the hand-camera men had the pull.

Mr. W. E. Debenham, as to Mr. Welford's claim that the hand camera tended to quicken a man's perception and readiness for carrying out a train of movement in a rapid manner, thought the use of the hand camera might in that respect be compared to certain games of skill. As to the speed of plates having been quickened by the demand for rapid plates for the hand camera he (Mr. Debenham) thought that a mistake. He had used as rapid plates (of his own make) ten or twelve years ago as were obtainable commercially now.

Mr. G. Austin thought that the hand camera as a companion on walking tours passed the time very pleasantly.

Mr. J. S. Teape corroborated Mr. Welford's remarks as to the necessity of speedy action when photographing in crowds of people. The hand camera had certainly increased one's power in that direction. He did not agree with Mr. Welford in his reference to the articles on art, which appeared in the journals, as "padding." They were of great use at times and no check should be used against their appearance. Photographers had learned a great deal from them.

Mr. T. Bolas thought such articles useful from the point of view of awakening thought, even though the articles might themselves be valueless.

Mr. Simpson, of New York (a visitor), said he had been travelling for three years and had carried a hand camera all the time and wished to say something in its defence as it was abused on both sides of the Atlantic. He used a whole plate camera for landscape work but if one travelled with any baggage it was too cumbersome. He had taken 1200 negatives with the hand camera in the course of his travels, and showed lantern slides from them made on Carbutt's lantern plates which were three years old.

Mr. J. H. Avery thought that, if photography was to take up a position as a fine art, it would not be due to the hand camera.

Mr. R. Child Bayley asked, if Mr. Welford regarded articles on art as padding, why such a large proportion of the articles in his paper were on artistic subjects?

Mr. P. Everitt said that if any camera sinned in giving drunken architecture it was the hand camera. As to the speed of plates being influenced by the hand camera, he thought the assertion was altogether wrong. He (Mr. Everitt) did not believe it for one moment. It was due to competition on the part of platemakers to supply the public with what they wanted, and to claim it as due to the hand camera was a piece of cheek. Professional photographers required quick plates and the increase of speed was as much due to the use of large plates as small. Mr. Welford's sneer at articles on art cut against the paper he had just read.

Mr. J. Nesnit detailed some recent experiences with a fixed-focus hand camera which had resulted in failures.

Mr. S. J. Beckett said the hand camera was an advantage when travelling, and showed results he obtained with one which he could not have got with a stand camera, or even at all.

After further observations Mr. Welford replied: Too much had been made

of the waste of plates in the hand camera; there were just as many failures with the ordinary camera. Having instanced the utility of the hand camera in street work from his own experience, he said most of the arguments used against hand cameras were the usual arguments of non-workers.

A vote of thanks to Mr. Welford closed the proceedings.

Hackney Photographic Society.—April 25, Mr. R. Beckett in the chair. A print of uneven colour was shown and a question was asked as to the reason. A reply was given that the toning bath was out of condition. Mr. ROBERTS asked if after developing in pyro a plate can be put into amidol for further detail. Mr. DRESSER said it was like jumping from the frying-pan into the fire, and was not altogether advisable. Mr. PUTTOCK asked how to remove pyro stains from the hands. Mr. BECKETT said one way was to wash in 1:4 hydrochloric acid. The HON. SECRETARY asked Mr. Dresser how he removed amidol stains from the hands. Mr. DRESSER said they cannot be removed, must wear off, but washing in the dark was a good plan as the light caused an action on amidol. Mr. HUDSON had been experimenting with developers for snap-shot work and gave an excellent formula, an admixture of eikonogen and quinol with caustic potash. Mr. DRESSER then gave *The After-work of the Hand Camera*. Although he treated very largely upon this subject, he was drawn into other questions upon the hand camera, for which he is so well known, and gave among other details the following:—The chief point was a good lens and shutter and he advised a shutter working between the lenses, roller slide or films, objected to magazine form owing to the tendency to stick. A good eikonogen formula for snap-shots is:—Eikonogen, 1 ounce; sulphite soda, 5 ounces; carbonate of potash, 1 ounce; caustic soda, 1½ ounces; water, 30 ounces; and for use take 1 ounce of solution and 1 of water. For fuller exposures he would add bromide and redevelop by adding a little hydroquinone. He had been experimenting with metol, but did not find it quite so good as amidol for short exposures. His amidol formula was:—I. Amidol, 1 ounce; metabisulphite potash, 1 ounce: water, 10 ounces. II. Carbonate of potash, 1 ounce in 5 ounces of water. III. 10 per cent. solution bromide potassium. For bromide work he would use 1 ounce of I. and II. and 1 ounce water, adding bromide for full exposures. He used in enlarging the incandescent light, but care was necessary; one light was placed behind the other, as better illumination was given. Mr. A. BARKER asked whether it was necessary to have a rising front and swing back to a hand camera. Mr. DRESSER was of opinion a rising front only was necessary. In answer to other questions Mr. Dresser preferred a four and a quarter or a five inch lens, he would develop with amidol until he got detail, and then wash and finish with hydroquinone.

Birmingham Photographic Society.—April 25, Mr. W. Jones in the chair. —An extremely fine set of slides by Mr. Hendren, a member of the Society, were shown on the screen. They comprised beautifully selected landscape and architectural bits, and were instances of most careful and successful composition. Mr. Hendren gave most interesting descriptions of the places and styles of architecture; he also instanced the different results of various methods of development by sometimes showing two slides from the same negative. This was of great interest to members. A plucky slide of a warm brown tone was, in most instances, preferred by the lecturer.

Brighton Natural History and Philosophical Society (Photographic Section).—April 21, Adjourned meeting.—The new rules regulating competitions in the Society were adopted. The subjects also for the competitions being arranged for the ensuing year. Dr. W. Harrison owing to pressure of engagements was compelled to resign the office of Hon. Secretary. The following gentlemen were elected as officers and committee for the year:—*Chairman:* Mr. J. P. Slingsby Roberts.—*Committee:* Messrs. D. E. Caush, W. Harrison, C. Job, W. W. Mitchell, H. V. Shaw, C. B. Stoner, and A. H. Webling.—*Hon. Secretary:* Mr. G. Foxall.

Halifax Camera Club.—April 25.—Mr. A. STEWART gave a interesting paper on the subject of *Lenses*. In the course of his remarks Mr. Stewart said that without the use of a lens, but simply by means of a pinhole, an inverted image is formed on the focussing screen by the rays comiug in a direct line through the pinhole from the object. In this case there is no focus, everything being in focus at whatever distance. The use of a lens is to utilise other than straight rays, and, according to its focus to regulate the angle of view included and the size of the image, as well as to give greater sharpness. When a lens is used, objects at different distances from the lens are not brought to a focus at the same point; and, in order to overcome this, stops are used, which tend to equalise the focus. The focus of a lens depends on its curvature; the greater the curvature, the shorter the focus. The rapidity of a lens is influenced by the size of stop used, and also by the number of reflecting surfaces in the lens. A short-focus lens gives more depth of focus than one of longer focus. Objects at a greater distance require less exposure owing to the fact that more rays of light come from distant objects. Mr. Stewart also spoke of the faults of lenses, and also of the special uses of the different sorts of lenses.

Liverpool Amateur Photographic Association.—April 27, Mr. J. Sirett Brown in the chair.—Messrs. H. Jennings, Stanley, Rimmer, James Wilson, and David Robinson were elected members of the Association. Mr. J. T. Norman-Thomas reported on the excursion to Ince Blundell Hall and Park, which was thrown open to the members, by Mr. Charles Weld Blundell, on Saturday, April 15. About one hundred ladies and gentlemen were present. Mr. E. M. Tunstall gave his lecture, entitled, *Picturesque Holland*, illustrated by over one hundred slides, made from negatives taken duriug August last year. An excursion to Chester and River Dee to Eaton will take place on Saturday, May 13 next.

Photographic Society of Ireland.—April 27, Professor J. A. Scott (President) in the chair.—Mr. J. A. C. RUTHVEN, C.E., Hon. Secretary, read a paper and gave a demonstration, entitled *Tips in Woodwork for Amateurs*. The subject formed a very interesting lecture, which was ably handled by the lecturer, who appears to be an adept in the theoretical as well as the practical use of all tools required in woodwork. After having successfully explained the use of the wedge, the axe, chisel, and other tools, and illustrating on the blackboard the splitting effects of these various instruments, Mr. Ruthven entered into the practical part of the work, and showed how planes, chisels, and other implements should be used, and referred to the manner in which amateurs were always inclined in using the saw to cut through the wood in drawing the saw up as well as down. The cut should only be made in the down stroke. Various methods of wood-joining for camera-making were also shown. After the demonstration, those present had the privilege of examining a splendidly constructed bench equipped with British and American tools of the newest and most approved description.

FORTHCOMING EXHIBITION.

May 5–6 ..... *Forfarshire Photographic Association. Hon. Secretary, W. J. Anckorn, West Port, Arbroath, N.B.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE PARVIN TELE-PHOTO OBJECTIVE.

To the EDITOR.

SIR,—*Credat Judæus*, indeed!

You say, "*We are afforded no clue as to its optical nature.*" Again, emphasising this, in reference to the particulars of the lens given, "*That little conveys no optical information.*" Further: "*True, we are put in possession of some of what we may call its externals.*"

Now, Sir, for the "externals" and the paragraph "that conveys no optical information!" Here it is:—

"For example, in a 7 × 5 objective, the combination positive lenses are 6½ inches focus, the negative single lens is 6 inches focus, and these are mounted in a tube of 2⅝ inches long. The diameter of both lenses is 1$\frac{3}{32}$ inches."

What more information is wanted? The only thing lacking is the said "externals," or shapes of the lenses.

The *Phrenology* of lenses is not the *Science* of optics. The telephotographic lens was founded upon the latter, and its theory is fully explained in my paper read before the Society of Arts on March 1, and still further at the recent Camera Club Conference. In the latter I treated, as being simpler, a fixed system, such as Mr. Parvin claims to have "invented," showing, for the first time, the rationale of how, with a comparatively *weak* negative posterior lens, a fixed system can have a short "back focus," with the advantage of a considerably longer "equivalent lens."

In Mr. Parvin's selection, and taking the *separation* at 2⅝ inches, as quoted, the lens must give an image equal in size to that of a lens of 18·3 inches focus, but would only have a back focus of 10·9 inches; if there be no diaphragm, it would work at full aperture at an intensity of *f*·16·7.

Again, if the lens be reversed, the back focus would be 26·4 inches, but still the same equivalent focus of 18·3 inches.

Mr. Parvin has adopted the principle I first introduced into photographic lens construction, but in a much more limited degree, and, moreover, without the advantage of varying the amount of magnification and covering power.

The question is, whether the amount of magnification given in his case is worth a special construction.—I am, yours, &c.,

25, *Newman-street, W., May* 1, 1893. THOMAS R. DALLMEYER.

"THE PHOTO CORRECTOR."

To the EDITOR.

SIR,—It appears to me that Mr. Van der Weyde's new method of modifying or "correcting" the ugly and inartistic proportions of things as they often appear in photographs has scarcely been received with that enthusiasm which it deserves, considering that it presents us with an additional means of "bending," so to speak, photography to our will, and thus removes one of the great disabilities under which we have hitherto laboured. If by using a lens of sufficiently long focus, or by taking a station point distant enough from the picture plane, we obtain what is called "wide-angled" perspective, and this gives us a picture free from those apparent disproportions which we meet with in pictures taken under opposite conditions, well and good. In such a case the "corrector" need not be employed to correct the perspective, but it has another use, the value of which seems to me, as I mentally cling to the idealistic in art; inestimable. In the discussion which followed Van der Weyde's demonstration of his invention at the Camera Club Conference he made the weak and apologetic admission that there was *money in it*, as, by altering the proportions of any part of the human body, we can flatter our sitters, and thus secure additional custom and remuneration. This is true, but is immensely overshadowed by the much more dignified and noble consideration, that, by thus being enabled to adapt the proportions

of our model's figure to an ideal standard, we become possessed of one of the powers most prized and most exercised by all the great artists of antiquity.—I am, yours, &c. FRANK WILCOCKSON.

20 *Orde Hall-street, Lamb's Conduit-street, W.C., April* 29, 1893.

AMIDOL.

To the EDITOR.

SIR,—I have been away from home, and only just read the inquiry of "Cosmos."

The report of my lecture was very condensed; the actual words I used were as nearly as possible as follows:—

"For photo-mechanical and lantern plates I was able, when using amidol, to reduce the exposure to about one-third the time required for the very restrained pyro developers recommended by the makers of the plates. No doubt this was principally due to the very small quantity of bromide necessary to be used with amidol."

I further said I had not tried amidol for general work, so would not express any opinion of its capabilities for other than copying and lantern slides.

"Cosmos" asks what proof I can give for my assertion. All my exposures were made by the aid of a Watkins actinometer.

The actinic value of the light and the aperture of lens become very simple matters, and I have only to estimate and record in my note-book the subject-number.

I find this plan a very simple and accurate one, as I can, without any difficulty, in any light, give to another plate a corresponding greater or less exposure, as I desire, and only by varying the subject-number.

I have now developed about five dozen plates with pyro and the same number with amidol, on one series of similar drawings, and I have found the subject-numbers for amidol are about one-third of the corresponding ones for pyro. Notwithstanding this, I find the time required to develop with amidol is also much shorter than with pyro.—I am, yours, &c,

2, *Craven-terrace, Ealing, May* 2, 1893. H. W. PEAL.

ART IN PHOTOGRAPHY.

To the EDITOR.

SIR,—Referring to your note signed "F. B.," page 269, I should have thought that you would have long ago discarded the idea of mixing oil with water. Art in photography is about as vexatious as amateurs and professionals. The first one (artist) will not admit in his exclusiveness that any art is at all possible without *him*, and the second one (amateur) that any improvement is possible without *him* also. The only difference is that the artist is educated to the art, while the amateur is born so; that is, at least, the reasons given to the lower class of mortals that do not understand what they so well try to impress upon the few or many uninitiated. From all the articles on art in photography as against art in painting that have been published I have gleaned the following:—An artist, however poor in art he may be, will never turn out anything but there will and must be in it some artistical merit. Bad design, bad colours, bad posing, bad everything, yet artistic. Now, a photographer, however well chosen the subject, well lighted and well finished the result, is never artistic—at least, from an educated artist's views. Why not let this matter rest a while now? I, for one, would rather (uneducated as I am) have a fine photograph than a poor painting. I may be wrong, but I am pretty sure that, however educated an artist may be, he will not average in taking photographs more than one real fine view out of a dozen, and ditto the artistic photographer. Of course, they may not admit this readily; but, nevertheless, they will show you always very few of the results of their work, carefully omitting mistakes and failures. It is human nature only, after all. They all do it.

I have tried several makes of films lately, and, as you object generally to giving names, I do not think that the results obtained would be very interesting to your readers. With one English firm I have always very fine results, while with the others I have uneven ones, such as frilling, no intensity, and disagreeable lifting of the gelatine while printing. I have also tried lately some American films, which have a rough or ground back to them. Having given what I think a correct exposure, I found the picture come up pretty quick; but the film (developed with pyro) was fearfully stained yellow, and the back of it same way, so that it takes a whole day in full sun, and with this fair weather, to get one print. I wish you could tell me how to get rid of this yellow stain, if possible.

I wrote you some time ago in regard to the Exhibition at Chicago, and the failure I met with in regard to obtaining an answer from the head of the photographing department. Do you know of any one that has met with better success? and if so, please let me know how he managed it, so I may do the same.—I am, yours, &c., A. LEVY.

Asnières, Seine, May 1, 1893.

"AMATEUR PROFESSIONALISM."

To the EDITOR.

SIR,—During the last few days the town of Malton has had the honour of a visit from two individuals with a camera and other appliances for photography, and who profess (as so-called amateurs invariably do) to call on schools for the purpose of taking groups of children, &c. During the course of their canvas of the town I had the honour of a call from them at my studio, and, on asking their business, the principal operator said they had called on me to ask if I would grant them the loan of my dark room, in order to change plates and develop. This, certainly, was a poser; but, when I afterwards asked them whether they were professionals or amateurs, they answered that they were *both!* This was a conundrum indeed, which I could not solve, and so I politely told these "amateur professionals" that I must decline to accede to their request, and they immediately meandered from my doorstep.

Since the above took place these two gentlemen have billed the town, announcing that they were prepared to take all kinds of photographs at a certain hotel in the town at stated prices, &c. So much for their amateurism. I mention this simply to show what dodges some people will resort to in order to hinder the true professional members of the trade from earning a livelihood. The public ought to put their foot on such bastard professionalism, which contributes nothing towards the rates and taxes of a town.—I am, yours, &c., PROFESSIONAL.

May 2, 1893.

"ALBUMEN *VERSUS* GELATINE PAPER."

To the EDITOR.

SIR,—So much has been said in condemnation of albumen that I would like to be allowed to repeat that permanent albumen prints can now be obtained as of old, if professionals will pay the necessary attention to their production that is required.

To use good paper with strong salting solution, and sensitise with strong silver.

With such paper, when printed and toned, and fixed in *freshly* made hypo, and thoroughly washed, pressed, and squeegeed after each change of water for two hours, will do more good than to allow the prints to remain all night in a tub or tank.

Above all, do not entrust the washing to boys who do not understand the nature of hyposulphite of soda, who hurry through their task in order to get away from it.

Time only can prove whether gelatine prints are permanent, but silver prints made so long ago as 1856 are good now.

Can as much be said of gelatine prints? Apart from the curling and stickiness of the latter, hyposulphite of soda cannot so effectually be removed from gelatine as from albumen.

The good old collodion wet-plate process was to be superseded by gelatine plates, but it is valued more than ever in process work, and by many professionals; and, much as albumen has been maligned, it is not doomed yet! It is being improved upon daily, and will not be discarded for gelatine.—I am, yours, &c., W. H. HUNT.

May 2, 1893.

To the EDITOR.

SIR,—In your JOURNAL of last week, I see "B. B." complaining of dirt spots, &c., on gelatino-chloride paper, due, I should think, to dirt and dust flying in the air. The scraping is caused by having the burnisher too hot. I have enclosed print printed and toned in the ordinary way, and burnished by the common bar burnisher. I have only taken to P. O. P. for two months, and I think I can say that I have hardly spoilt one print, which I cannot say of the albumen.—I am, yours, &c.,

S. W. R. BROWN.

Chateau Studio, Boulevard, W.-S.-M., May 2, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange No. 2 Kodak, complete with case, instruction book, and about thirty unexposed films, for Beck's Frena hand camera.—Address, J. E. RIDDALL, 2, Elm-park, Brixton Hill, S.W.

Wanted, three dozen quarter-plate double dark slides for hand cameras; will give, in exchange, Coventry tricycle, tangent wheels, for two riders.—Address, F. WRIGHT, Photographer, Northampton.

Wanted, backgrounds or head and body rest, in exchange for English lever silver watch or quarter-plate camera, lens, tripod, &c.—Address, J. E. OATEY, Photographer, Wadebridge, Cornwall.

MR. WILFRED EMERY, of 24, South-street, Baker-street, W., has sent us his trade price-list, from which we gather that he undertakes printing in bromide, carbon, platinum, and silver. His prices for these and for retouching appear to be moderate.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2 *York-street, Covent Garden, London.*

B. O.—So long as the jars are clean, they may be used any number of times for emulsion boiling.

PYRO.—1. A letter addressed to the firm, Berlin, is sufficient. 2. The Autotype Company, Oxford-street, and Gerson & Co., Rathbone-place.

R. BLAGDEN.—If a choice of position is open, by all means have a north light for the studio. Such an aspect will be far the easiest for a novice to work with.

S. W.—The firm of Bourquin ceased to exist many years ago. A lens bearing that name, though it may be a good instrument, has very little commercial value.

AMIDOL.—You will observe that Mr. Dresser recommended the amidol formula for bromide work given at page 28 of the JOURNAL for January 13. This may meet your purpose.

PHOTOS wants information as to the best means to recover gold and silver from a combined toning bath.—The metals will be thrown down if potassium sulphide be added, avoiding an excess.

BUCKLE.—A matt surface on carbon prints can be produced by squeegeeing them, while still wet, on to a ground-glass plate that has previously been waxed to prevent them adhering when dry.

T. A. R.—We cannot endorse your idea that the public do not expect photographs to stand for more than a year or two. If you act upon it, you may possibly find that your business will not endure for a much longer period.

E. D. J.—It would be useless for you to write either to the Secretary or the General Manager of the Crystal Palace Company for permission to photograph in the building or grounds, as they have no power in the matter. The exclusive right has for many years been leased to Messrs. Negretti & Zambra, and for which they, we believe, pay a high rental.

H. W. H.—1. To copyright a photograph, you must fill up a form describing the picture, and deposit it at Stationers' Hall, with a fee of one shilling. The form costs a penny. Our publishers undertake registrations at a charge of one shilling and sixpence each. 2. No duty is payable in America on cameras or other apparatus when taken there for personal use.

T. CROSBY asks if, in the wet-collodion process, the ordinary ferrous oxalate developer, as used for bromide paper, could not be used instead of the sulphate of iron and acetic acid as given in the ALMANAC? No. Wet-collodion plates can only be developed with strongly acidified developers, such as those given in the different formulæ for the collodion process.

SPOTS sends a number of mounted prints which, he says, became covered with fine spots within a few months, though they were produced with every care as to washing, &c. He asks if we think the mounts are the cause?—The spots are, no doubt, caused by the bronze powder used for the lettering. Particles of it are sparkling all over the cards. Avoid bronze lettering for the future.

L. B.—You have been misinformed, or have confused matters. For a mirror simply for reflecting light through a negative in the enlarging apparatus, common glass, silvered at the back, is all that is necessary; but for a mirror to be placed at an angle of forty-five degrees in front of the lens, for producing reversed negatives, an optically plane surface, which is silvered on the face, is required.

N. D. R.—Two thicknesses of canary medium, with a small fishtail burner, will be quite safe with ordinary plates, but it will not do with the orthochromatic ones. When these are used, the medium should be supplemented by ruby glass, and the plates shielded from the light as much as possible. Your case is by no means exceptional. A deep red light is very painful to many people, and often produces headache if worked in for long.

OTHELLO.—1. Chadwick, of Manchester, makes a stereoscopic partition on the spring roller-blind principle, which possesses certain advantages over any other that we have seen. It is always tightly expanded, no matter what focus of lens is used. 2. A partition must extend to the plate, but it is not necessary it should do so to the lens board. All that is required is that no light from the one lens shall find access to the plate covered by the other.

W. REDMONT says: "I want to try the lime toning bath, and have sent to all the chemists in this small town to get hypochlorite of lime, and cannot obtain it. One said there is no such thing, and the other two say they do not keep it, yet I see it often mentioned in the photographic journals. Is it difficult to make, and how, as I am anxious to try the lime bath?"—If our correspondent will send for "chloride" of lime, or bleaching powder, from the nearest oil shop, he will obtain what is requisite. It is a little surprising that the local druggists do not know what hypochlorite of lime is, though they doubtless have it in stock under the other names.

G. SAYERS says: "I have a wide-angle doublet bearing the name of Ross. It is said to cover the whole-plate size, and is of very short focus. But the largest aperture is exceedingly small, as compared with the size of the glasses, which makes it too slow for my purpose. If I had the opening enlarged to, say, *f*-6 or *f*-8, would it then do for a hand camera?"—No, unless pictures of the fuzzitype order will suffice. With lenses of this class a small aperture is necessary to overcome the spherical aberration always present.

R. CLAYTON writes as follows: "I have several plain, flat oak frames, that had become very dirty. I glass-papered them up, first with rather coarse, and then finished them with very fine, paper; they then looked as good as new. I then gave them a coat of the "best oak varnish," and, although it was carefully laid on, the surface has become quite rough to the feel, and looks wretched. Can it be the fault of the varnish, or what?"—This experience is by no means exceptional in varnishing oak and some other woods. The varnish appears to draw up the grain of the wood. However, the thing is easily rectified. With a piece of fine glass paper rub the surface smooth again, and apply another coat of varnish.

SENIOR asks: "1. Is it necessary to put iodide of silver in the bath for collodion negatives, and what would be the results with and without? I find it rather dear and not easily obtained. 2. I have a Winchester bath that has gone quite yellow with about three weeks' work. I put it down to the collodion being old, but perhaps you would give me your opinion, with remedy."—1. Yes. If the solution is not saturated with iodide of silver, it will dissolve it from the film, and thus leave it thin. It is not necessary to purchase iodide of silver for the bath, as the addition of a few grains of iodide of potassium to the solution of nitrate of silver will precipitate it, when the excess can be filtered out. A drachm or so of collodion will answer the same purpose. Some iodise a bath by coating a plate with collodion and leaving it in the solution one or more hours. 2. The bath ought not to become yellow unless something has contaminated it, and that is scarcely likely to be the collodion. Remedy, add a small quantity of carbonate of soda, and then expose to sunlight for a few days. Filter, and make slightly acid.

A PHOTOGRAPHIC SOCIETY has been started at West Kirby, of which Mr. J. Maurice Jones, of Bank House, is Hon. Secretary.

WEST LONDON PHOTOGRAPHIC SOCIETY.—The forthcoming Annual Dinner has been arranged for at the Frascati Restaurant on May 9.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—Outdoor meeting, May 10. Train leaves Newcastle for Brompton Station at 8.15. J. Hedley Robinson, leader.

PHOTOGRAPHIC CLUB.—May 10, Members' Open Night. 17, *Testing the Speed of Plates.* Outing, Saturday next, May 6, Eynesford (Kent). Train from Holborn Viaduct at forty minutes past two.

THE last number of the *St. James's Budget* is illustrated exclusively by process blocks, some being line and others half-tone reproductions of drawings or photographs. Several illustrations of life in Japan are very interesting.

Process Work, No. 2 (Penrose & Co.), will be found a useful sheet and price-list for those who make, or desire to make, experiments in photo-mechanical processes, as its publishers make a speciality of the appliances for this class of work.

ASHTON-UNDER-LYNE PHOTOGRAPHIC SOCIETY.—From Monday, May 15, to Thursday, May 18, there will be an Exhibition, in the rooms of the Society, of over one hundred photographs of *The Land of the Broads*, kindly lent by the Great Eastern Railway Company.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—May 9, Ordinary Meeting, at 8 p.m. A paper, on *Some Uses of Moving Sensitive Surfaces*, by Captain W. de W. Abney, C.B., R.E. *On the Use of Tinfoil as a Support for Photo-lithographic Transfers*, by Captain A. M. Mantell.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—May 11, Paper by Mr. W. H. Harrison, *Is the Present Construction of Photographic Studios Wrong in Principle?* 18, Monthly Lantern Night (last of the season). 25, Members' Open Night. June 1, Paper by Mr. P. Everitt, *The Angle of View.*

WE gather from the *Australian Photographic Journal* that the free-portrait dodge is rife in Sydney, N.S.W. The local press has denounced it, and there is a notice placed prominently on the show-cases of the leading photographers throughout the city, drawing the attention of the public to the fact that in England and America the free-portrait system is denounced as a "fraud" and a "swindle."

THE illustrations in the *Idler* have lately been so excellent that the portrait of Mr. Robert Buchanan and his favourite dog in the May number of our versatile contemporary, strikes a hostile chord on account of the very commonplace and inartistic pose. It is suggestive of the Saturday afternoon efforts of tyro who has hitherto devoted his time to the technical rather than to the art side of photography. It is a "front elevation" of both man and dog. But amends are made in a sitting figure of the *littérateur*.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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THE RAPID DRYING OF GELATINE NEGATIVES.

Given a good light, and there was no reason why, in the former days of wet collodion a sitter could not be shown a proof, unfixed of course, of the negative which had been taken of him before he left the studio, and that without unduly detaining him. After being fixed, the washing of a collodion negative was effected in a brief period of time compared with a gelatine one, and the drying before a clear fire was still more quickly done.

Gelatine, on the contrary, does not quickly yield up its fixing salts even to a stream of running water, although this time may be considerably reduced when the washing water is applied in the form of a spray from a rose jet and under a high degree of pressure. We have been surprised at the rapidity with which a jet of tepid water—not so warm as to affect the gelatine surface—eliminated the hyposulphite of soda from a negative and with such a degree of thoroughness as to stand a delicate test for its presence, such as the iodide of starch. But it is the drying rather than the washing of the gelatine negative we have at present to consider.

This operation is much abbreviated by the removal of surface water by mechanical means. The back may be dried at once by the application of a soft towel, after which it is laid down on a padded board and a piece of cambric spread over its surface, with a pad of blotting-paper supervening. Gentle pressure is then applied either by a roller or by the hand. This operation, if properly done, leaves the negative surface-dry. On no account ought the blotting-paper to be placed directly in contact with the surface of the negative, as numerous little fluffy hairs will become adherent, and their perfect removal is not always readily effected.

It may be thought that the texture of the cambric will be indented by the pressure into the soft surface of the gelatine. So it will, but after complete drying it totally disappears. We have intentionally selected cambric with a pronounced pattern in it, and have applied a needlessly strong degree of pressure, one by which the pattern was rendered plainly visible on the gelatine; but it invariably became invisible upon drying.

Having removed all surface moisture by the method indicated, complete desiccation is attained with a surprising degree of rapidity by the adoption of either of the following means:—That by immersion in a dish of alcohol is so well known as only to require mentioning. The alcohol has such an affinity for water that the very small quantity remaining absorbed in the film is quickly abstracted, and in consequence the drying may be effected by heat if necessary, or by the rapid evaporation of the alcohol.

What we consider a more economical, if not, on the whole, a much preferable, method of drying is by a centrifugal machine, which we have had constructed for experimental purposes. Four arms, or more if desired, emerge from a pivoted spindle mounted vertically, and capable of being rotated with great velocity by means of a long horizontal rod geared with the spindle at the inner end, and terminating at the outer end by a winch handle. On these projecting arms are mounted frames or sheaths, into which the plates to be dried are dropped. The rotation of the handle causes the arms to revolve rapidly, and the impact of the air carries off all moisture. We have found that it is better to set the plates at a slight obliquity rather than in directly facing the line of the circle of rotation. We believe that, if some of our enterprising dealers would have this apparatus made and supply the public with it, there are few professional photographers who would care to be without it. Instead of the toothed wheel and pinion a simple pulley and band may be employed with equal effect for causing the rotation.

An analogous means for effecting the rapid drying of a negative from which the surplus water has been removed is to submit the surface to a jet of air directed by a rubber pipe connected with a foot bellows. In such trials as we have made with this system we found that the best means of applying the air current, as might have been anticipated, is to direct the jet at an acute angle to the plate when lying flat upon a table.

Here, and in connexion with our subject, it may not be amiss to speak of a plate, the result of a discovery of Mr. T. C. Roche, of New York, introduced over a dozen years ago by Messrs. Anthony & Co. of that city, under the designation of "The Tropical Plate." The special characteristic of this plate, which we think is not now manufactured, was that by special treatment in its preparation the gelatine was rendered quite insoluble even in very hot water, and that in consequence both the fixing and the subsequent washing could be conducted with fluids heated to very many degrees above the ordinary temperature with a commensurate reduction of the time necessary when these were cold. Added to this was the possibility of drying the negative by heat after being flooded over with boiling water. As to the method of preparation of these plates we cannot speak definitely, as it was held a secret, although several methods of imparting insolubility to gelatine are known to every one who has studied the subject. There is, however, no doubt as to the abbreviation of the whole system of finishing a negative up to the stage of placing it in the printing frame for proofing that is capable of being attained by the adoption of one or more of the suggestions we have here thrown out.

STRIPPING AND REPLACING NEGATIVES WITHOUT THEIR EXPANDING.

Allusion was made last week to a question put at a meeting of one of the Societies, as to how a gelatine negative could be removed from the plate and yet retain its original dimensions. We then briefly referred to two methods of procedure, but the subject is really one, now that so many reversed negatives are required for mechanical processes, that may with advantage to many be dealt with more in detail; and especially so, as on several occasions we have received complaints that negatives, which have been supplied to have mechanical prints made from them, have been returned to their owners, sometimes in film form or on glass reversed, and sometimes also with the image of a larger size than it was originally. In this condition the negatives were, of course, of no use for the purpose for which they were originally taken, namely, silver printing.

There is no reason whatever why, if necessary, a negative should not be taken off the plate, utilised as a reversed one for any purpose that may be desired, and then be replaced on the glass and returned to its owner without even his suspicion being raised that it has in any way been tampered with. If a "pyro" developed negative be thoroughly alumed, there is but little tendency of the film to expand when it is taken off the glass. But this condition cannot always be depended upon, as some gelatines behave differently from others. Therefore, to make sure of its retaining its original size, the film before its removal should be secured to some medium that will prevent its lateral expansion. Reference was incidentally made last week, as just mentioned, to two methods of working as given in the Almanac for 1889, each of which answer well in practice. The one is by Mr. A. Pumphrey, and the other by Mr. H. J. Burton, and it will be seen that each of them is based upon the property of hydrofluoric acid loosening the film from the glass. Here is a brief description, slightly modified, of each.

The first method is this:—The varnish is removed, supposing the negative to have been varnished. Next, a thin film of plain gelatine is moistened in a dilute solution of hydrofluoric acid—one part acid to sixty of water. This gelatine film is secured on paper by a coating of indiarubber. The dilute acid softens the gelatine, and makes it very adhesive; it is then attached to the negative, which may be readily done with the aid of a squeegee. The acid in the film passes through the negative, and releases it from the glass. It is then lifted off, and pinned to a flat surface to dry. The paper is then stripped off, which can easily be done when it is dry by moistening the back with a little benzole. We thus get the negative in pellicular form of precisely the size it was when on the glass, and which can be restored to glass at any time if desired.

Here is the other method, which is really given for repairing broken negatives:—Instead of paper being the resisting medium, in this case collodion is the one employed. The negative, denuded of its varnish, is placed on a levelling stand, and coated with thick collodion, such as that used for enamelling prints. This is allowed to thoroughly set—say, for ten minutes or a quarter of an hour. The negative is then immersed in a dish of plain water until the collodion solvents are washed away, known by the film losing its greasiness. Then a few drops of hydrofluoric acid are added to the water, and the dish gently rocked. In a short time the film will begin to detach itself, when the plate should be at once rinsed with clean water. Another plate—and, for convenience of working, somewhat larger than the negative—which has previously been coated with plain gelatine and dried, is then placed in the dish, and the released film, after being turned over, is floated upon it, removed from the water, and allowed to dry spontaneously. We have now a reversed negative, ready for printing from, cemented to a rigid support by gelatine, with an intervening film of collodion.

We will now suppose that, after the negative has served its immediate purpose as a reversed one, it is desired to restore it to its original state—say, for silver printing—this is how it may be done:—Take a clean glass plate, again a little larger than that now holding the negative, and coat it with a solution of gelatine, this time containing a little chrome alum, and dry. Next place the plate in tepid water until the gelatine is softened and feels slightly slimy, and remove to cold water; then place the negative in a dish of water, to which a few drops per ounce of hydrofluoric acid have been added, until the film shows signs of being released. It is then rinsed with clean water and floated on to the plate with the softened gelatine, of course again reversing it; remove, and allow to dry spontaneously.

The negative is now non-reversed, as at first; but it has upon its surface a film of plain gelatine and also one of collodion. As the gelatine that cements the negative to the glass is insoluble in warm water by reason of the chrome alum, the former can be sponged off with warm water, and, after drying, the collodion can be dissolved off with alcohol and ether. The negative is then varnished, supposing it to have been varnished before, and the glass cut to the original size. We have now the negative just as it was in the first instance, and none the worse for the treatment it has received.

It might be imagined that, if the collodion film were formed thicker, there would be no necessity to attach the negative to the glass, and this is the case; but, on the whole, it will be found safest in practice to proceed as directed. Then the negative, when dry, is always attached to a rigid support, while, when it is in pellicular form, with only the collodion to retain it, there is always a tendency to cockling, unless the latter is abnormally thick.

EXPERIMENTS WITH MULTIPLE-COATED FILMS.

Since we wrote on this subject a few weeks back the interest in multiple-coated films has been on the increase, and several experimentalists have, like ourselves, been endeavouring to investigate the functions of the separate films in so far as they affect halation and latitude of exposure. The importance of the inquiry seems to increase as we go deeper into the subject for fresh facts and suggestions are constantly forcing themselves on the attention and raising new issues in the inquiry.

For instance, it is pointed out that, as each film or layer of sensitive gelatine is thoroughly dried before the next is applied, the two "are not in chemical or even in mechanical contact," the latter portion of the statement, however, being, we think, a little difficult to maintain. Supposing, however, that the films are not in chemical contact—and in the instances we are about to relate they are still less likely to be than in the case of double or triple gelatine films—we should like to find an explanation of the following result.

In the course of some experiments with combined collodion and gelatine films a layer of collodion emulsion was spread upon an ordinary commercial gelatine plate, this method being adopted as the easiest for obtaining a double film the constituents of which were of widely different character. In one experiment, by mistake an unwashed collodion emulsion was employed, the fact being only discovered in consequence of the

great falling off in sensitiveness. But here is the remarkable part of the matter; the collodion emulsion employed, if exposed *per se* without washing, would be perfectly incapable of forming an image under development owing to the excess of soluble bromide it contained: yet, when exposed in contact with a sensitive layer of gelatine, although the exposure had to be vastly increased to properly impress the gelatine film, still an image was produced on the collodion film as well, as was shown by the difference in density when the latter was removed. The exposure given—some three or four times that necessary for the gelatine film alone—was still all too short to impress the collodion emulsion even had it been washed; but, as we have said, in the condition in which it was employed it was utterly incapable of receiving a developable impression with any exposure.

To place the matter beyond all question, a portion of the gelatine film was carefully and completely removed from a plate by scraping, followed by warm water. The whole plate was then coated with the same unwashed emulsion, so that a portion of it presented a compound film of collodion and gelatine, while the remainder consisted of collodion alone. Upon exposure and development the image upon the double film was of the same character as already described, namely, it was partly or mainly on the gelatine, and slightly, though quite distinctly, upon the collodion. Upon the plain collodion portion of the film, on the other hand, there was not the slightest trace of any image, although the development was intentionally pushed to the stage of incipient fog.

The result points certainly to the conclusion that it is an erroneous supposition that the films are not in some sort of chemical contact, but how the image on the collodion film is formed is an interesting question that is open to argument. At least, we may drop the assumption, as, indeed, we seem to be forced by other facts to do, that the different films are inert towards one another, except in so far as they act as light-screens, absorbing a portion of the light that passes through them. It seems more reasonable to take the view, as presented by the experiments of Captain Abney some years ago, that one film does very materially affect the other in development to such an extent, indeed, that in some instances it is found that, if a second film be coated on top of another after it had been exposed, on development an image will be produced upon the unexposed film.

This appears to be the only explanation of the experiment we have quoted. We can readily imagine that, on proceeding to develop the compound film, the excess of bromide contained in the collodion will be absorbed by the swelling gelatine underlying it, which will in this manner, as well as by the upper film of collodion, be powerfully restrained or retarded. Mr. W. K. Burton has shown that the effect of bromide in the developer is merely to retard development, not to destroy the image; hence, as we have shown that it was necessary to give three or four times the exposure required by the bare gelatine film, the latter must have received a very full impression, and during development may be taken to represent a store of pent-up force capable of reacting on the practically insensitive film above it; or it must be borne in mind that the collodion film, containing, as it does, the unremoved decomposition salts, as well as the excess of bromide useful to its due keeping, is, if not absolutely insensitive, at any rate sufficiently so to bear full exposure in the camera without giving the least sign of image on development, though, on re-exposure, a perfect picture can be produced. For all practical purposes, therefore, the collodion film in this case must be taken as insensitive or unexposed.

Not so, however, in the case of a washed emulsion. When such a film is applied above the gelatine film, the exposure of the latter is not greatly increased, though the time of development is the latter effect, being, we imagine, rather mechanically produced by the overlying collodion film than by any chemical slowing action. Under the head of mechanically produced we may include the slowing produced by the absorption of light in passing through the film, though, as a matter of fact, this is so slight as to be not worth considering. But the retardation of development by the collodion film is a different matter, and that that is purely mechanical may be proved by coating a plate with plain collodion instead of emulsion, in which case there is neither light arrested nor any chemical agent introduced to act upon the sensitive film. Yet the same impervious varnish suffices to render development a comparatively slow process, and also to raise some uncertainty as to whether there is really any loss of sensitiveness, or only retardation of development.

The compound film produced when the washed emulsion is used gives a similar result to that from the unwashed emulsion, so far as the development of an image upon the upper film is concerned. But in this case it is with a shorter exposure, and still too short to impress the collodion emulsion itself, except perhaps in the extreme high lights, as the sky of a landscape. We have, indeed, simultaneously exposed a compound film and one of collodion emulsion alone to an open landscape with clear sky, and on development the sky was the only portion visible on the collodion plate; in the compound film, however, the whole of the image was impressed upon the collodion portion, as was easily proved by the difference in density when a portion of the latter film was rubbed away.

In this instance it would certainly be supposed that the effect of the collodion film would be to give an image showing greater contrast than that given by the gelatine plates alone, but such was not the case. Two plates were exposed side by side—or rather a plate divided into two portions—one of which was coated with collodion emulsion, the latter receiving a slightly longer exposure than the other. On development—not for the same period—as, owing to the slowing action of the collodion, that was out of the question, but until as nearly as possible the same general density was obtained, the two images were practically identical so far as gradation was concerned, or at least it could be said that there was an entire absence of any suspicion of stronger high lights in the compound film.

But—and here is the noteworthy point in the matter—when a portion of the collodion film was rubbed away, the image on the gelatine film underneath showed decidedly less contrast than it had done previously. We do not refer to merely decreased density owing to the removal of the upper image, but the sky had lost noticeably more density than had the other portions of the image; indeed, the extreme high lights in the stripped portion of the image were thinner than the half-tones.

The explanation of this, it seems to us, is not far to seek, and, if this action occurs between two films of collodion and gelatine, it is even more likely to occur or to come with greater force when two or more films of gelatine are in question. Bearing in mind what we have said about the slowing action of the collodion film upon the development of the underlying gelatine film, and also the well-known fact that a collodion image

develops with great rapidity, it might be expected that *the sky* of the picture on a compound film would develop at once on application of the developer, or within a very short period, and that there would then be a long wait until the solution reached the gelatine below. This, however, is not the case, for the first indications of sky did not make their appearance for fully five minutes, and the remaining portions of the picture then followed with perfect regularity. Thus we must believe not only that the upper film exercises an influence on the development of the under one, but also that the converse is the case; otherwise, seeing that the sky of the collodion film had had sufficient exposure to produce a developable impression, that impression would have been produced in less time than five minutes, unless it had been held back by the gelatine film underneath it.

When development did commence, it commenced from the surface—that is to say, in the collodion film. This much is evident to the eye, but is capable of easy demonstration, and has since been proved by means which need not here be detailed. That being the case, as the silver is reduced in the collodion film, bromine is given off, and either directly or in combination with the alkali of the developer, as bromide is present to act upon and restrain the corresponding portions of the gelatine image lying underneath and in contact with it. In other words, as the high lights of the collodion image are developed, the bromine evolved goes to restrain the high lights of the gelatine image and weaken them.

Although the compound films with which our experiments have been made are totally different from, and, in fact, diametrically opposite in principle to the Sandell double and treble-coated films, still we think the same kind of action may be traced in both. For instance, with an ordinary short exposure, the bromine given off by the high lights of the rapid top film hold in check those of the second film, and contribute to the softness which is so remarkable a feature of these plates. Again, with longer exposures, it is possible to trace the action of one film upon the other, and to explain the freedom from halation so obtained in a far more intelligent manner than by supposing it to result from mere opacity of film.

Photographic Salon, 1893.—We have received from Mr. Alfred Maskell a notification of a proposed "Photographic Salon," for which the Dudley Gallery has been taken. Its nature will be ascertained from the following:—"An exhibition of photographic pictures, to be called the Photographic Salon, will be held at the Dudley Gallery from October 9 to November 11, 1893. Careful consideration will be given to all pictures entered for exhibition, and a selection of works of pictorial merit only made by a Committee. Foreign as well as English photography will be represented. The aim of the organizers of this, the first Photographic Salon, is to inaugurate a series of exhibitions (which it is hoped may be annual ones) bringing before the public the best productions of photography solely from the pictorial point of view. No awards are offered, and no charge made to exhibitors. The usual charge of 1*s.* will be made to the public for admission. Arrangements will be made for the sale of pictures, if desired, and a commission of fifteen per cent. will be charged on sales effected."

Photographic Competition at the Welsh National Eisteddfod.—We may remind our readers that at the Eisteddfod, which takes place at Pontypridd in August next, photographic competitions will be held in the following classes:—1. A set of not less than six or more than twelve photographs illustrating the coal industry from cutting to shipment. Prize, 5*l.* 2. A set (not less than six) illustrating the industries of Wales. Prize, 5*l.* 3. Six instantaneous photographs of a football match in its various phases. Prize, 2*l.* 4. Landscape. Prize, 1*l.* 5. Architectural photograph. Prize, 1*l.* Photographs should be sent to the General Secretary, Pontypridd. The adjudicators are practical photographers, and, as the prizes are to be in money, there is every incentive for a keen and interesting competition among that large class which regards honour as not incompatible with profit.

A Constant Light for Spectrum Work.—In a paper of importance on certain absorption spectra by Dr. W. Lapraik, he refers to the desirability of having a source of light as constant as possible, and at the same time of sufficient illuminating power. With this idea a quick-combustion petroleum lamp having a circular wick was used. This gave a very powerful light equal to forty-eight candles (British measurement). He used electric light, and also sunlight reflected from a heliostat, but did not find any material difference between the absorption spectra so obtained and those by the petroleum light.

Mr. R. P. Drage and the London and Provincial Photographic Association.—Our readers will learn with regret that Mr. R. P. Drage has resigned the Secretaryship of the London and Provincial Photographic Association, a position which he has filled for the past three years. The "L. & P.," as it is familiarly known, takes rank as one of the principal technical photographic Societies, its reported discussions and proceedings being, as we are aware, read with deep interest throughout the world. Mr. Drage's services to the Association have been of such a thorough-going nature, by persistent hard work and unfailing courtesy to members and visitors alike he has rendered himself so agreeable, and has contrived, week after week and month after month, to bring matters and papers of such interest for discussion before it, that he is certain to be much missed. The best wish we can extend to the Association is that Mr. Drage may have a worthy successor in the office he has so ably filled.

Carbonic-acid-free Ammonia.—The uncertainty as to the composition of any particular sample of ammonia solution required for development is always a stumbling-block in the way of those who would make photographic operations as exact as possible. In estimating the strength, by ascertaining the amount of acid it will neutralise the difficulty if the presence of carbonate comes in, for it is well known that, though carbonate of ammonia preceded liquid ammonia for use in development, the latter in bromide dry plates is much more powerful than the former. Hence a simple suggestion by Herr J. Hertkorn, in the *Chemiker Zeitung*, will be of value in regard to this particular source of uncertainty. He recommends that some lime-water (quite free from turbidity, of course) should be added to the suspected sample of ammonia, and the mixture then boiled. If turbid, the presence of carbonic acid is shown; but if it remains clear, or only very slightly turbid, the sample is free.

Temperature Limit of Light Sensitiveness.—Dr. Dewar, in a lecture on the magnetic properties of liquid oxygen, referring to the extremely feeble energy displayed by the oxygen molecules at extreme low temperatures, said they seemed to be drawing near what might be called "the death of matter" so far as chemical action was concerned. Liquid oxygen, for instance, had no action upon a piece of phosphorus and potassium or sodium dropped into it, and once he thought and publicly stated that at such temperatures all chemical action ceased. That statement he remarked in this later lecture required some qualification, because he had found that a photographic plate placed in liquid oxygen could be acted on by radiant energy, and at a temperature of 200° C. was still sensitive

to light. This fact is of considerable importance as regards the actual result of light action on a plate, for it is well known that chemical action goes on less quickly in solids than liquids, and that a solid dry plate should be influenced by light at this extraordinary low temperature would be a fact that the old advocates of a mechanical rather than a chemical action as the result of light would not be slow to take advantage of.

Lightning Photographs.—A note on two such photographs taken at Sidney was read at the Royal Meteorological Society's last meeting, and the writer gave an explanation of certain effects. The two photographs referred to were taken with a half-plate lens mounted in a whole-plate camera, and as a matter of course showed distortion at the edges. For example, while the lights of street gas lamps were white specks in the centre of the plate, they were crescent-shaped at the edge. The lightning flashes also were distorted, and we have specially referred to this matter on account of the suggestions in the paper that the so-called "ribbon flashes" may be accounted for by this distortion. It is quite obvious that, if accurate depicting of lightning flashes is to be obtained, every care should be taken that neither coma nor astigmatism should play any part in the obtained results. On every account, therefore, it would be advisable, when setting the camera up on the chance of securing flashes, that a lens with as flat a field as possible be employed, and that it be well stopped down. It appears to us that the lightning flash is of such brilliancy, that no matter how small the stop employed the appearance would be recorded brief, as is its duration.

Phosphorescent Zinc Sulphide.—In a recent number of *Comptes Rendus* this substance has been proposed as a photometric tandard by M. C. Henry. The original investigations by which Mr. Warnerke established the usefulness of the instrument which bears his name are on record, and will not be found out of accord with the most recent investigations. M. Henry's results show that, within somewhat wide limits, which correspond with luminous saturation, the quantity of light emitted by a surface of zinc sulphide, rendered luminous by exposure to magnesium light, is independent of the distance of the light or its duration, and of the thickness of the layer of zinc sulphide. He states that the law governing the loss of luminosity is always the same, though the material itself may have such different characteristics as it would probably have after being prepared by different experimenters by different methods. The actual law is expressed in the formula $i^m (t+c)=K$, when M is taken as ·598, and c as 28·35. It holds good for thicknesses of layers varying from ·45 to ·9 mm. Within these limits of thickness the maximum intensity of the luminosity is not influenced by the length of wire burnt, nor by the distance it is held within a limit of 15 cm. of length, and of 28 of distance.

STUDIO-BUILDING.

III.

At this stage it might be well to refer to an aspect of the subject that has caused me the receipt of several letters. How much of the roof should be glazed, and how low should the side lights extend? Here, again, it would be better to reply on broad general principles rather than fix a hard and fast line. Thus if it be remembered that when the blinds and screens used are of good design and construction it is—so far as the actual illumination is concerned—quite immaterial so long as there is a sufficiency of light area. For instance, if the whole roof and sides were glazed, the lighting could be made to assume any character and come from any direction merely by arranging the blinds suitably. But, unfortunately, there is something more to be considered than the illumination only; we have to think of the sun's heating rays as they affect the sitters' comfort. So that here the indications are all in the opposite direction, that is, to restrict the amount of roof area to be glazed. When large groups are to be taken, or on occasions where difficult subjects requiring quick exposures are in hand, the need for most light will be experienced, and the artist will feel he cannot have too much; but, as a line must be drawn somewhere, a fair principle to act on will be that not more than one-half of the roof in a ridge roof, that would be the whole of one side, should be glazed; the rest should be quite opaque, slated by preference, to keep out the sun's heat. This latter point is of such supreme importance that no essay or instructions on studio-building can be complete without a thorough consideration of its bearing. The possibilities of building a studio on a low level against a lofty building at its south or west, influence this point to an important extent, as before referred to, and if two sites, of equal merit otherwise, were under consideration, that which provided an already formed sun-screen in this manner should unhesitatingly be preferred. This subject will be referred to again in a final chapter on screens and blinds.

The glazing of the whole length of one side of a roof may to some appear excessive, but it must be borne in mind that it is the light furthest away from the sitter that has to be relied upon to equalise the illumination on groups, which may possibly extend across the whole breadth of the studio, also a studio to seat the sitter at either end is the present groundwork of our remarks. Of course, a similar effect could be obtained by glazing a portion only of the opposite side of the roof, though, unless carefully done, and its position well chosen, such a method would lead to that cross lighting of the subject which on a face is so ugly and inartistic.

Some photographers prefer to make the roof opaque for about two feet from the end, and the plan has many advantages. Its chief disadvantage is that there is then an insufficient control over the lighting of the backgrounds. When they are lighted from overhead, and the light aperture screened from the sitter, the effect of the background is but slightly interfered with. However, the main light may be controlled by blinds in any special way, while, if the lighting of the background depends on that of the sitter, very unfortunate results may be unwittingly obtained. The relative disposition of the lights and darks may alter the whole chiaroscuro, and cause possibly, for example, a usually light background to come out quite dark in the negative.

As to the side lights, little need be said. If they are continued to about three feet from the floor, that will be quite as low as would ever be necessary, and when too low it could be blinded. Side lights, however, are often useless, owing to the light from sky to sitter being arrested by contiguous buildings. Obscured glass of course, as advised, should then be made use of.

We have now arrived at an advanced stage with our studio erecting. The walls are built, the roof is on, and the sash-bars are ready for glazing; and this is a point on which many photographers are in doubt: whether to use plain glass, rolled plate, hammered plate, or obscured glass. Instead of answering the questions that have been put directly, it will be better to discuss the general principles or the governing conditions which may be looked to for guidance in coming to a decision. From a given beam of light direct from sky to sitter—using the word sky to indicate either clouds or the unclouded azure—least light will be removed by the interposition of plain glass; rolled and hammered plate come next; and obscured, *i.e.*, smoothed, or ground glass in the given circumstances robs the beam the most But there are other conditions. According to the situation and construction, the strength of the sheets is matter of greater or less importance. Ordinary window glass can be had of a strength of fifteen, twenty-one, and twenty-six ounces to the foot. The same holds good with obscured glass. The varieties of plate may be had, practically, of any thickness. Under all ordinary circumstances, where no violence beyond the forces of nature is anticipated, glass of the thickness of that represented by twenty-six ounce is sufficient. In the course of a long experience I have seen the results of many hailstorms, and have never found glass of that thickness injured even by the heaviest fall. The country is occasionally visited over narrow belts of a few miles by hailstorms when the stones are of extraordinary weight; but, though I have seen the windows of private houses facing the direction of a storm literally riddled with hailstones, I have never

yet had a roof pane of that weight broken. It is well to note that the best English glass should be used. There is a cheap kind of foreign sheet on the market, which, though fairly thick, I have been credibly informed is far inferior to a thinner make of the kind I recommend. It is not only said to be more easily broken by hail stones, but is also liable to crack *in situ* through slight expansions of the sash-bars from wet or heat, or from trivial strains of the supports through painters on the roof, or slight warping of the timber used.

As my object is to give, and only to give, my personal experience, I may here say I have had no experience whatever of metallic sash-bars. I should have a prejudice against them, owing to the need for experiments in lighting arrangements, necessitating the use of nails and screws for suspension, and the impossibility of obtaining such support when metal framework was employed.

To assist in coming to a decision as to whether glass plain or obscured should be selected, it may be said that every studio builder should ask himself why he should have other than plain glass. In any situation where the studio is liable to being overlooked it will, of course, be a necessity. But granted a free, unobscured light, there is nothing to gain by making the glass translucent rather than transparent. But many studios are built in situations where surrounding buildings intervene and prevent a free light entry; then translucent glass may be a decided benefit. The rule to adopt is for the artist to place himself in any situation in the studio where a sitter may probably be placed, and look round at his sky light and side light. If he sees nothing but clear sky, he will receive most light from the use of clear glass. If, however, in his line of sight buildings are visible, then obscured or other similarly acting glass will bring more light to the sitter. Supposing a studio to be painted internally dead black, and all the unglazed roof covered over, except such parts as would only permit a view of buildings to be seen by the sitter, then—at any rate, speaking for the face—he would be almost in perfect darkness, except the building were painted or otherwise light in colour. If, then, clear glass were put in the sashes, the darkness would remain unaltered. But if obscured glass were made to take the place of plain, a great difference would be observed. Those beams or pencils of light which in the first would from other directions penetrate the roof, illuminate the walls or floor and not the sitter, would be dispersed or scattered, and so many would reach the sitter as to give a fair illumination to his features.

These are the conditions under which portions of a roof might with advantage be glazed. In the studio with very steep roof that I described, and which was built in the old wet-collodion days, I used ground glass for the lower panes, owing to my being shadowed over by an exceedingly lofty building at some distance away. Standing at the sitter's end, in all positions where I might expect to place him, I looked through the empty sash-bars, and got the carpenter to mark, with a pencil, the limit on the bars through which I could see bricks and mortar. These I had glazed with obscured glass; where sky only was visible, I used clear glass.

G. Watmough Webster, F.C.S.

CONTINENTAL NOTES AND NEWS.

Ammonium Hyposulphite.—M. Ch. Hermitte writes in the *Revue de Photographie* that the ammoniacal odour given off by ammonium hyposulphite with which several Continental photographers have been experimenting as a substitute for sodium hyposulphite, may be obviated by the addition to the solution of a small quantity of chlorate of potash. This, however, does not apply to all samples of the new hypo that are prepared, considerable variations in its quality being experienced. M. Hermitte recommends the following bath:—

Water	1 litre.
Ammonium hyposulphite	150 grammes.
Chlorate of potash	10 „

Negatives fixed in this bath are said to be beautifully clear, and in the quantity of solution mentioned fifty to sixty half-plates may be fixed. M. Hermitte finds an hour's washing in running water sufficient, but recommends for greater safety a longer immersion.

A Platinum Toning Bath for Silver Prints.—The following bath is recommended by a foreign contemporary:—

Water	500 c.c.
Sodium chloride	35 grammes.
Tartaric acid	8 „
Sulphate of soda	6 „
Chloroplatinite of potassium (12 per cent. solution)	8 „

The salts are dissolved in the order named. The bath is said to give tones much resembling those of platinum prints, and to keep well.

Photography and the Falsification of Documents.—It is stated that the Russian Government has instituted a photographic laboratory in connexion with the Courts of Justice, the principal object of which will be the verification of the authenticity of legal and other documents. The laboratory, it is further said, has already done signal service to the cause of justice in this way.

Hypo in the Metol Developer.—Herr Schmidt, of Wiesbaden, finds that hypo in the metol developer acts as a retarder instead of, as is generally the case when it is added to the developer, an accelerator. He uses it in the proportion of from 30 to 40 drops of a hypo solution 1 : 100 per each 30 c.c. of metol solution.

Society Outings in France.—The plan of photographic instruction in the field, which seems of late to have been adopted by several English photographic societies, is being followed in France. On Sunday, April 9, the Société d'Etudes Photographiques met in the gardens of the Trocadero, Paris, under the direction of the President, M. Balagny, for the purpose of photographing a certain view which had been previously decided upon, the development of the plates being subsequently conducted at the President's house. Under experienced direction such a method should be a useful source of knowledge to young photographers.

Salted Gelatine Paper.—"Violette," in *L'Amateur Photographe*, publishes a plea for plain salted gelatine paper (*à la* albumenised paper) which could be sensitised and used according to the requirements of the individual, and he claims that, by its use, better tones than is the case at present could be obtained, that toning would be more rapid, and that yellowness, which is more or less evident with commercial sensitive gelatine papers, would be minimised, inasmuch as the elements of deterioration would be absent.

Sulphocyanide of Ammonium in Uranium Toning.—Professor Rodolfo Namias, in the *Rivista Scientifico-artistica di Fotografia*, recommends the addition of ammonium sulphocyanide to the uranium toning bath as a solvent of the ferrocyanide of silver and potassium which, he says, is formed in toning, and to facilitate the deposition of the uranium ferrocyanide upon the image. The following is the formula he employs:—

A.—Potassium ferridcyanide	2–3 grammes.
Water	1000 c.c.
B.—Uranium nitrate	10 grammes.
Ammonium sulphocyanide	50 „
Acetic acid	10 c.c.
Water	1000 „

Equal parts of the solutions are taken for use.

Purifying Eosine.—Eosine, which is employed in orthochromatic photography, is not always found in commerce of a sufficient degree of purity for photographic purposes. The following method of purifying it is given:—Dissolve 20 grammes of eosine in 700 c.c. of boiling water, and, after dissolution, add sulphuric acid 1 : 10 until no further precipitate of bromofluorescein is formed. The liquid is separated by decantation, and the salt washed and dried. The purified eosine is insoluble in water, but is soluble in alcohol.

The Aero-carbon Light for Printing-out Purposes.—With a celloidin paper and a negative of normal density M. Kowarzik finds that by using the aero-carbon light he can obtain developable images in from 20 to 30 minutes, and under a thin negative in 20 minutes, while a dense negative takes from 40 to 45 minutes. With gelatine paper 15 to 20 minutes suffices, but platinum paper requires from 3 to 5 hours. The printing frame is placed within a few inches of the source of light.

PHOTO-LITHOGRAPHY.

[Photographic Society of Great Britain.]

The purpose to which photo-lithography is applied with special advantage is the reproduction of a subject where only two tones, as black and white, without intermediate gradations, are required. True, there are photo-lithographic processes in which the half-tones of the original are broken up into a kind of grain, which gives the idea of half-tones, as do the fine lines of an engraving. The present paper and demonstration will not include these processes, nor be concerned with many of the variations that have been made in the practice of photo-lithography; but an endeavour will be made to clearly show throughout a practicable working method, such as the writer has used with success, and, in the main, such as he has known to be employed in printing works turning out large quantities of excellent work.

The absence of half-tone, and the consequent separation of the gradations of the original into two tones as dissimilar as can be obtained, is, in most of the cases for which photo-lithography is employed, not only no drawback, but a positive advantage. An engineer's tracing, for example, has to be copied. There may be pencil markings, traces of erasure, some amount of soiling, and lights and shades from the cloth lying irregularly, or being creased. In any of the ordinary photographic methods these defects would be reproduced, but in a process devoid of half-tone everything must be either black or white, and so representations of soils and creasing, if not strong enough to show as black, will be got rid of.

The General Principle of Lithography.

The general principle of lithography depends upon the fact that a porous stone imbued with water, especially water containing mucilage, does not readily take to grease, and *vice versâ*. If a drawing be made with greasy matter upon a lithographic stone, and the stone be then well wetted, a roller charged with greasy ink will deliver its ink on to the drawing, but not on to the surrounding moist parts of the stone. A paper laid on the stone and subjected to pressure will pick up sufficient of the ink to represent the drawing, and the stone may be rewetted and inked up again for as many prints as may be wanted. Certain additions to the process have been found necessary, and will be described; but this is the main principle.

The first thing necessary in photo-lithography is to have a negative, the shadows of which are really clear. It is also desirable to have dense lights, but this is not essential. Wet collodion is recognised as being the best negative process for the purpose, though, for coarse lines from a clear black and white original, some gelatine plates may be made to serve. I always use wet collodion, and I believe that to be almost the universal practice in commercial establishments. It is of course much easier to get a suitable negative from a pure black-and-white subject than from one in which blacks and whites are deficient in purity, and some establishments insist upon having a drawing made with Indian ink and on Bristol board. However, it is often necessary to copy a subject which presents greater difficulties. I have here a letter more than twenty years old, written to me by a well-known artist. It is rather soiled and creased, and the ink (which, of course, was of the ordinary kind) has faded in parts. Illustrating some of the words is a pen sketch, which I have selected as the subject for the demonstration. Of this I have made two negatives (wet collodion). One, which is of full intensity and shows the paper as of fairly solid opacity throughout, looks, to those not aware of the special quality required, to be the better. It is, however, a full half-tone negative. The lines where the ink is still black are transparent, but in other parts, where the ink has been thin or has faded, there is a good deal of deposit. Such a negative is not suited for the present purpose, for, although by deep printing on the sensitised transfer paper the faint lines might be made to show, there would then be a spreading and thickening of the more transparent lines. The second negative, which is of the kind required, shows the lines throughout as clear as the margin. The white of the paper is not so good, every soil and irregularity shows strongly, but these

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an be masked out; or, if they print sufficiently to take the ink on he transfer, can easily be cleaned off the stone.

Preparation of the Photo-lithographic Transfer.

The principle concerned in preparing a photo-lithographic transfer is this:—Certain organic substances, such as gelatine and albumen, combined with a bichromate, undergo a change when exposed to the light, in virtue of which they are no longer soluble, and do not even absorb water. When, therefore, a film of bichromated gelatine is exposed under a negative, a greasy ink may be made to adhere to the parts affected by light, whilst the unaffected parts when imbued with water will not take the ink, or will permit it to be removed.

Paper prepared with gelatine for photo-lithographic transfer is an article of commerce, but if preferred can be made at home. The paper should be of firm, good quality, or it may split up in manipulation. Gelatine such as is used for photographic emulsion, tolerably hard, may be swelled in water, and dissolved by heat. The strength may be conveniently one to ten, and the solution must be warm enough to allow of easy flowing. Floating in a dish is best, but means must be taken to keep up the heat during the time the requisite number of sheets are being floated.

The paper is sensitised by immersion in a bath of bichromate. Bichromate of potash is generally used, and it has been recommended to use a solution nearly saturated, about an ounce and a half to the pint. I have more generally used a rather weaker solution, about an ounce to the pint, and have even got good results with half that strength. The objection to a very strong solution is the rapidity with which the paper goes bad. It is generally advised to add ammonia to the sensitising bath until the deep orange colour becomes changed to a yellow. I have not found this an improvement. When the paper is softened in the bichromate solution, it may be hung up to dry; but a plan which I much prefer is to squeegee it on to a sheet of talced glass, and leave it to dry there.

There are several advantages about this method:—

1. The surface is fine and smooth, and the paper may consequently be pressed into more intimate contact with the negative.

2. For the same reason the ink may be applied more evenly, without having to be forced into the depressions of the grain of the paper.

3. The sensitised surface of the paper is kept out of contact with the air whilst drying, and until it is required, when it may be stripped and taken direct to the press.

4. The paper being dried in an expanded condition, and applied in that state to the negative, there is very little, if any, distortion from expansion of the paper by moisture when applied to the stone.*

The objection that I have heard raised to drying on talced glass is that there is a tendency for the paper to stick, and, in short, to refuse to strip. I have never known this occur since finding that ease of stripping depended entirely upon a vigorous rubbing in of the talc. Take a little powdered talc (French chalk) and with a cloth rub a clean glass hard until the surface appears to be matt nearly all over. It may afterwards be rubbed until polished again, but the effect remains. The grain of the matt is so fine that it is of no consequence, and the plate may be used many times in succession without any further rubbing or application of talc being required. All loose talc is, of course, dusted away before use.

The paper, stripped from the talced glass, is printed from the negative in the usual way. The exposure is not long, and may be judged to be sufficient when the lines show as a clear brown on a yellow ground. The ground may even print through to a certain extent, as a faint image may be made to part with the ink whilst the stronger parts retain it.

Inking the Transfer.

The print taken from the negative is covered with a thin film of transfer ink. This may be done in various ways. A very good plan is to roll up a lithographic stone with a thin film of ink, and then lay the transfer on it and pass a few times through the press, reversing the stone to ensure equality of pressure. Another plan is to roll on to the transfer paper direct. The end of the paper may be turned over the edge of a piece of glass so as to reach the back. The glass is then laid on another glass, and so the paper is held during the rolling. In either case the first thing is to get a thin, even coating of ink upon a roller. A special ink is used, containing a large proportion of fat. It is sold as lithographic transfer ink, and being very stiff requires a little thinning before use. For this purpose lithographic

* To make up for this distortion, it is customary with some photo-lithographers to take the negative somewhat smaller than is required for the finished print; but then, as paper expands unequally when wetted, it will be necessary to note which way the paper is to be cut, and even then the result will only be of the required size in one dimension, and will exceed or come short of it in another.

varnish is commonly used; some, however, take a fat oil, such as palm oil, and others turpentine. The diluent, whichever it is, is worked up with the ink by a palette knife on a stone, and then by repeated rolling; the stone and the roller are evenly coated. It is desirable that the coat of ink on the transfer be thin, or the fine lines may hang together. The image should just show through the ink.

The roller used is an ordinary lithographic leather roller, which, however, should be of fine texture. For very fine work some use a velvet roller. Small subjects, and, indeed, larger ones if time is not an object, may be coated with ink by a pad of linen or other rag merely, and the use of a roller may be dispensed with until the transfer is on the stone. The pad should be first dabbed with a little ink on a stone or piece of glass until it will distribute a thin even film of ink.

Placing the Transfer on the Stone.

When the transfer is inked, if turpentine has been used as the diluent, it is left for some time, say, twenty minutes. With other diluents it may be proceeded with at once. It is laid in water, or merely floated on, face upwards. This is perhaps the best way, but then no water should be allowed to get on the face in parts, or these will be less strong in the image than the rest. When the gelatine has absorbed sufficient moisture (which can be told by the unexposed portions being raised a little above the lines), the transfer is laid on the slab, held down as before described, and the roller passed over it a few times. The ink will now, for the most part, leave the whites, and the blacks will be strengthened. The transfer is next sponged with water until the spaces between the lines are perfectly clear. Sometimes the rolling off is omitted, and sponging alone is relied on. The transfer is then partially dried and put on to the stone, or, as is often done, it is dried and damped again by placing it in a moist blotting-book. The transfer is best put on to the stone the same day as made. If kept several days, it may refuse to take properly. The stone, having been cleaned and polished with snake-stone used with plenty of water to prevent scratching and dragging, is, after drying, and sometimes slight warming, laid on the bed of the press. Warming is necessary if the stone is colder than the air of the room, as in that case a film of water may be deposited. The damp transfer is put in place face downwards. Some thicknesses of paper are placed on it, and it is then passed a few times through the press, the stone being reversed and the back of the transfer redamped half way through the process. A corner is lifted to make sure that the impression has taken well on the stone, and then, after damping the back of the paper, it is pulled off entirely. If there is a difficulty, warm water is used. The stone is sponged, and then gum water is rubbed all over. This helps to keep the whites clean, and the lines from spreading. The gum water should be allowed to dry, and then the stone is sponged, and ink from the transfer is reinforced by rolling, or rubbing with a pad, with ordinary lithographic ink slightly thinned with varnish or turpentine. If a pad is used, enough ink should be taken up to show as a smear. Before touching with the pad, thick gum water is poured on to the stone, and rubbed in at the same time that the ink is strengthening the deposit on the lines.

Preparing the Stone.

The stone has to go through a process called etching, which, however, does not dissolve it to an appreciable extent, but cleans it up. Before etching, the image is protected by being dusted over with finely powdered resin. The excess of resin is lightly dusted off, and the surface of the stone is sponged. If there are any blemishes in the way of ink on the stone where not wanted, they can be removed at this stage by a scraper, or a narrow slip of snake-stone. Sometimes powdered talc is used instead of resin. The etching fluid is a very dilute solution of nitric acid. The strength of the acid is determined by its effect on the stone. If effervescence takes place in from five to ten seconds, the acid is about right for strength. After sponging off the acid the stone is again gummed and dried.

The stone is now again sponged, and the ink, which has been clogged by the resin or talc, is washed off with turpentine. The stone is again sponged clean, and, a little thick gum water being first poured on, the image is partly brought back by rubbing with a pad of linen that has been touched on to the inky slab. The stone is once more sponged clean, and wiped with what is called the damping cloth, which, as its name implies, is always kept damp enough to leave the stone moist. The damping cloth is a material of a soft muslin character, without any dressing in it. What is called butter cloth, such as is sold for the purpose of wrapping round rolls of butter, is suitable; enough to make a good handful—say, a yard—is sufficient.

Printing.

The stone is next inked up by rolling with the ordinary lithographic ink, slightly thinned with lithographic varnish. The amount of ink left on the image may be regulated by the thickness of the coat on the inking slab, by the dilution or softness of the ink itself, and by the manner of rolling. Heaviness and slowness of rolling deposit ink freely, whilst lightness and quickness tend to remove it from the stone and clean up the lights. A piece of paper is laid on, the tympan lowered into place, and the print made by pulling through the press. The first print may be a little weak, and yet, after about a dozen pulls are taken, it may come up of full strength.

After each print is pulled, the stone is damped again before re-inking. Wiping with the damping cloth is generally sufficient. If the stone itself appears to take the ink in places, rubbing with a sponge will generally clean it; but, if there is a difficulty, clean it off with turpentine, and, after sponging with water, bring back the image by rubbing with a cloth, charged with thinned ink as before directed, taking care that there is some thick liquid gum on the stone at the same time.

Of course the assistance of a practised lithographic printer will save some failures, and be of great use during the first essays in the printing part of the work. It would be perhaps as well at first to confine oneself to making the negative, and from that the photo-litho transfer, and hand the latter over to a lithographer for printing from. If only one or two prints are required, it may suffice to make the photo-litho transfer, and consider that as the final result. At all events, this will afford good practice for those commencing to work the process.

W. E. Debenham.

AMIDOL FOR DEVELOPED PRINTS.

I have made some thousands of bromide prints, and used some hundreds of gallons of ferrous oxalate developer during the past ten years. Recent events, however, have worked a change. Ferrous oxalate has been an old and valuable servant, but I am afraid it will now have to be deposed and be considered practically defunct. "Requiescat in pace."

For printing in bromide—and one is almost compelled to adopt this method when days are short and leisure scanty—I find amidol to be a particularly satisfactory developer. Things are getting simplified nowadays, for we are able to develop out negatives and prints in the same solution, and fix them side by side in the same bath, while we can (and it is a good riddance) say good-bye to the acetic-acid clearing bath. The developer made several months ago, viz., amidol 1·0, soda sulphite 10·0, water 48·0, was used. I have not met with any trouble so far with reference to the keeping qualities of this new developing agent. A solution, ten per cent., of potassium bromide was also prepared. Exposure of the bromide paper should be full and ample, the addition of a few drops of the bromide solution keeping the development well under control. The whole arrangement is quite easy, the requisite exposure ascertained by a trial print, the remainder are exposed, and may then be immersed in a bath of clean and very slightly (at this time of year) warmed water.

One part of stock developer is put into another dish with two or three parts of water, and bromide solution *ad libitum*. The prints may be developed singly or in batches, are then transferred to a dish of clean water, and thence to the fixing bath; afterwards, a thorough washing to complete this stage of the operations. This is of the first importance to thoroughly elimidate the hypo—hence fixation should be complete. Then, after thorough washing, a final bath of hydrogen peroside and water, about one ounce to the pint should be resorted to; then a final rinse in water. The *tone* of the developed print is quite pleasing, and leaves little to be desired; but if we wish, various colours, more or less rich and warm (and rather *less* than more, by the way), are easily produced. If the print be, and this is, perhaps, preferable, on *thin* paper, I don't know of anything better than the old mercury bath, followed by a wash in ammonia water or a solution of sulphite of soda. One advantage I find in the use of *mercury* is that no lessening of density results. Whatever intensifier (?) is used, the subsequent washing is to be ample. We may then safely immerse the print in the alkaline solution.

Eder & Toth's bath may be used, *e.g.*:—

Ferridcyanide potassium	6 parts.
Nitrate of lead	4 „
Water (distilled).....	100 „

followed by a thorough washing, then the print toned by various chemicals. It seems, having in view the exposure, density, and length of time in the mercury bath, or Eder & Toth's, possible to get an extraordinary variety of tone; in fact the process is extremely in-

teresting experimentally. At the same time it would require very careful working to get a dozen prints exactly alike. If toning be resorted to I have a liking for the lead and ferridcyanide bath. The print should be fully exposed and over-developed, this bath taking "a lot out" of the print. After bleaching and washing we get, with a ten per cent. solution of cupric sulphate, a really good reddish brown, and very often the print will be the better for a second dip in a bath of weak ammonia water. *Washing* in water, not to be lengthy, follows, a piece of cotton wool helping at this stage to get a thoroughly clean surface, and the prints are then suspended to dry. For opals amidol should be very suitable: in fact, looking at the ease of working, keeping qualities of the solution, and the fact that a clearing bath is not a necessity, to say nothing of colour of positive, one is inclined to ask what further use have we for ferrous oxalate? J. PIKE.

CENTRAL PHOTOGRAPHIC CLUB,

FLEET-LANE, LUDGATE-CIRCUS.

HON. TREASURER: John Howson, "Brockenhurst," Ilford, E. Executive Committee: Messrs. Birt Acres, R. Beckett, Thomas Bedding, Austin Edwards, Thomas Fall, T. E. Freshwater, John A. Hodges, E. J. Wall, and H. Snowden Ward.

The following circular is in course of circulation:—

The want of a photographic club and institute with a permanent home in a central position of London, and easily accessible from the principal railway termini and by the chief omnibus routes, has been for some time felt, and, after several meetings of gentlemen interested in the matter, two public meetings have been held, and it has been decided to at once supply the deficiency.

Numerous premises have been seen and reported upon by the Executive appointed at the first public meeting; and it is proposed, and negotiations are on foot to secure premises at the above address, consisting of basement, ground, first, and second floor, at what is considered a very reasonable rent. In the basement twelve dark rooms could be fitted up, and leave sufficient space for setting up apparatus for enlarging by artificial light. The room on the first floor, after structural alterations, will be sufficiently large to seat 230 persons. It is also proposed at first to provide a smoking-room and library, and other club conveniences. It is proposed at first to utilise the refreshment-rooms in the Memorial Hall-buildings, with which communications will be made. The excellence of the usual catering and the moderate charges have, after actual experience, been highly spoken of. This arrangement will be terminable at any time, and the Club Committee can take the supply of refreshments entirely into their own hands. While the social element will be a strong feature in the proposed Club, technical photographic meetings, demonstrations, lantern entertainments, exhibitions of pictures, apparatus, &c., will be held at stated times.

All gentlemen interested in photography will be eligible for membership.

The subscription for town members, *i.e.*, those residing within twenty miles of the Club, will be 1*l.* 1*s.* per annum, and for country members 10*s.* 6*d.* per annum. The first 500 applicants will be admitted to membership without payment of an entrance fee, which has been fixed at 1*l.* 1*s.* for town members, and 10*s.* 6*d.* for country members. About 250 applications for membership have been received. Life members will be admitted on payment of 10*l.* 10*s.*

A number of rules drawn up and published in the photographic journals for the week ending April 15, 1893, were adopted at the public meeting held on the following Monday. It is anticipated that the Club will be opened early in July next, when a working Committee will be appointed and the necessary bye-laws and regulations drawn up. Every effort will be made to make the club a home, and rendezvous and resort for all those interested in photography, whether residing in London or in the country, and a representative force in each of the many branches of modern photography. We shall be pleased to receive applications for membership, and will, on application, furnish any further information that may be desired.

It is proposed to form a limited liability company, with a capital not exceeding 100*l.*, divided into 5*l.* shares, of which 2*l.* 10*s.* will be payable on application; to take the lease of the premises and to furnish and fit up the same for the use of the club. It is particularly pointed out that all who are interested in the advancement of photography should take shares to assist in placing this cosmopolitan and much-needed club on a sound basis. We shall be pleased to hear from gentlemen as to taking shares, and will forward a prospectus on hearing from you.

W. FENTON-JONES, Hon. Sec. Hackney Photographic Society, 12 *King Edward-road, Hackney, N.E.*
CHAS. H. OAKDEN, Hon. Sec. South London Photographic Society, 51 *Melbourne-grove, East Dulwich, S.E.*
Joint Hon. Sec.

May 1, 1893.

"PHOTOGRAPHY APPLIED TO JOURNALISM."

[Brixton and Clapham Camera Club.]

ON Tuesday, the 18th ult., Mr. T. C. Hepworth, F.C.S., gave a lecture on *Photography applied to Journalism*. The lecture, which was illustrated by means of fifty-seven specially prepared lantern pictures, may thus be briefly summarised.

The lecturer, in his opening remarks, pointed out to what a great extent the journalism of the present day owed a debt to the art of photography. Such papers as the *Graphic* and *Illustrated London News* are almost wholly illustrated by pictures produced by photography. The application of photography has, of course, tended to almost extinguish the wood-engraver, but such an extinction must always be expected when manual labour is replaced by machinery. As an instance, he referred to the substitution of reaping machines, which have thrown manual labour into the corner. Photography has ousted, to a large extent, the wood-engraver, just as photogravure is ousting the steel-engraver. It is to be deplored, and we sympathise with those who are thus thrown out of employment; but, on the other hand, we must congratulate ourselves on the steady advance photography is making year by year.

The existence of such papers as the *Cuts*, of which there are many would be practically impossible were it not for the art of photography. Mr. Hepworth then showed a copy of one of the earliest papers, published in 1679, entitled *Domestic Intelligence; or, News from City and Country*. The original had two columns on either side, and consisted of one small sheet eight and a half inches by six inches; only three advertisements appeared in the paper, and he contrasted these with the big triumphs of printing in the present day—*e.g.*, the *Telegraph*, *Standard*, and *Daily News*, which contain from fifty to sixty columns of closely printed matter, and are crowded with advertisements.

The want of illustration was felt at a very early date, and rough woodcuts very soon appeared; a specimen—*St. Christopher*—was shown on the screen. The original is supposed to be in the possession of Earl Spencer. The picture showed that the woodcut contained some really good work in it, rough as it was. This kind of illustration first appeared in the seventeenth century. A ludicrous specimen, representing a flood in Nottingham, caused great amusement. We must remember that there were few artists in those days, and people had to be content with such drawings. Still greater difficulty was experienced in getting some one who could cut the blocks for the press.

A portrait of Charles I. and his Queen, and another of Isaac Pennington which appeared in the *Mercurius Civicus* in the seventeenth century created some amusement when Mr. Hepworth informed the members that these portraits represented different people at different dates on account of the costliness of the blocks. This custom is still in vogue, as will be seen when our thoughts are directed towards the annual "penny panorama of the Lord Mayor's Show." He referred to a paper of some years ago entitled, *The Illustrated Times*, in which it was the custom to insert old blocks from which the heads of the people had been excised and new ones substituted. A picture of the marriage of the Princess Royal and the Prince Frederick (afterwards the Emperor) was represented in this way. The same block was in an old block representing the wedding of another couple years previously. For many reasons the *Observer* may be called the first illustrated newspaper. An example from that paper in 1827 was shown, illustrating the dire effect of using steam for locomotion, and it caused much laughter.

The copper-plate process was sometimes used. It differs from the woodcut in this respect: in the former the lines are cut in, and in the wood block the lines are raised. In the copper plates the lines are sunk, rolled with ink, the surface cleaned, the ink remaining in the lines of the picture. It was the practice to first print the newspaper in the ordinary way and then pass it through the copper-plate press in order to obtain the engravings. Specimen copper-plate engravings from the *Observer*, representing Nelson's funeral car, were shown on the screen.

Another class of picture known as the broadside then appeared in the papers. Sheets were issued having a rough picture at the top and perhaps underneath some lines or history of a murder. Some of these old broadsides may now be purchased in our back slums. A specimen was shown, Britannia bringing Nelson home from his last victory. In March, 1820, a picture appeared in the *Observer* representing the house in Cato-street where the conspiracy was first hatched. A broadside representing the execution of Mary Perry in 1834 was also placed upon the screen.

Comparing these broadsides with those in the *Daily Graphic*, it will be seen how we have advanced in the art of pictorial illustration. An amusing picture, representing "the first banns," was also exhibited.

Having treated of the historical portion of his lecture, Mr. Hepworth traced the history of the *Daily Graphic* woodcuts from their first conception to their appearance in the paper. The back of a wood block was shown, and it was explained that, owing to the difficulty in getting box-wood more than three inches in diameter, the block had to be composed of several small pieces bolted together. These pieces were distributed between several engravers, and, after the drawing had been engraved, the pieces were rebolted together, an impression taken in wax, a stereotype produced and bolted to a wooden block, which was then ready for press.

The method of engraving was described, and an illustration of the engravers' studio placed upon the screen. Mr. Hepworth stated that in the pre-photographic days the engravers very frequently spoiled the work of the artist, much to the annoyance of the latter. Examples of original drawings and of photographic reproductions were placed upon the screen, and it was difficult to distinguish one from the other. The lecturer then explained very fully the method of printing the *Daily Graphic*. He

stated that this paper was produced at the rate of 50,000 copies an hour, five machines being used. The paper, he said, passed through each of the machines at the rates of three and a half miles in fourteen minutes.

Type-composing, the formation of paper moulds, cylindrical casting, and the general working of a machine were fully explained from the illustrations. The method of drawing and photographing the pictures was very lucidly explained. Balloon sketches, telegraphic instruments, &c., were each in their turn dealt with, and Mr. Hepworth concluded his lecture with a photograph of a group of artists, amongst whom were noticed Professor Herkomer and Mr. Frank Holt. A vote of thanks was unanimously accorded to Mr. Hepworth for his lecture. Later in the evening the Club resolved to affiliate with the Photographic Society of Great Britain.

FORFARSHIRE INTERNATIONAL EXHIBITION.

The Forfarshire Exhibition was held last week in the Reid Hall, Forfar, the task of organization devolving upon Mr. R. Whyte, Forfar, and Mr. W. J. Anckorn, Arbroath, assisted by a local committee. Exhibits were on view from New York, Chicago, Italy, Vienna, and Germany; and, but for a hitch as to time, pictures from Russia, India, and Africa would also have been entered for competition. The Exhibition was well supported by the principal exhibitors throughout the country. For Judges, the Committee engaged Mr. Walter D. Welford, London; Mr. Marshall Wane, Edinburgh; and Mr. Adam Diston, Leven.

The following were their awards:—Class I., confined to Forfarshire amateurs: Silver medal, Peter Feathers, Dundee; bronze medal, G. Mackie, Brechin. Class II., open amateur landscape: Silver medal, T. M. Brownrigg, Guildford; bronze medal, A. H. Bishop, Helensburgh. Class III., amateur *genre* and portraiture: Silver medal, withheld; bronze medal, John E. Dumont, New York. Class IV., professional portraiture: Silver medal, W. J. Byrne, Richmond, "Winnie;" bronze medal, J. H. Hogg, Kendal. Class V., professional *genre*: Silver medal, Robert Terras, Markinch; bronze medal, W. J. Anckorn, Arbroath. Class VI., open class enlargements: Silver medal, Alexander Bros., Glasgow; bronze medal, W. J. Anckorn, Arbroath. Class VII., professional landscape: Silver medal, Robert Terras, Markinch; bronze medal, J. H. Hogg, Kendal. Class VIII., ladies only: Silver medal, Mrs. Bennetto, Italy; bronze medal, Mrs. Amy Warneuke; hon. mention, Margaret Watson. Class IX., lantern slides: Silver medal, T. M. Brownrigg, Guildford; bronze medal, Edgar G. Lee, Newcastle; hon. mention, W. Taverner and W. C. Beetham. Class X., champion class: Gold medal, W. M. Warneuke, Glasgow; silver medal, J. A. Dumont, New York; bronze medal, Robert Terras, Markinch. Special awards: Gold medal, withheld; silver medal, W. J. Byrne, London; bronze medal, Miss Hall, Brechin. Apparatus section: Bronze medal, A. H. Baird, for Todd-Forret flash lamp.

Our Editorial Table.

The Official Catalogue of the British Section of the Chicago Exhibition.

A consideration of the fact that this catalogue of the British Section fills 536 pages, together with 110 pages of advertisements, almost appals one at the probable immensity of a complete catalogue embracing all nationalities. That portion relegated to photography is prefaced by a brief summary by Captain Abney, from which we learn that, as regards the application of photography to scientific purposes, it is believed Great Britain is very much on the same level as other countries. Its uses in medicine, chemistry, astronomy, physics, mineralogy, gunnery, and other branches of pure and applied science, has been very fully demonstrated at the various learned societies, where a very large proportion of contributions are illustrated more or less by photographs. He gives credit to the Eastman Company for having given impetus to flexible film photography, and the form of roller slide in which to use it. We are pleased to see that a large number of pictures are contributed by the photographers of the United Kingdom.

Metol-Hauff.

London: Fuerst Bros., 17, Philpot-lane, E.C.

Messrs. Fuerst have sent us samples of the metol manufactured by Herr Hauff, and which, as we learn from their circular, has been patented in all countries. These samples are put up in small pill-box like tins, each containing thirty-five grains of metol, which, we may say, is in the form of a dry, white, sparkling powder.

Adhering to the instructions for use by which they were accompanied, the contents of one case (thirty-five grains) were dissolved in eight ounces of water—that of the New River Company in this case—and when dissolved, three-quarters of an ounce of sulphite of soda were then added. This, so far as we can perceive, is likely to remain good for an indefinite period; it therefore forms a useful stock solution, and may be labelled A. Solution B contains the same quantity of water—eight ounces—and three-quarters of an ounce of carbonate of potash. Now, in accordance with the proportions in which these are mixed, so does the character of the negative depend. For example, and in the case of studio portraits, the addition of one part of B to three of A, will give an ordinary average negative; while, if a soft negative be desired, one-half part of B will suffice for the same quantity of A; equal parts of A and B, with a third of its bulk of water, gives a hard negative. It will thus be seen that this developer lends itself to the production of any class of negative desired. We may add that, for the development of landscape negatives, a large admixture of water, even up to an equal bulk, is recommended.

But soda can be used equally as well as potash. The proportions recommended are:—

A.	
Water	1 pint.
Metol	130 grains.
Sulphite of soda	3 ounces.
B.	
Water	1 pint.
Soda crystals	2½ ounces.

We have only to add that the Metol-Hauff acts very admirably as a developer, and keeps well in solution.

Since writing the foregoing we have received from Messrs. Arthur Schwarz & Co. samples of Dr. M. Andresen's metol, between which and that above noticed we have not been able to discover any noticeable difference. The formula for development issued with this latter is as follows:—

Water	1 quart.
Metol	¾ ounce.
Sulphite of soda	7 ounces.
Carbonate of potash	3½ „
Bromide of potassium	⅒ ounce.

To photographers who prefer to work with separate solutions the following is recommended:—

A.	
Water	1 quart.
Metol	¾ ounce.
Sulphite of soda	7 ounces
B.	
Water	3 quarts.
Carbonate of soda	7 ounces.

Of these one part of A is mixed with three parts of water for use, bromide of potassium being added as required for the prevention of fogging. The preparations of Dr. Andresen reach us both in pill-box and cartridge form.

La Biblioteca de Fotografo.

Paris: 4, Rue Antoine Dubois. Milan: Lepage et Cie, 11, Via Santa Radigonda.

This little volume has for object the provision of a sectionised list of all published works, so far as can be ascertained, that relate to photography. It should be useful for reference, as the subjects are given in French, German, Italian, and English.

Willis's Photographic Mounts.

Messrs. Willis & Co, Limited, Long-acre, have submitted to us samples of various styles and sizes of mounts enamelled, plate sunk with paste down tint, plain-toned, dark enamelled in various colours, ivory surface, plain and gold blocked, embossed, gold bevel, &c. The mounts are not only all in excellent taste, but are beautifully finished, and appear to be very cheap. A specially pure, plain mount contains seventy-five per cent. of paper, which Messrs. Willis say is not usually found to that extent in photographic mounts. As showing the magnitude of Messrs. Willis's business, it may be mentioned that over 100 hands are employed in the production of the mounts. They supply samples free.

"To Every Photographer."

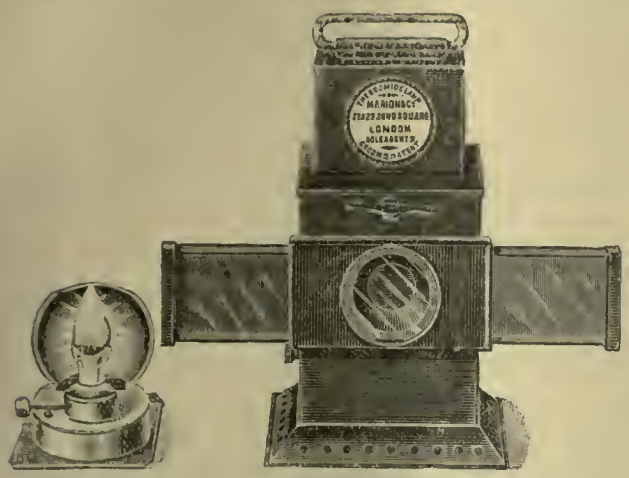
This is the title of a *brochure* issued by the firm of Taylor, Taylor, & Hobson, Leicester, relating to the standard lens flanges and adapters made on the principles recommended by the Photographic Society of Great Britain, and for accuracy in the construction of which this firm has acquired a great and well-deserved reputation. Having had

occasion to avail ourselves of their services in the adoption of several lenses to the one system, in view of the comfort that has, in consequence, been experienced, we can strongly advise those who have a variety of lenses to have them all brought under the standard, feeling assured this will conduce to their comfort as much as it has done to ours. The pamphlet contains a list of prices.

The Bromide Lamp.

Marion & Co., Soho-square, W.

This lamp, which is constructed under Groom's patent, is primarily intended for contact bromide printing, for which it seems admirably adapted, but it can make a useful lamp for all-round purposes. The lamp proper, which is shown in the cut isolated from its framework,



has its wick operated on by a pinion, and its flame is backed by a well-designed reflector. When inserted in its casing, no light is emitted save through the aperture in front, and this governed by slides fitted respectively with either colourless glass or ruby and yellow, the last two of which can be combined if desired. The lamp is so constructed as to consume kerosine without the necessity for employing a chimney. Total darkness is obtained by a shut-off actuated by a lever in front. The burner is regulated from the outside.

Photographic Accessories.

Mr. F. Beresford, 14, Bridge-street West, Battersea, S.W., has introduced several accessories calculated to prove of use to the photographer. The "Eclipse Focussing Cloth" can be instantaneously adjusted over the camera, excluding all light, and leaving the hands free. Several buttons and elastics ensure perfect fitting to the camera. The "Paragon Changing Bag" is designed for those who object to changing plates by touch. It is provided with sleeves for the admission of both hands, there is a ruby window in front, an elastic strap to pass over the head, and a pair of eye-holes protected by ruby glass, through which the operation of changing plates in the field may be watched. Accompanying this is the "Eclipse Light-tight Case" for use with it. This is strongly made of black and ruby fabric, and holds six plates. Mr. Beresford has timed the introduction of these useful accessories with prudence.

The A B C Guide to the Making of Autotype Prints.

By J. R. Sawyer. London: The Autotype Company.

The increasing interest now being taken in carbon printing renders the present a fitting time for issuing a reprint of the admirable manual written a few years since by the late J. R. Sawyer, director of the Autotype Works, and which in this edition has been brought up to date. When, six years since, we reviewed this *Guide*, we characterised it as a practical quintessence of all that had been previously written on carbon printing, and expressed ourselves sorry for the intellect of the man who, with such a *Guide* in his hands, could fail to produce excellent work. This, in effect, is all that we can say of this reissue, which is replete with all that is good and practical, and embodies the experience of this most experienced firm up to the present time. It should by all means be perused by every one who aspires to be a pigment printer of any eminence.

It is embellished by a full page illustration, *Sleepy Hollow*, by Colonel J. Gale.

La Fotografia: Secondo i Processi Moderni. Compendio Teorico-Pratico Del Doctor Luigi Gioppi. Second edition, Revised and Enlarged, with 472 woodcuts and 10 plates.

Milan: Ulrico Hoepli.

Dr. Gioppi's work extends to nearly 750 pages, and in that space he compresses a compendium of the theory and practice of modern photography, which, if not quite complete—as, for example, in the case of photo-mechanical printing—is at least full enough in other respects. The book is a compilation from recognised sources of information, which are acknowledged, the illustrations of apparatus, &c., being of an international character. It opens with an examination of natural and artificial light in their relation to sensitive surfaces, while successive chapters treat fully of the camera and accessories; the lens in its various forms; exposure; shutters, &c. Other divisions of the book are devoted to the negative; its development; after-treatment; retouching; printing processes; and many other departments of what may be termed pure photography. The book, which is dedicated to the Prince of Naples, Honorary President of the Milan Photographic Society, is a monument of industrious compilation, and should prove a useful work of reference for Italian photographers.

RECENT PATENTS.

APPLICATIONS FOR PATENTS

No. 8956.—"Improvements in the Manufacture of Sensitive Plates and Films for Photographic Purposes, and in the Treatment of such Plates and Films after Exposure in the Camera." C. E. Pettitt.—*Dated May* 4, 1893.

No. 9072.—"'The Phrenoscopic Camera,' being an Instrument for the Production of Binocular Perspective in a Single Photograph." S. N. Gordon and S. C. Wicks.—*Dated May* 6, 1893.

No. 9106.—"Improved Dark Slide for Exposing Celluloid Films in Photographic Camera." E. H. Fitch.—*Dated May* 6, 1893.

No. 9107.—"Improvements in and in connexion with Photographic Cameras known as Hand or Detective Cameras." H. G. M. Conybeare.—*Dated May* 6, 1893.

No. 9118.—"Improved Means for Operating Photographic Shutters." C. J. Wollaston and J. Stuart.—*Dated May* 6, 1893.

PATENTS COMPLETED.

A New or Improved Photographic Accessory for Portrait Photography.

No. 9721. Edmond Stanley Lauder and James Stack Lauder, 30, Westmoreland-street, Dublin, Ireland.—*April* 1, 1893.

This invention relates to a new or improved accessory for use in connexion with portrait photography, whereby such work may be carried on more economically and with greater convenience, and more artistic effect than hitherto.

The invention consists in the use of a sheet of clear glass, tinted or otherwise, arranged between the sitter, or object to be photographed, and the camera This sheet of glass is utilised as a medium to carry decorative designs, floral or otherwise.

The advantages of this arrangement are as follows:—

1. The interposition of the sheet of glass tends materially to soften the lights and shades in the pictures produced.

2. The operator is enabled to use designs of such a nature in front of the sitter as would be quite impossible by any other means.

3. It is rendered possible to photograph a variety of objects apparently occupying different planes, while they are actually in one plane, thereby ensuring perfect sharpness and definition for all distances.

4. When the designs upon the glass represent flowers, they photograph in front and around the figures in all naturalness of real flowers, but being upon the one plane they are much sharper and better defined than real flowers could possibly be under the circumstances.

5. Economy, inasmuch as the power is available at all times of the year of adding to portraits all the effects to be obtained from the choicest and rarest plants.

Improvements in Photographic Cameras and in Films for use therein.

No. 13,926. John Featherstonehaugh Parsons, Siddington House, Kingsdown-parade, Bristol.—*April* 1, 1893.

This invention relates to photographic cameras and to films for use therein.

According to this invention the films are arranged in a pack after the manner of a pack of cards, and are placed in a carrier inside the camera box and acted upon by a spring tending constantly to draw the carrier towards the lens. Each film is separate from the others, and each is provided with a tongue or strap, which is extended forward to the front of the camera, and made to project beyond a recess formed at the front for the reception of the straps or tongues. The latter may either be made in one piece with the films, or be separately made and attached to the films.

After exposure of the foremost film, it is drawn up from the pack through the medium of the strap or tongue aforesaid, and is pulled over the edge of a ledge, on which, after having been drawn, the film lies face downwards. The spring before mentioned as tending to draw the carriers towards the lens advances the pack of films so that each film is brought into focus in turn, and is drawn up after exposure as above described. Restraining strips or stops are provided for the films, so that they cannot be advanced beyond the proper focus.

The films as they are drawn out of the pack are piled one over the other on the ledge aforesaid, and can be removed at will. The chamber into which they are drawn is light-tight.

The operator is enabled to ascertain, by observing the outer ends of the straps or tongues, the number of films which have been exposed, and as each film is drawn up the operator may sever the tongue at the recess through which it projects.

Improvements in Photographic Cameras.

No. 9819. Conrad Beck, 68, Cornhill, London, E.C., and Joseph Thacher Clarke, Boston, Massachusetts, at present residing at 3, College-road, Harrow, Middlesex.—*April* 8, 1893.

Our invention relates to photographic cameras intended for the separation and manipulation of a pack of sensitised films or cards, such as that described in Clarke's Specification, No. 11,891, of 1890. In apparatus of this description a frame or holder, turning upon an axis, contains a pack or series of films or cards, which are separated and deposited by simultaneously acting selecting devices working upon the front of the holder. When released from the said holder and deposited in another pack or series, the films or cards have hitherto been held in position by a retaining device or presser foot, which was raised when a sheet or film was to be deposited from the holder, and was afterwards returned to bear upon and retain the deposited films or cards.

Our present improvement has for its purpose to replace the beforementioned retaining device or presser foot by a flexible and movable dividing band or septum, which, when the holder is in position for an exposure, intervenes between this and the pack of deposited films, and which is capable of being turned out of the way by the rotation of the holder when this is moved for the purpose of releasing and depositing the exposed films or cards. Such a septum may be formed of a strip of cloth or leather, a band of exceedingly flexible metal (as, for instance, sheet steel or phosphor bronze, about three or five-thousandths of an inch thick), or of any similar suitable material.

When it is introduced into a photographic camera having a chamber for the reception of the deposited films or cards situated at the bottom of the case, at right angles to the holder, it has been found advantageous to hinge or otherwise attach the lower edge of the septum to a low transverse partition strip, so constructed upon the bottom of the camera body as not to exclude the light of the lens from the holder. The upper end of the septum may be similarly attached to the cross-bar or flap, which forms the back of the holder and provides the abutment for the spring tending to press the pack of unexposed films forward against the separating devices upon the front of the holder. The width of the septum may be made nearly equal to the clear interior width of the camera itself, while the length may be somewhat greater than the distance between the partition to which its lower end is attached and the bar or flap upon the back of the holder to which its upper end is attached.

If the chamber for the reception of the exposed and deposited films be situated behind and parallel to the holder, the flexible septum may be attached by its lower end to the bottom of the case at some point between the receiving chamber and the holder, and by its upper end to the top of the holder itself.

In both cases it is requisite to reverse the direction in which the holder has hitherto been rotated, in such wise that the top of the holder is moved away from, instead of towards, the lens. By this motion, after a revolution of 270° or thereabouts, the septum is lifted out of the way of the falling films or cards. When the holder is in its normal position ready for an exposure, the septum intervenes (as before said) between the pack of unexposed and the pack of exposed and deposited films, thus preventing the latter from falling into the body of the camera when this is placed upon its side. At the same time it shields the pack of exposed and deposited films from the light admitted through the lens during the act of exposure.

The notable advantages of our invention—as compared with the presser foot which it is designed to supplant—are economy in manufacture, and the assurance that by no irregularity or other failure of reciprocal action on the part of the presser foot can a sheet or film be dropped into the body of the camera between the lens and the holder.

Improvements in the Manufacture of Transparent Materials, and the Application of the same to Photographic and other Purposes.

No. 7567. Thomas Christy, 25, Lime-street, London, E.C.—*April* 8, 1893.

This invention relates to certain improvements or modifications in the manufacture of transparent tissue described in my Specifications, No. 12,230, 1890, and No. 13,917, 1888, and it has more particularly for its object the rendering of such or similar material suitable in photography for dark-room illumination, or its application to the manufacture of photographic apparatus and appliances, such as transparent changing bags, chambers, covers, window blinds, films, and the like, and for other purposes.

In carrying this invention into practice, I make a solution of gelatine or an equivalent substance, and I incorporate therewith a ruby colouring matter of a nature which does not allow the actinic rays of light to pass through, such as red and yellow aniline, or other dyes in these colours. I also most generally add certain chemical agents which will render the glutinous substance insoluble, such as a salt of chromium; or I subsequently subject the gelatinised substance to a fixing bath, such as chrome alum or other agent having the same effect. I also most generally combine glycerine with the glutinous matter for the purpose of imparting flexible properties to the same. I more generally prepare the glutinous solution substantially as described in my Specification, 12,230, 1890, and I employ the same as a film upon glass or otherwise, or I treat suitable paper silk tissues or other fabrics with the glutinous solution, substantially as described in the hereinbeforementioned Specification, 12,230, 1890, and I apply the products as covers for camera screens, to the manufacture of developing bags in the form of muffs, or otherwise for photographic and for other purposes.

But, instead of simply proceeding as above described, I more generally prefer for the purpose of this invention to produce a transparent tissue substantially as described in my Specification, 12,230, 1890, and as above referred to, and then to cover the surfaces of such material with a coat of siccative oil or a suitable varnish, and after drying the material is ready for the purposes herein intended.

The desired colour is embodied with the material as herein described, or as described in my Specification, 12,230, 1890, and sometimes, for the purpose of intensifying the colour, I also mix a suitable colouring matter with the oil or varnish with which the material is to be coated.

Instead of producing a gelatinised base material as above referred to, I may also prepare a suitable paper, or silk tissue, or other material, with a solution of glycerine. I more generally employ an unsized or partially sized long-fibred paper for the purposes herein intended, and I saturate the same with a solution of glycerine in water, more generally a proportion of three to four parts of water to one part of glycerine with which I incorporate any desirable dye, or I dye the paper first to the required colour. The material is then dried, and I then saturate it with a suitable siccative oil, or varnish, and I more generally employ a quick-drying flexible varnish. I then dry the material again, after which it is ready for the purposes herein intended. With the object of producing very intense colours, and also to cover any minute holes in the material, I may also combine some of the colouring matter with the oil or varnish with which the matterial is to be treated.

I wish it to be understood that I may also apply the improved material for some of the purposes named in my Specification 12,230, 1890, such as for surgical purposes, and in this case colouring matters are more generally omitted.

The patentee claims:—1. The manufacture and application of material, substantially as herein described, for purposes in photography requiring the exclusion of the active rays of light. 2. The application of the improved material for surgical and other purposes. 3. The improved material manufactured substantially as and for the purposes herein described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 15	Camera Club	Charing Cross-road, W.C.
„ 15	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
„ 15	Fillebrook Athenæum	Fillebrook Lecture Hall.
„ 15	Hastings and St. Leonards	
„ 15	Leeds Photo. Society	Mechanics' Institute, Leeds.
„ 15	Richmond	Greyhound Hotel, Richmond.
„ 15	South London	Hanover Hall, Hanover-park, S.E.
„ 16	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 16	Brixton and Clapham	376, Coldharbour-lane, Brixton.
„ 16	Hackney	206, Mare-street, Hackney.
„ 16	North London	Canonbury Tower, Islington, N.
„ 16	Paisley	9, Gauze-street, Paisley.
„ 17	Brechin	14, St. Mary-street, Brechin.
„ 17	Bury	Club Rooms, 13, Agar-street, Bury.
„ 17	Leytonstone	The Assembly Rooms, High-road.
„ 17	Manchester Camera Club	Victoria Hotel, Manchester.
„ 17	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 17	Southport	The Studio, 15, Cambridge-arcade.
„ 17	Southsea	3, King's-road, Southsea.
„ 18	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 18	Camera Club	Charing Cross-road, W.C.
„ 18	Glossop Dale	
„ 18	Hull	71, Prospect-street, Hull.
„ 18	London and Provincial	Champion Hotel, 15, Aldersgate-st.
„ 18	Oldham	The Lyceum, Union-street, Oldham.
„ 18	Oxford Photo. Society	Society's Rooms, 136, High-street.
„ 19	Cardiff	
„ 19	Croydon Microscopical	Public Hall, George-street, Croydon.
„ 19	Holborn	
„ 19	Leamington	Trinity Church Room, Morton-st.
„ 19	Maidstone	"The Palace," Maidstone.
„ 20	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

May 9,—Ordinary Meeting,—the President (Captain W. de W. Abney, C.B., F.R.S.) in the chair.

The Brixtou and Clapham Camera Club were admitted to affiliation of the Society.

Judges for the Society's Exhibition.

It was announced that the following gentlemen had been appointed Judges for the forthcoming Exhibition of the Society:—Dr. P. H. Emerson, Colonel J. Gale, Messrs. F. Hollyer, F. M. Sutcliffe, and J. B. B. Wellington, with, as scientific experts, Messrs. Chapman Jones and Andrew Pringle.

Tinfoil as a Support for Photo-lithographic Transfers.

Captain A. M. Mantell read a paper on this subject, describing a process of Mr. Husband, who is employed in the Lithographic School at Chatham, for the substitution of tinfoil for paper in the preparation of transfers, so as to prevent expansion and consequent distortion. Captain Mantell showed comparative examples illustrating the superior qualities of picture produced by the use of tinfoil. [We shall print the paper *in extenso* in a future number.]

Mr. Leon Warnerke, in the course of a discussion which followed, suggested the use of silver foil, which he had successfully employed in another photo-mechanical process. It was easily obtainable commercially.

In answer to an inquiry by Mr. Bolas, Captain Mantell said the foil could be used for retransfers from the stone, having the advantage that it gave no distortion, but he did not lay stress on that, as the foil transfers were awkward to keep.

The President said that some twelve years ago tinfoil was employed at Chatham for the purpose, and he was enamoured with the results obtained, but

their great difficulty which Captain Mantell had surmounted, was that of obtaining suitable foil. He did not agree with Captain Mantell that process blocks were not required for military work; he held that they were of the greatest use.

A vote of thanks was passed to Captain Mantell for his paper.

The PRESIDENT then read a paper on *The Use of Rapidly moving Sensitive Surfaces*, with reference to their applicability to ascertaining the speed efficiency of shutters, the duration of flashlights, the comparison of the photographic effects produced by direct sunlight with the amyl. acetate lamp, &c. He also said it was possible by such means to measure the duration of the electric spark by employing a rotating reflector with the instrument.

Mr. G. L. ADDENBROOKE explained a similar instrument for measuring the speed of shutters, which he had described before the Society some years ago.

In reply, the PRESIDENT pointed out that the instrument referred to only demonstrated the speed and not the efficiency of the shutter, and was inapplicable to such work as the comparison of sunlight and candlelight. He also objected to the fact that its results were given in the form of ares, which were not so readily measured.

A vote of thanks was passed to the President for his paper.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 4, 1893,—Mr. Alexander Cowan in the chair.

Mr. Ashley Cowan was elected a member of the Association.

Circulars relating to the new Central Photographic Club were distributed among the members.

RESIGNATION OF MR. R. P. DRAGE, HON. SECRETARY.

The resignation of Mr. Drage, Hon. Secretary, having been announced, in consequence of the action of a previous meeting in requesting the chairman of that meeting to enter on the minutes a resolution moved by Mr. Beckett, referring to the remarks made in the spiritualistic press as to the attitude of the Association over spirit photography,

The CHAIRMAN said it was an unfortunate thing that Mr. Drage had taken a personal view of a matter which was strictly to do with the Society. He was sure the members would receive the resignation with great regret.

Mr. A. HADDON endorsed the chairman's expression of regret. The Society had been in a better state under Mr. Drage than under his predecessors, and it was to be regretted that he had taken the view of the matter that he had, and should have considered it such a personal insult as to throw them over. He (Mr. Haddon) hoped that Mr. Drage would continue with them as an ordinary member. Mr. Drage had always had a pleasant welcome for both members and visitors, and his resignation must cause them all great regret.

Mr. R. BECKETT echoed all that had been said by the previous speakers, and said that, in moving the resolution in question, nothing personal was intended for Mr. Drage.

Mr. W. E. DEBENHAM said that Mr. Drage's services had been extremely valuable to the Society; and, indeed, no Society could possibly have a better secretary than he had been, but Mr. Drage had, in his opinion, certainly committed a mistake in refusing to enter the resolution on the minutes.

A formal resolution having been put to the meeting, Mr. Drage briefly acknowledged it.

Mr. T. E. FRESHWATER acted as hon. secretary *pro tem.* during the meeting.

THE ASSOCIATION'S TECHNICAL LECTURES.—III. "DEVELOPERS."

Mr. E. J. WALL delivered the third of the series of the Association's Technical Lectures, his subject being *Developers*. Mr. Wall said he would not touch on theory, but he would controvert Messrs. Hurter & Driffield's statement, that a photographer had no control over his results, by saying that a photographer could so control them as to get what he wanted, either by the stain of the developer, fog, or different colours of the deposit, which so affect the printing qualities of the negative as to give him enormous power over those results. Mr. Wall then proceeded to discuss the practical advantages of the principal developers, first of all pointing out that a developer consisted of the developing agent, the restrainer, and the accelerator, and indicating the action of each. Having dealt with ferrous oxalate (formulæ for which, as well as for the other developers, will be appended to the paper when it is published), he passed to pyro, both with ammonia and the alkaline carbonates. In regard to the sulphites he said he thought they had some action on the developed image, as it seemed to him they altered the character of the print by keeping the shadows clear and had a tendency to prolong the unprintable numbers given by a Warnerke sensitometer. For a standard pyro developer for scientific purposes he recommended the formula recently published by Mr. Cowan, and by means of diagrams pointed out that prolongation of the time of development altered the ratios between the high lights (which he supposed to have been developed through) and the half-tones and shadows, especially with thinly-coated plates. Hydroquinone gave more unprintable numbers than any other developer. As a restrainer with it he preferred acetic acid to bromide. Eikonogen gave such softness that it was difficult to avoid want of contrast with it. It should be employed at a temperature of not less than 65°. Rodinal was a very convenient one-solution developer, and lent itself easily to modifications. In cases of under-exposure he employed it 1:60, for over-exposure 1:20, with 10 to 15 grains of bromide to the ounce, and for ordinary work 1:30. Mr. Wall concluded his paper by touching on amidol, which he recommended to be used freshly mixed, with a stock solution of sodium sulphite. He did not see the necessity for using alkalies. Finally, he promised at a future date to treat of metol and glycin, and said developers in use might be divided into two classes, the slow and gradually working developers, which lend themselves to modification, and rapid developers, with which the whole of the image appeared nearly simultaneously.

The CHAIRMAN said Messrs. Hurter & Driffield defined a perfect negative as the true inversion of the original. Mr. Wall said he obtained what he wanted by the aid of fog, but whether that was the way to get a perfect negative was another thing.

Mr. R. CHILD BAYLEY doubted whether pyro was the only developer which stained the gelatine of a plate.

Mr. W. E. DEBENHAM said Mr. Wall had quoted Mr. Bothamley's standard pyro formula, which contained two and a quarter grains of bromide to the ounce; he (Mr. Debenham) thought that too much, and about one grain sufficient to give density for portraiture. A standard time of development did not seem to him a practical thing, as some plates required much longer than others. It had been claimed for amidol that it allowed of a picture being taken with a quicker exposure than with other developers, but he could not find that he got out more exposure with amidol than with pyro.

Mr. J. S. TEAPE confirmed, from practical experiment, the statement as to different plates requiring different lengths of time for development.

Mr. A. MACKIE asked Mr. Wall which gave the denser image, potash or soda, and also what was the action of potassium ferrocyanide in the developer?

Mr. S. HERBERT FRY thought that tentative development implied more than the reduction of the pyro and bromide; he would begin with a weak solution all round. He asked whether bromide was of any effect in retarding over-exposure. Mr. Wall had said quinol made a large part of the image unprintable, but was not that largely a question of temperature? He could not get sufficient density with amidol unless he employed it at a strength of ten grains to the ounce.

Mr. E. H. BAYSTON had exposed two plates of the same speed, developing one with pyro and ammonia, while Messrs. Fuerst developed the other with amidol. He found that pyro and ammonia brought out more detail than amidol, although the latter gave a much quicker printing negative.

Mr. MACKIE had tried amidol, and found nothing in favour of it over pyro and soda. He did not think it was a really quick developer, for, although the image appeared quickly, if one wanted density the developer had to be kept on the plate a long time.

Mr. W. COBB was very favourably impressed with amidol, which seemed to him the developing agent of the future. The question of temperature was of great importance with it. It had a greater power over under-exposure, and gave a softer image than pyro.

After other discussion Mr. WALL replied: As to the staining action of pyro alone, he had referred to the other developers as they were generally used. He had not found that amidol enabled one to shorten the exposure, and he had tested it by means of the sensitometer and a standard light. As to standard time for development experience alone could teach that. He did not agree with a remark of Mr. Mackie that pyro and bromide were interchangeable. Mr. Mackie had doubted whether he could develop an image right through to the back of the plate, but he had done it. As to the action of bromide, Mr. Bothamley said it only had the effect of extending the time of development. Mr. Wall said he found that potassium ferrocyanide in the developer gave black and brilliant images. He could not say whether potash or soda gave the denser image.

A vote of thanks to Mr. Wall concluded the proceedings.

North London Photographic Society.—May 2, Mr. E. W. Parfitt in the chair.—A circular letter from the Photographic Society of Great Britain was read, asking the Society to furnish a set of lantern slides for circulation among the affiliated Societies. It was resolved that a collection of slides should be contributed by the members to form a set for circulation. A demonstration on *Carbon Printing* was then given by representatives of the Autotype Company. Mr. BRAHAM, one of the representatives, said that the process when first brought out was difficult and uncertain, but with the new and improved methods it was now one of the easiest to work. He gave a short history of the process, referring to the introductions and improvements of Messrs. Swan, Johnson, Sawyer, and Lambert. As to the advantages, carbon prints were undoubtedly permanent, and copies of drawings could be reproduced in facsimile, not only as regards colour, but on the same kind of material that the artist had used. The prints can be finished with the highest gloss or the roughest surface, and, as the tissue was brought into perfect contact with an uneven surface, the want of sharpness, which was apparent in other processes finished on a rough surface, was overcome. The transparencies produced by the carbon process are splendid. After commenting on the manner of printing from the negative, and the use of the actinometer, Mr. Braham developed several prints, and showed the single and double-transfer processes, and the production of transparencies. The demonstration proved the ease with which the process could be worked and the simplicity of the operations.

Harringay Photographic Society.—May 4, Mr. Towers in the chair.—A demonstration of development was given by the Vice-President, Mr. Bennett. In opening, the demonstrator said he preferred and recommended the fixed alkalies, as they were less liable to produce fog, and then proceeded to experiment on an unexposed plate, showing how, with the aid of ammonia, fog can quickly be obtained.

Hackney Photographic Society.—The Annual Meeting was held on Tuesday. A very successful season had to be recorded, the membership (although several removals had taken place) keeping up to 115. The Treasurer reported a fair balance in hand, and stated the weekly meetings had done much to improve attendances. The election of officers resulted:—*President:* Mr. F. Houghton.—*Council:* Messrs. W. F. Barker, G. J. Avent, F. W. Gosling, G. Hawkins, R. Beckett, W. A. Hensler, Dr. Roland Smith, and E. Puttock.—*Hon. Treasurer:* Mr. J. O. Grant.—*Hon. Secretary:* Mr. W. F. Fenton-Jones, 12, King Edward-road. *Hon. Assistant Secretary:* Mr. A. Dean. The Society meets weekly on Tuesdays at 206, Mare-street, Hackney. At the close of the business the prize slides of the *Amateur Photographer* were shown, augmented by slides of Messrs. T. H. Blake and S. J. Beckett.

Putney Photographic Society.—Dr. Sheppard in the chair.—Mr. CHARLES GAMBLE read a paper on *Lighting of Objects to be Photographed*, in which he clearly pointed out the importance of studying the effects produced under varying conditions of light. About 100 slides, prepared by himself to illustrate the lecture, were shown. Mr. Gamble explained the qualities or defects of each, and the members were thus able to see what effects they should en-

deavour to secure and what faults they should avoid. A vote of thanks to Mr. Gamble for his paper and for the thoroughly practical way in which he had placed the subject before the meeting concluded the proceedings. This was the last ordinary meeting of the winter session. The Annual General Meeting of the Society for the election of Council and other business was held on May 4, Dr. Sheppard in the chair. All the members of the retiring Council were re-elected; the accounts, which showed a balance in hand, were passed, and some slight alterations were made to the rules. As in previous years, a series of outings will be held on Saturdays during the summer months, a feature being that on each occasion one or more members will act as leaders, having previously gone over the ground and made the necessary arrangements. In addition to the opportunity of photographing picturesque scenery, it is intended to give instruction in field work to the novices and to arrange a series of experiments with, and comparative tests of, apparatus and materials. The first outing will take place on Saturday, May 13, when the Joint Hon. Secretaries, Mr. Gorin and Mr. Zachariasen, will take the members along parts of the Basingstoke Canal and the Wey Navigation, starting from Byfleet.

Brixton and Clapham Camera Club.—May 2.—One new member was elected, and three other gentlemen proposed for membership. The next meeting of the Club will be held on May 16, on which occasion Mr. W. Thomas will read a paper on *A Photographic Picture and its Production.* As the subject is one which every photographer should thoroughly understand, the attendance of every member and also of any gentlemen interested in photography is specially requested. Mr. Thomas's paper will be fully illustrated.

South London Photographic Society.—May 1, the President (Mr. F. W. Edwards) in the chair.—Mr. S. Herbert Fry delivered an address on *Multiple-coated Plates,* during the course of which he gave a minute description of the peculiarities of the Sandell plate, and the treatment of it. For development he recommended Messrs. Thomas & Co.'s "cyclol" developer, composed as follows:—Hydroquinone, 30 grains; eikonogen, 100 grains; rodinal, 9 drachms; sulphite of soda, 2½ ounces; carbonate of potash, 2½ ounces; water, 20 ounces. Use 1 part to 7 parts of water in the summer, and in the winter time 1 part to 3 parts of water. The fixing bath should be as strong as 8 ounces of hypo to a pint of water. A longer time should be allowed for the fixing and washing of the plates, owing to the thickness of the coating. Mr. Fry, in conclusion, claimed the following advantages for the Sandell plate:—(1) Special merit for hand-camera work; (2) peculiar fitness for interior work; (3) a practical cure for halation; (4) a better atmospheric effect and a longer range of gradation; (5) exposure is practically unimportant. Examples of work were passed round and examined. A question was asked: "What is the best background for photographing flowers for lantern slides?" It was answered, "A black velvet, brown paper, or a dark-coloured plain background. Two new members were elected, and five nominations were read. Attendance, fifty-two.

Croydon Microscopical and Natural History Club (Photographic Section).—May 5.—Mr. J. R. Gotz exhibited several photographic novelties, and explained their working. The chief one was a pair of lenses with a shutter attached—part of a new camera he was about to introduce—which could be used at will as a stereoscopic camera, or as a hand camera with full-sized finder, or as a double quarter-plate. The shutter had a considerable range of speed, and although working simultaneously on each lens could, when necessary, expose them independently. A changing box for large films was also shown, the films being carried in thin steel sheaths, and exposed in a single dark slide. Mr. Gotz then demonstrated the new Obernetter positive films, the various methods of toning Obernetter gelatine, and celloido-chloride papers, and their development when partially printed; the great variety of tones obtainable were shown in a number of prints that were handed round.

Birmingham Photographic Society.—May 2, Mr. W. Jones in the chair.—About forty-five members present. Mr. FRY gave a lecture on *The Uses and Advantages of the Sandell Plate.* Mr. Fry described the advantages claimed for multiple films. They are, briefly: (1) Freedom from halation even with the most trying subjects. (2) Possibility of giving enormously more than a normal exposure, which, with careful tentative development, would give all detail and density possibly required, and would dispose of the correct exposure question. (3) Increased detail and transparency in the shadows of instantaneously exposed plates. This was well exemplified by an extremely fine series of pictures produced by Mr. Sandell, the inventor of the plate. As to manipulation, briefly, one may say, give a long exposure and develop tentatively, hydroquinone and eikonogen used together being one of the most suitable developers. The CHAIRMAN said he had used and liked the plates very much; the one thing he did not like was the price. Mr. SIMKINS said he thought all that had been done by these plates could be done with any ordinary good plate properly backed. Mr. Simkins' method of working is to largely over-expose, development being tentative and stopped by citrate of ammonium when detail is out, and then redeveloped to full density as recently described. Mr. MIDDLETON said he thought the Sandell plates did not always prevent halation, and challenged M. Fry to expose a plate on the interior of St. Martin's Church, Birmingham, a very difficult subject. Mr. JAQUES said he considered the results shown very beautiful; so soft, and such transparency in the shadows.

Leeds Photographic Society.—May 4, Mr. J. H. Walker (President) in the chair.—Dr. Jacob gave a lecture, with practical demonstrations, on *Tone and Colour in Lantern Slides.* He showed that, with various exposures and suitable developers, a great variety of tones could be produced at the will of the operator. He also showed good results on the Alpha plate, toned in the combined bath.

Lewes Photographic Society.—May 2.—A demonstration of *The Cold-bath Platinotype* was given by Mr. G. I. Wightman, who developed a number of prints, and showed how glycerine could be used in controlling development and in saving over-exposed prints. The results were very satisfactory, and the demonstration was much appreciated. A number of sample packets of plates, kindly sent for trial by the Imperial Dry Plate Company, were distributed among the members.

Sheffield Photographic Society.—May 2, Mr. Bradley Nowill in the chair.—Mr. T. G. Hibbert showed four photographs taken in America by the Daguerreolype process, which are still in a good state of preservation.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Optimus rapid rectilinear eighteen-inch iris diaphragm, want concentric seven-inch or over; difference, if any, adjusted.—Address, WRIGHT, Studio, Hanwell.

Will exchange Lancaster's half-plate camera, two double slides, landscape lens, and tripod for magic lantern or first-class rectilinear lens of four and a half inches focus by good maker.—Address, G. MOORE, Buckfastleigh.

Will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY 1888, 1889, 1890, 1891, 1892 (about six missing), also 140 numbers *Photographic News* between 1880 and 1887, for a good hand camera or field glass (Lemaire).—Address, MURRAY LUNDIE, 11, Bridge-street, Rothesay.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE CONCENTRIC LENS.

To the EDITOR.

SIR,—I have looked in vain for some authority in the photographic world to challenge Mr. Stillman's letter on this lens, as set out in the JOURNAL of April 21.

This is the second letter I have read from this gentleman, in which he contends that the Concentric lens defines as sharply with *f*-16 as it does with *f*-64, and I note he sends you prints with a view, no doubt, to an editorial foot-note confirming his conclusion. Messrs. Ross may well pray to be delivered from their friends; anything more misleading to the public or unfair to the lens cannot be imagined. Mr. Stillman makes 10×8 negatives with an eight-inch lens, attached to a camera with a cracked front, cuts out the centre of his prints, and rushes to the JOURNAL with a positive assertion, which he defies any one to contradict, "that an eight-inch Concentric defines as perfectly on whole-plate with *f*-16 as it does with *f*-64."

This statement is so opposed to my experience with the lens, that I can only conclude that Mr. Stillman obtained his two prints, which are so equal in definition, on the "pinhole" principle, through the crack in his camera front, and that he omitted to remove the lens cap in both cases when making the exposures.

When the Concentric was offered to the public, I obtained one of twelve-inches focus, with which I have made some hundreds of negatives. My lens is fitted with rotating stops which run from *f*-16 to *f*-32 only. I am therefore unable to say what it would do at *f*-64, but the difference in definition between *f*-16 and *f*-22 is so remarkable, that I venture to give my brother amateurs a direct repudiation of Mr. Stillman's contentions; and, further than this, to warn them to be careful how they use the lens at *f*-16. I spoiled plate after plate with this stop until I tried focussing with *f*-22, even when intending to make the exposure with *f*-16, but even then *f*-16 is not a stop for general use with this lens, and I now rarely or ever use it.

The strong points of the Concentric are its equality of illumination and the freedom with which you can raise or lower your camera front in difficult places; you can obtain sharp definition with the very edge of the lens, where an ordinary rectilinear would give you nothing but astigmatism, only let *f*-16 severely alone, and stick to the *f*-22 to *f*-32.

I am an utterly unknown amateur, who can remember the wet-plate days, but make no claim to the title of an expert. I do not wish to be discourteous to Mr. Stillman, but there are pitfalls enough for the unwary, and many are unable to discriminate between the sound and the unsound. I recommend your article on "Focal Peculiarities of Wide-angle Lenses," in this week's number, to Mr. Stillman's careful consideration.—I am, yours &c.,

F. H. BURTON.

Roundhay, near Leeds, May 6, 1893.

SULPHURIC ETHER.

To the EDITOR.

SIR,—I find by a clerical error I put down ·770 as the specific gravity of best sulphuric ether instead of ·717, in my "Lantern Mems." of to-day's "Lantern Record," and, as my correction did not reach you before going to press, I shall be obliged by your inserting this in the next JOURNAL. It should also have read: "·720 to ·750 specific gravity will do." As, however, the latter is stronger smelling, ·720 specific gravity is about the densest that should be used for the oxy-ether light.—I am, yours, &c.,

May 5, 1893. G. R. BAKER.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

To the EDITOR.

SIR,—My duties as Hon. Secretary and Treasurer having terminated, will you kindly allow me to inform your readers that all communications intended for the London and Provincial Photographic Association must be forwarded to Mr. T. E. Freshwater, 3, Fleet-street, E.C., who is acting as Hon. Secretary *pro tem.*—I am, yours, &c., R. POULTER DRAGE.

95, *Blenheim-crescent, W.*

GELATINO-CHLORIDE *VERSUS* ALBUMEN.

To the EDITOR.

SIR,—I think "B. B.'s" difficulty with gelatino-chloride is due to want of scrupulous cleanliness, without which it is impossible to work the paper satisfactorily.

I judge from "B. B.'s" letter that he finds his prints dirty after burnishing—dust is burnished into them. The remedy is obvious: as the prints are mounted, they should be placed on frames covered with muslin, and with short feet attached, so that when piled one on top of another an air space intervenes; the burnisher must be in good condition and well dusted; the prints carefully dusted and lubricated with Castile soap in methylated spirit before passing through (except a roller burnisher is used, which, I need hardly say, is by far the better instrument). To avoid abrading the surface, the prints must be *thoroughly dry;* had "B. B.'s" been so, they would not have been "scraped." They must not be baked to make them dry, for, if all moisture is taken out of *the mount*, no gloss can be obtained. With care, which ought to be exercised in every branch of photography, no prints need be spoiled in the burnishing, at least not more than if they were albumen, for even these, I gather, are sometimes spoiled in "B. B.'s" hands by "ordinary scratches." Pyro and amidol should not be weighed out in the printing room; this is sometimes done, and printers are puzzled to account for black spots on the prints.

I have never found prints on ready-sensitised paper to spoil sooner than those on the home-prepared article, and I think I am right in saying that, if prints on any paper "mottle," the fault will, in all probability, be found elsewhere than in the paper.

As to gelatino-chloride *versus* albumen, looking at the matter from a purely professional point of view, I consider the odds are greatly in favour of the former, for the following reasons:—It is uniform, the sheets cut more economically into photographic sizes, it is perfectly good to the edges, no water marks, it is beautifully clean *back and front*, and is almost invariably free from the slightest blemish, and for these reasons it is *cheaper*.

It is more permanent, as may be tested practically by putting gelatino-chloride and albumen prints, prepared with equal care, side by side in a well-exposed show-case; it gives more brilliant prints, washes quicker, prints faster (and "time is money"), both innately, and because thinner negatives can be used.

Albumen, on the other hand, is rarely uniform; in many photographic establishments, where carelessness reigns paramount, the bath is permitted to vary (I have known it to be used for months, and never once filtered), the albumenising formula is an unknown factor, or is permitted to be so, and the paper sensitised without regard to it. The ready-sensitised paper often comes, even from makers of repute, dirty, stained, and wasteful.

In many instances, where years have been spent in acquiring proficiency with albumen, gelatino-chloride is expected to be known in a moment. If those to whom gelatino-chloride is new find it at first a bit intractable, they should remember the *blisters and measles* of its rival.

Albumen (except for breakfast) is out of date; it wants careful labelling and placing on the shelf with the wet plate.—I am, yours, &c.,

May 6, 1893. T. FITZGIBBON FORDE.

To the EDITOR.

SIR,—I notice your correspondent, "B. B.," has got into some difficulties in working gelatino-chloride paper, and I want, in all brotherly love, to help him out.

I have abandoned albumen paper entirely for more than six months now. I use P.O.P. and work as under. For enamelling it is the best thing I have ever struck, but collodionise your plates first if you don't want opalines. For ordinary work, when the prints are mounted, rub them over with a damp, clean sponge to take off any dirt, and to remove the fluff which will adhere to them from the blotting-paper that is used to press them in contact with the mount. Then, mark this "B. B.," stand them up on end face to the wall till dry, this will prevent dust settling on the tacky surface.

Now the burnishing. When I began to burnish P.O.P. on a bar burnisher, I spoilt dozens. I used to heat the bar hotter than Gehenna, as in old albumen days, and, of course, it frizzled all the gelatine off the paper. Now I find it only necessary to make the bar about as hot as the hand will just bear for a second, say, about 300° Fahr. Previous to burnishing, I give the print a dose of my old silver print lubricator, but when dry rub it all off, or the prints may be streaky. The prints should now go through the machine like oil, and have a nice gloss. *En passant*, I may say I have never met with the marks referred to by "B. B." Probably these originate in the fixing bath; but the one thing that delights me in gelatino-chloride papers is the entire absence of measles, a malady to which our old friend albumen was very subject.—I am, yours, &c., "OTHELLO."

May 3, 1893.

REGULATORS.

To the EDITOR.

SIR,—I must certainly say, when Mr. Birrell asked for information respecting a regulator for oxygen and hydrogen gases, I was under the impression that it was a regulator for condensed gas at high pressure of not less than 600 pounds per square inch.

But by his latter remarks, and also judging from a print sent me by him of his apparatus, he evidently means a low-pressure regulator such as would be used upon the ordinary house gas mains of, say, from seven-tenths to four inches water pressure. Mr. Highley speaks of these for use with oxyhydrogen jets made by Mr. Parkinson as far back as 1870, but I don't profess to know the date of their origin. I only know there are more than I should like to enumerate.

Again, Mr. Birrell speaks of his anti-friction cock. Does he suggest a lubricant of any fatty matter? If so, he will find his anti-friction cock meet with little success. Gas compressors strongly discourage the use of grease of any kind whatever. Before Mr. Birrell proceeds further with his regulator he should get a cylinder of gas from the Scotch and Irish Oxygen Company to test it with.—I am, yours, &c., R. R. BEARD.

62, *Alscot-road, Bermondsey, S.E., May* 2, 1893.

"ART *VERSES* PHOTOGRAPHY."

To the EDITOR.

SIR,—At the present juncture of the endless argument on Art *versus* Photography (let them both have capitals) it was interesting to read in the *Saturday Review* of last week the following in their criticism of Mr. W. B. Davis's picture:—

". . . . Notwithstanding his wonderful sincerity and the almost perfect photography of his eye . . ."

Should we take this as a compliment to Mr. Davis or as a compliment to photography?—I am, yours, &c., FREDERICK H. EVANS.

158, *Osbaldeston-road, N., May* 9, 1893.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

PHOTOGRAPHS REGISTERED:—

Walter Azembey Smith, Southampton.—*Portrait of Dr. Perrin, Bishop of Columbia.*

John Stephen Brown, Bridgwater.—*Photograph of crayon drawing of Samuel Taylor Coleridge.*

Everitt Edward Hibling, Maidstone.—*Portrait of John Cuckow.*

George Henry Lawrence, Cardiff.—*One photograph of a Welsh Sunday "Field" Club.*

D. ROSS.—We know nothing whatever of the Company.

GIL BLAS.—The address of Messrs. Penrose & Co. is 5, Amwell-street, E.C.

WILLIAM BIRRELL.—See the JOURNAL for December 16, 1892, where you will find the specification.

ALPHA has not, in compliance with our rules, given his name and address. Hence his query remains unanswered.

C. H. E.—When the combined toning and fixing bath is used the double action is scarcely simultaneous. Fixing takes place first.

LANTRO.—To utilise a *carte-de-visite* as a lantern slide, copy it in the camera, and, from the negative thus obtained, print a lantern slide in the usual way.

CLEARER.—For all practical purposes you will find a solution of alum acidified with hydrochloric acid an efficient agent in removing the hypo from the film after washing.

P. JOHNSON.—For obtaining cloud effects, we do not think there is any advantage to be gained in the use of a yellow screen with ordinary plates. It simply lengthens the exposure.

DICK.—The Crysteleum process has never been much pushed by professional photographers. It may be considered as reasonably permanent, if the printing has been properly carried out.

J. BAXTER.—It is a very common occurrence. As we have no particulars as to the preparation of the paper, or know anything of the after-manipulations, we can offer no opinion as to the cause.

R. C. TODD.—So far as we are aware there are no patents in force at the present time with regard to ceramic photography. Several patents have been taken in connexion with the subject, but they have, we believe, long since elapsed.

CONEY ISLAND.—If we knew the use to which you were to put the lens, we could better advise you; but we think that there would be no difficulty in having a lens of, say, sixty to seventy inches focus made. The price will be greatly influenced by the diameter.

BRIXHAM.—It is of no use making an enlarging lantern with eight-inch condensers to enlarge from half-plate negatives if it only be fitted with a quarter-plate lens. The objective must be such as would be capable of taking a negative of the size of the one to be enlarged.

TORQUAY.—It is a fraud to supply bromide prints for platinotypes, as it is a false trade description. The fraud is easily detected. If a bromide print is immersed in a solution of bichloride of mercury, the image will, in a short time disappear, whereas a platinotype will be unaffected.

E. R. W.—There is no necessity to go to the trouble of making transfer ink for photography now. It may be purchased from any of the large firms supplying printer's material, and of a far more satisfactory kind than can be made on a small scale. Your difficulty, you see, is now overcome.

T. R. HEWDY.—When anything is directed to be boiled in a Florence flask, a glass flask, such as may be obtained from any dealer in chemical wares, is understood. It would not do to dissolve silver in nitric acid to make nitrate of silver, in an enamelled iron saucepan. The enamel is not perfect enough.

S. A.—If the exhibitor takes portraits for which he makes a regular charge' although he may carry on a totally different business, he is not an amateur, and is sailing under false colours. If this had been brought to the notice of the Society at the time, he ought to have been, and, no doubt, would have been, disqualified.

W. R.—It does not follow that because a gelatine is transparent and colourless that it is purer, or better suited for some photographic purposes, than others that have colour, and are more or less opaque. The majority of the colourless foreign gelatines are acid, some of them strongly so, and often contain other impurities. As gelatine, though not perhaps so slightly in appearance, probably the purest kinds are probably those of the best brands of English manufacture.

F. J. CLARK.—If you desire to make enlargements in carbon it will be necessary to make enlarged negatives. It is not essential that they be collodion ones so long as they are of the right character to yield good carbon prints. Extra sensitive carbon tissue is not equal to producing enlargements direct after the manner of bromide paper, unless the solar camera be employed, and then the exposure is very long. That instrument can only be employed in sunlight.

A. O. Z.—If the indentures are not drawn up in the proper form and duly stamped, they are not binding either on the master or the apprentice; therefore you cannot compel your master to teach you any more than he chooses. On the other hand, you can leave him at any time by giving a week's notice like any other weekly servant, and that is what you legally are, and take another engagement at higher wages. Considering the four years' experience you have had, and the merely nominal wage you are receiving, it may be advisable to take this course.

A. J. finds that while he gets good black and white enlargements on slow bromide paper, he fails to get equally brilliant blacks on rapid paper. He has varied the exposure without gaining any advantage, and asks if there is any modification of the developer possible, or any other means by which he can obtain good blacks on rapid paper.—We would like if some experienced reader would impart the required information; meantime, let him, after washing and before fixing, try the effect of immersing in a combined toning and fixing bath.

LOUIS TAINDON says: "I had, in the course of business, to copy a ferrotype picture, and, owing to part of picture being covered by a brass mask, had to remove it from the frame, and, as there were several particles of dust on the plate, I sought to remove same by brushing it lightly with my hand, when, to my horror, I discovered that wherever my hand had touched it the picture had vanished, leaving only a faint image, which can only be discovered by holding it sideways (Daguerreotype fashion). Can you tell me the cause of this, and also if there is any remedy?"—The cause is simply this: the picture not being varnished, and most ferrotypes are not, a portion of the image has been rubbed off. There is no remedy.

T. WARRENER says: "It is generally understood that when water is added to methylated spirit, it will still be quite clear; but, if it becomes milky, it contains gums—in fact, is what is known as 'finish,' which can be sold without a licence. I recently bought half a gallon of methylated spirit, and found, on adding water to it, that it became turbid. On taking it back to the oilman, he asserted it was not finish, but genuine methylated spirit, and refused to change it. Is this possible?"—Yes. Under the new excise regulation, a small proportion of mineral naptha has to be added to the spirit, the effect of which is that, on the addition of water, it becomes turbid. Now, without a special permit, the old kind of methylated spirit is not to be obtained.

W. P. N. asks: "1. Is it necessary after an addition of nitrate of silver to a silver bath to add iodide of potassium? I have been given to understand that there will be enough in an old bath by what it has extracted from the collodionised plates that have been excited therein. 2. In the case of the iodide getting in excess, what is the result and remedy? 3. Also of insufficiency?"—1. There will be quite enough iodide in solution to warrant the addition of more nitrate solution without any further addition. 2. Add distilled water, by which much of the iodide will be precipitated, then filter, and lastly, add crystals of nitrate of silver to bring up to the strength required. 3. Coat a plate with collodion, and allow it to remain immersed in the silver bath for one hour.

J. T. KENNISH writes: "I forward you a mounted print, which is much spotted, as you will see, and will thank you if you will give me your opinion as to the cause. The paper used was 'double albumenised;' fixed twenty minutes (in hypo, four ounces; water, one pint); hypo neutral to litmus paper; hypo used fresh; mounted with Glenfield starch, made fresh, and used as soon as cold; sponged while damp with clean water. *Cartes-de-visite*, whole-plates, and 12×10, produced at the same time, under exactly same conditions, are perfectly free from spots; washed all night in syphon trough. Cabinets only show these spots.."—Seeing that the spots only make their appearance on the cabinet prints, and assuming that in their after-treatment there is no difference made, the only suggestion we can make is, that our correspondent test the mounts. It is possible the trouble has its origin in them.

DURING the summer the steamship *City of Richmond* will make several pleasure trips to the fjords and mountains of Norway. The first trip is from Liverpool on May 20. Messrs. Staveley & Co., of 102, Shaftesbury-avenue, W., are the London agents, and will supply all particulars.

MESSRS. ADNITT & NAUNTON, of Shrewsbury, have sent us a short *résumé* of objects of interest to photographers visiting Shrewsbury. It is embellished with several picturesque views. Should the Convention carry out a half-formed intention of holding their meeting in Shrewsbury on an early occasion, such a list as this will prove very useful.

MR. E. H. FITCH, of 34, Angell-road, Brixton, will shortly introduce a celluloid film for photo-mechanical purposes; also a very light double slide-film carrier, and other novelties.

WEST LONDON PHOTOGRAPHIC SOCIETY'S DINNER.—The annual dinner of this Society took place on Tuesday last, May 9, at the Frascati Restaurant, Oxford-street, the President (Mr. J. A. Hodges) in the chair. The challenge cup won by the Society at the recent Crystal Palace Exhibition was on view. The President, in proposing the toast of "The Society," took occasion to comment on the fact that, although the Society had been adjudged winners of the Champion Cup at the Crystal Palace, no awards had been made to individual members, and thought some explanation of the circumstance was due. Mr. W. Eugland responded for "Kindred Societies," Mr. Thomas Bedding (THE BRITISH JOURNAL OF PHOTOGRAPHY) and Mr. E. J. Wall (*Amateur Photographer*) for "The Press," and Mr. T. R. Dallmeyer for "The Visitors."

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THE BRITISH
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NOTICE—PICTORIAL SUPPLEMENTS TO "THE BRITISH JOURNAL OF PHOTOGRAPHY."

It is our intention from time to time to issue with The British Journal of Photography pictorial supplements illustrating subjects of popular interest, and reproduced in the highest style of photo-mechanical work.

We have no doubt this feature will prove very popular with our readers. The first illustration will be given with the Journal of Friday, June 2, and, as the publishers anticipate a largely increased sale for that issue, orders for advertisements and extra copies should be given as early as possible.

INVERSION AND REVERSION OF IMAGES ON THE BINOCULAR FOCUSSING SCREEN.

When a stereoscopic image is focussed on the ground glass of a binocular camera, the image presented to the eye is seen to have undergone a total reversion, not merely in respect of its being inverted, for that is the case with every camera image, but also in regard to the relative displacement of the near and distant objects on the screen when viewed stereoscopically, could such be done by the neophite.

The stereoscopic photographer cannot, with his unaided vision, ascertain the effect of relief by the inspection of the camera image in the same way as he can when examining the finished print in the stereoscope; and this to some extent interposes a difficulty in the selection of the best point of view in order to secure the degree of relief which an artist of taste invariably likes to characterise his binocular pictures, neither, on the one hand, such protrusion of foreground objects as to cause the scene to look like a model, nor, on the other, such a lack of it as to impart a feeling of flatness to the united photographs.

Some who have not bestowed sufficient attention to the subject have imagined that, by employing a stereoscope to examine the image projected on the camera focussing screen, the desired end ought to be attained; but the futility of this is established by a single trial, for it will be found that the effect obtained is pseudoscopic, that is, the near objects appear distant, while the most distant ones are brought near. We shall apply the "similia similibus curantur" principle to this presently, and show in what manner, by looking on the ground glass through a pseudoscope, the desired relief can be seen.

A pseudoscope, we here pause to say, is nothing but a pair of small rectangular glass prisms, mounted the distance of the eyes apart, with the hypothenuses to the inside, so that each eye is directed to a surface inclined to its axis. In ours there is provision for an adjustment, by which the reflecting surfaces can be slightly inclined towards each other, so as to direct the eyes without any straining to any object situated from within a few inches to infinity. When a scene is viewed through this, it is neither magnified nor reduced, nor is its brilliance apparently diminished, but the singular effect is obtained that the distant objects are brought close at hand, while the nearest objects—such as a vase of flowers on a table in the window of the room from which the observation is made—is projected into the far distance, the near and distant flowers in the vase obeying the same law, that of visible direction. In virtue of this the nearness or distance of any object is ascertained by the greater or less convergence of the optic axes.

Were the mere inversion of a camera image desired, this could be secured by the time-honoured expedient of placing a mirror at an angle with the ground glass of the camera, and by looking down into this mirror, viewing in it the image on the focussing screen, not upside down as formerly, but erect, a reversion from right to left being still left uncorrected. This, however, affords no clue as to the amount of the relief or stereoscopeity of the scene focussed unless by crossing the axes of the eyes, the right side being viewed by the left eye and *vice versâ*. An examination by a pseudoscope would effect the same end.

The best way to employ this instrument is to view with it the direct image on the ground glass without caring that the image is seen inverted. Throw a large focussing cloth over the camera, and then use the pseudoscope as would be done in the case of an eyepiece held a short distance from the ground glass, and adjust the prisms till only one image formed of the coalescence of the two is seen.

But by far the readiest and most convenient method of judging stereoscopic effect in the camera is by the unaided eyes after they have been subjected to a very slight degree of training. Hold the head from twelve to sixteen inches from the ground glass, and cover the inter-space with an opaque cloth. Now direct the axes to a point midway between the eyes and the camera screen. This may at first be done by interposing a pencil or the finger at the midway point. It will now be found that the crossing of the axes at this point will have had the effect of causing the right eye to see the image on the left, the same being the case with the left eye. This may prove troublesome just at the first attempt, but after a few trials it will be found to be singularly easy. The combined image thus seen is the stereoscopic one, precisely as it will appear when printed on paper and viewed through a stereoscope, with this exception, that the camera image will be upside

down, a matter of but small consequence to an experienced photographer, who can in most cases better judge the effect of the ultimate picture when the image is inverted than when it is non-inverted, the consequence, doubtless, of practice.

EXPERIMENTS WITH MULTIPLE-COATED FILMS.

Resuming these experiments with a view of removing, if possible, certain apparent anomalies, a special collodion emulsion was prepared which, while moderately sensitive (for such an emulsion) was capable of giving *per se*, and with ordinary development, a perfectly clean image of good vigour and free from fog. The "pellicle" was washed with rather more than ordinary care, in order to ensure the entire absence of soluble salts.

In our earlier experiments it was mentioned last week that development was extremely slow in starting, as long as five minutes elapsing in some instances before any action was visible, while in other cases it began almost immediately. This we traced to mechanical causes connected with the collodion film, and it was one part of our new trials to remove as far as possible these uncertainties. In some instances, in the earlier experiments, the plates were exposed wet, *i.e.*, without drying the collodion film, in which case they were well washed with water before development, in order to remove the ether and alcohol and allow the developer to attack the films in a uniform manner. In other cases the collodion film was dried before exposure, under which circumstances it became necessary to flood the films with alcohol in order to reopen the pores of the collodion, and afterwards to wash well with water.

It was this treatment we found that caused the difference or uncertainty in behaviour, for the gelatine film became charged with varying proportions of water, which, assisted by the same protective action of the collodion film, prevented the free access of the developer. By working constantly under like conditions, it is true that comparative results would be obtained; but we were strongly of opinion that this preliminary absorption of water by the gelatine film exercised an important action in modifying the general character of the results—a view which we had subsequently reason to believe is the correct one.

One way out of the difficulty was to charge the collodion emulsion with a substance of the nature of a "preservative"—using the term in the sense in which it was employed by old dry-plate workers—which, being soluble in water, would render the compound film permeable to the aqueous developer; but, though this was tried, the introduction of the preservative did not seem a desirable complication, so it was relinquished in favour of the simpler plan eventually adopted. This consisted in coating the gelatine plate with collodion emulsion immediately before exposure, and postponing the development until nearly the whole of the solvents had volatilised without leaving the film absolutely dry. In this manner, and developing in a dish in the manner usual with gelatine plates, the "greasiness" caused by the small remaining traces of ether and alcohol was easily overcome, and the developer passed directly into the films both of collodion and gelatine.

Under these altered circumstances, the behaviour of the compound films becomes quite different, and more in accordance with what might have been anticipated. For instance, the high lights or sky of a landscape appeared almost instantly on the application of the developer, owing to the rapidity with which an impressed collodion film produces its image. Under the conditions in which these plates were exposed, the sky or strongest high lights were the only portion of the plate in which the exposure was long enough to impress the collodion alone; hence these portions only showed reduction as soon as the developer was applied, the remainder of the picture being formed by the slower action of the gelatine film.

In our article last week we specially mentioned the extraordinary behaviour of an unwashed collodion emulsion in producing an image practically without exposure, or under such circumstances that, if exposed alone, without the gelatine film, it would have been quite insensitive. We have repeated that experiment several times, with precisely the same result; but, although there is unmistakably an image formed upon the collodion film, we have arrived at the conclusion that much of the increase of density shown is the result of a general veil that seems inseparable from this method of developing the collodion emulsion. In fact, although, as we have said, the emulsion employed is capable of working by itself without any fog or veil, it will not bear the protracted application of the energetic developer necessary for the gelatine film.

It must be remembered that the development proper of any direct image upon the collodion film would be complete in a very short time—certainly under a minute, and probably before that on the gelatine had commenced—and consequently, while the gelatine image is progressing, that on the collodion is being subjected to all the influences of fog, which, under the circumstances, it is unable to altogether resist; and yet the gelatine film itself reacts upon the collodion in restraining the fog, as may be proved by scraping off a portion of the gelatine film before coating with collodion, when on development the portions of collodion unbacked by gelatine will be found as completely reduced as the sky. In all the experiments made we have therefore been careful to note as far as possible the effect produced by veil or fog as distinguished from a definite image.

Before describing the individual experiments we may briefly describe the general character of the results. The collodion emulsion employed is one, as we have said, of moderate rapidity, and requiring, under the circumstances of light, lens, and aperture, from twenty to thirty seconds' exposure, to give a perfect picture when used alone, when the exposures given to the compound films averaged about one second, the subject being an open view from the window in a good light. Under these conditions, it is obvious that the actual exposure received by the collodion portion of the compound films is quite insufficient to impress it except in the sky; but that is done easily, with the result that the sky always becomes visible within three or four seconds of the application of the developer. Yet in all instances, or nearly all, where the development of the compound film has been completed, a developed image has been visible upon the collodion film.

In order to prove this beyond doubt, we have gone to the trouble of stripping the collodion film from the gelatine when the precise nature of the deposit—image and veil—is palpable; but this trouble is not necessary, as, owing to the peculiarly metallic nature of the deposit on collodion, the image is perfectly visible as a positive, and that, taken in conjunction with the alteration in density produced where a portion of the collodion film is rubbed off, will show precisely how much work has been done by each film.

There is one point that may be noted in connexion with the rapid formation of the image upon the collodion film that has

some importance as bringing these experiments more into line with the Sandell plate than would otherwise seem to be the case. In the latter plate the first or outer film is the more sensitive, and therefore naturally develops first, the effect of that development passing on to the next film to modify it more or less. In the collodion-coated films, although the first or apparent film is by far the slower, it is the first acted upon by the developer, and in the same manner the action of this first development is transmitted to the underlying film, and produces most powerfully modifying effects, as we shall show.

Rather out of curiosity than as having a direct bearing on the rest of the experiments, a gelatine plate was exposed, and *subsequently* coated with collodion emulsion before development. According to the experiments of Captain Abney of sixteen or seventeen years ago, the collodion film should have shown an image; but, beyond a slight veil from over-development, no effect was produced upon the collodion whatever. A second plate, coated *before* exposure, and exposed for precisely the same time, gave an entirely different result; for, whereas in the first the sky was thinner in the coated portion than on a part of the plate that was left uncoated, owing to the resisting action of the collodion film, in the second plate the coated portion of the sky was very much the denser, though, on removing a strip of the collodion film, it became much thinner than the uncoated portion, proving that the greater part of the image was on the collodion.

With the normal exposure the general result was greater vigour, especially in the high lights; but, as the exposure was increased, the contrast became less increased, but general vigour, more especially in the half-tones, became the rule, that is, supposing the development to be carried out to its full extent; but, when the latter is stopped at an early stage, the results are very curious, for, if the collodion film be removed, the image of the high lights will be found to be completely in the collodion, the gelatine showing either completely clear glass or absolute reversal. That this is not due to over-exposure, or to any other cause but the bromine given off from the collodion emulsion film, can be proved by leaving a portion of the plate uncoated, when an entirely normal image will be formed. Moreover, if the development be stopped at the early stage on a portion of the plate, and completed on the rest, the first portion will show the reversal, the second a normal image.

Another plate was coated over a portion of each of its surfaces, back and front, with collodion emulsion, and exposed through the glass in order to show how much action the absorption of light by the collodion film had. The bare gelatine film exposed through the collodion, beyond its want of sharpness from diffusion, showed comparatively little difference from that where the collodion had not intervened. But the collodionised surface exhibited not the least action, for the denser gelatine film through which the light had to pass before it reached the collodion had altogether protected it from the light, and, except the usual slight veil from over-action of the developer, no image of any kind was seen.

The result of these experiments shows conclusively that each separate film exercises a very distinct action upon the others in development, and it seems probable that, the greater the difference in the sensitiveness, the greater will be the action set up. It seems also probable, but that remains for future proof, that, by so arranging the relative rapidities of the different films, a film absolutely proof against errors of exposure may be made, as claimed by Mr. Sandell.

GUMS AND GLUES.

It will be desirable in our purview of this subject not to omit some consideration of the so-called "British gum" or dextrine, a substance of most extensive employment for adhesive purposes. It can be purchased of many degrees of purity, but at its best is not available for photographic use on account of the uncertainty of its composition, and also the possibility of its containing deleterious substances introduced at the time of manufacture. Dextrine has been called torrified starch, and is, indeed, starch acted upon by heat, acids, or diastase, the amount of real dextrine, if any, actually contained in a sample of British gum being an undetermined quantity. Hence, looked at from all points of view, its use for any photographic work, at least where it would be brought into contact with silver compounds, should be deprecated; of course, for carbon or platinotype pictures, its introduction, either as glaze or mountant, would be productive of no ill effect, and for ordinary adhesive purposes it possesses advantages over both gum arabic and tragacanth. A little salicylic acid is recommended to be added to preserve it from mould. It may be interesting to give the formula for the use of dextrine as employed by the United States Government for coating postage stamps. It is made by mixing two parts (by weight) of dextrine, one of acetic acid (free of water), and one of alcohol.

When we come to discuss glues, the subject so expands that very many pages of this JOURNAL might easily be devoted to it; hence a few leading points most likely to be of use will be named. If we put the question, "What is glue?" a true answer would be very cumbrous, for it is not by any means a definite chemical compound, and its mechanical or physical aspects are as varied as possible. Briefly speaking, it is the dried jelly obtained by boiling certain animal substances in water for some time, and its colour varies from black when thick pieces are examined down to the patent straw. In the early days of the gelatine process, the use of glue or gelatine was hailed with acclamation as being a substance of so much more certain composition than pyroxyline; but, when it is considered that the jelly of which it is made is obtained from such widely different sources as we will specify in part, it would not be reasonable to expect constancy of chemical composition. Thus it is made from scraps of hides, tendons and intestines, tissues of bones, cartilages, horn, fishes swimming bladders, rabbit skins, parchment, old gloves, &c. When this jelly is required in the purest form, it is extracted from specially pure materials specially prepared; it is then dried, redissolved, and again chemically treated, and finally dried and put in form for the public. When it is required for dietetic or medical purposes the utmost care is taken, and the product is, when well selected, not at all likely to be injurious for any photographic purpose. At the time when there was more amateur gelatine plate-making than is now the case, most readers of the journals of the time had almost a surfeit of the properties of the various gelatines, British and foreign, and many brands grew to be well known. But at present the dry-plate makers may be presumed to know all about the matter, though there is no doubt of the advantage they gained from the discussions in the technical journals of the day. It was brought into prominence, for example, that the presence of a very minute quantity of grease had a very disturbing effect on the physical aspects of the film. It is not generally known that benzine and bisulphide of carbon are often employed in the preliminary treatment of bones before extracting the gelatine, so that all greasy matter is removed.

Most samples of gelatine of good quality are free from this

fault, and, as such articles as this are nothing if not practical, we may point out a few leading characteristics of a useful photographic glue. First, let us say that chemicals—bleaching agents and mineral acids—at one stage or another are so largely used in the manufacture of glues, that, though glues of most excellent purity are obtainable, a sample of so-called gelatine is far more likely to be pure and trustworthy for photographic use. One of the most important characteristics is the melting point. For sensitive tissue and many photo-mechanical purposes a gelatine with a high-melting point is to be preferred. As explanatory, we may remark that an ounce of glue, for example, may require a certain amount of water, at, say, a hundred degrees Fahrenheit, before it will be a firm jelly, while another sample, with the same weight of gelatine and water, will keep liquid until it is reduced to perhaps sixty or seventy degrees. How to ascertain the suitability of a glue for this purpose would involve considerable loss of time, though a glue expert could perhaps give a valuable opinion from personal knowledge. The photographer paying a good price for a pure gelatine, is able to obtain what he requires in this direction simply by asking for it, at the same time ensuring freedom from injurious chemicals and from incipient decomposition so likely to be ruinous to a silver photograph of whatever sort. In conclusion, let us say that, whatever price is given, or whatever brand is bought, a sample first brought into use should be, at any rate, tested with litmus paper to ensure its neutrality, too many of the examples of modern fading being undoubtedly due to the use of acid gums and glues.

Silver in Dry Plates.—Complaint is frequently made of the small amount of silver now put in dry plates. But it is consoling to know, according to a writer in the *Revue de Photographie*, that English manufacturers are quite as liberal with their silver as Continental makers. Out of about a score of brands tested, an English plate, the Sandell, stands first, and a Belgian and French the lowest. The former contained about three times the silver the latter did, other English brands being intermediate. We are, therefore, not so badly treated, after all, particularly when it is considered that, as a rule, foreign plates are dearer than English ones.

Discontent at the Chicago Exhibition.—Considerable dissatisfaction has been expressed as to the system upon which the awards are to be made, and it is stated, in a recent telegram, that the British, Belgian, French, German, Italian, and Russian commissioners have protested against it. Americans, it is said, would also prefer that the awards should be made by jurors, instead of, as proposed, upon the decision of a single expert, to be ratified upon report to a superior Board. In consequence of the adoption of the latter system, many exhibits will be withdrawn from competition. It is to be hoped that the judging of the photographs will not be relegated to a single individual. If it is, we may be certain of much discontent.

Chromo-photography.—*Apropos* of this subject. It is much to be wondered at that English photo-mechanical workers are giving so little, if any, attention to chromo-photography—that is, printing in colours from different matrices after the manner of chromo-lithography and the like. On the Continent excellent work in this direction is produced on a large scale, and it is proving highly remunerative; and, what is more, it meets with a ready sale here. Several systems are in vogue, including intaglio plates, the collotype process, and process blocks. For lack of enterprise much photo-mechanical work that might as well be done here goes abroad for execution. Just now there is an agitation about the Trade Marks Act, but we strongly suspect that "printed in Germany" will not deter English people from having the pictures if they are not to be had of equal merit of home production.

A Good Opinion of Himself.—A South African contemporary has the following interesting extract from the letter of a disappointed exhibitor:—"For cool, consummate assurance commend us to the letter in which ———, of Natal, declines the silver medal awarded him by the Executive of the Kimberley Exhibition. Here is the precious document: 'My reasons for so doing are, I do not acknowledge any superior in my profession in South Africa, and, after a careful and personal inspection at your Exhibition, I claim that my exhibits generally gave me *every right to first* position and honour, whether it was a gold or silver medal or diploma, my photographs being superior in *every* way to any others exhibited. The softness, delicacy of tone in detail, and high-class finish were altogether far above the work of any other exhibitor.' And the photographs are said not to have been such brilliant specimens, after all!"—which is what might naturally be expected.

Cheap Railway Tickets for Photographers.—Attempts have before now been made on the part of individual photographic societies to induce the railway companies to grant to parties of photographers or members of photographic societies a reduction on railway fares, just in the same way as a like kind of concession is given to anglers. Those attempts have, however, failed, possibly because the request for the rebates have not emanated from sufficiently representative sources. It has occurred to us that the Photographic Society of Great Britain, in conjunction with the fifty or so photographic societies now affiliated to it, might well approach the various railway companies on the matter, and we throw out the hint to the Affiliation Committee, of which there is at least one member who might put his railway experiences in the pursuit of the gentle art of angling at the service of photographers, in respect of obtaining them cheap fares on their outings.

Royal Society Soirée.—At the *soirée* last week, photography was well to the fore, it being utilised in somewhat novel directions. In the display there was a series of photographs of swede turnip plants grown in rotation, with mineral materials alone, and with mixed mineral and nitrogenous manures, to illustrate that it is a fallacy to suppose that root crops derive any great amount of their nitrogen from the atmosphere through their extended leaf surface. There was also a valuable contribution to the knowledge of the minute formation of rock structures by micro-organisms, in the form of a collection of photo-micrographs, by Mr. Wethered, of transparent slices of various rocks. Astronomical photography, was, of course, well represented in a collection of photographs of nebulæ and star clusters, taken by Mr. Roberts with a twenty-inch reflector; also by some photographs of stellar spectra, by Mr. Lockyer. Not only is photography largely used in science, but also in art, as witness some of the paintings to be seen in the multitudinous exhibitions now open.

More Photography in Colours.—This time it is, according to an evening contemporary, the Paris Photographic Club that "has apparently solved the mystery of coloured photography." According to this authority, "the members have just exhibited photographs giving all the colours of the original objects." Amongst these are enumerated a bouquet, with red, violet, green, blue, and other colours, in their various tints;" another, "a corner of a park, with a blue sky, gravelled avenues, and trampled soil." "Then there was a series of coloured placards in all their glaring hues, and next a photograph of a Japanese screen." In concluding the announcement of the great achievement, our contemporary adds: "As, however, with the early Daguerreotypes, each photograph is unique. How to obtain proofs on paper has yet to be discovered. Nearly half an hour's pose is also at present required, which would over-tax the

patience of any sitter." The continual prominence of colour photography given by the lay press naturally leads the non-technical public to infer that photography in natural colours is *un fait accompli:* hence so many applications to professional photographers for portraits by the new process in natural colours, and the scepticism of the would-be sitter when they are told the thing is quite impossible.

The Eclipse Photographs.—Highly successful as have been the two English expeditions, there now appears to have been a slight hitch in the photographic department of the one to the West Coast. Mr. A. Fowler says in a report that the English signal of the commencement of totality—the discharge of a pistol—was not given until ten seconds after the French one, which caused him "to lose three exposures during totality, and reduced the number of Sergeant Kearney's photographs from twelve to ten." In reply to this, Mr. T. E. Thorpe, in a letter to a daily contemporary a few days ago, says, although he did not hear the French signal himself, that another observer estimates it at two seconds only, and adds, "It is possible, therefore, that Mr. Fowler's estimate of ten seconds may not only have been erroneous, in consequence of the known difficulty of accurately estimating a time interval during the exciting conditions of an eclipse, but may also have arisen from the fact that the actual eclipse was shorter than the calculated one." It can readily be understood, with the months of preparation and anticipation, and the thousands of miles travelled to execute 243 seconds'—French calculation two seconds less—work, that there would be some little excitement, subdued though it might be, during that brief period. The thing can be better imagined than described.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The Exhibition of the Society for 1893 will be held in the Gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall East, London, S.W.

The Exhibition will be inaugurated by a *conversazione*, open to members and their friends and exhibitors, at eight p.m., on Saturday evening, September 23.

The Exhibition will remain open daily (Sundays excepted) from Monday, September 25, until Wednesday, November 15. Admission (from ten a.m. till five p.m.), one shilling. It will also be open on Monday, Wednesday, and Saturday evenings, when lantern slides will be shown; admission (from seven to ten p.m.), sixpence.

Members have free admission at any time. They may receive twenty day and ten evening tickets for their friends, and can purchase additional tickets at half-price. Members of affiliated Societies can purchase tickets at half-price of their respective Secretaries.

Medals will be placed at the disposal of the Judges for the artistic, scientific, and technical excellence of photographs, lantern slides, and transparencies, and for apparatus.

The undermentioned gentlemen have been elected by the members of the Society to act as Judges, and have consented to serve:—Mr. P. H. Emerson, B.A., M.B. (Cantab), Colonel J. Gale, Messrs. F. Hollyer, F. M. Sutcliffe, and J. B. B. Wellington. Scientific experts: Messrs. Chapman Jones, F.I.C., F.C.S., and Andrew Pringle, F.R.M.S. The Judges will select the exhibits before the Hanging Committee begin their duties.

Blank entry forms and any further information respecting the Exhibition, apparatus, and lantern slides, also nomination forms for membership, can be obtained from the Assistant Secretary, P. S. G. B., 50, Great Russell-street, London, W.C.

ARE GELATINO-CHLORIDE PRINTS PERMANENT?

When gelatine was first proposed as a substitute for albumen in the preparation of printing-out paper, we said that on theoretical grounds there was no reason why gelatine should not be made to supersede the other entirely. On what grounds it was at one time stated that it would be likely to set up a decomposition of the silver image we never could learn, beyond that it was a mere surmise.

We could better understand the good old conservative argument that, as albumen had stood the test of many years' experience, it was not well that an old friend should be discarded in favour of an interloper. Well, gelatine has now passed its novitiate, and has proved to be all that we anticipated for it. We possess the first, or among the first, photographs that have been produced on this substance, and can attest their excellence as regards their unfading properties.

As corroborative of this, we have just been shown the contents of a show-case which has been exposed outside a photographer's studio in Loughborough since May, 1892, and on which the light has been acting throughout the year, with such effect that the plush, originally of a maroon colour, which formed the background base on which the specimens were mounted, has entirely succumbed to the exposure except where covered by the prints—those known as "P.O.P." These prints show not the slightest indication of having been affected by sun or weather, notwithstanding their fairly long exposure to this crucial test.

INTENSIFICATION OF GELATINE PRINTS.

The *Photographisches Archiv* suggests the intensification of gelatine prints by means of physical development. It is unimportant whether the prints have been toned or not, but it is necessary that all traces of the fixing agent should have been removed. Briefly, the prints may be intensified in the same way as gelatine negatives.

A print on aristotype paper, fixed and dried, is placed in a solution containing hydroquinone, tartaric acid, and silver nitrate. The proportions of these substances can be varied without inconvenience, except that there should be a quantity of the acid sufficient to prevent any reaction between the hydroquinone and the silver. A few drops of ammonia are added to the solution to neutralise it. This will effect a slight deposition of silver on the image, which may be increased by the addition of more ammonia to the solution.

Instead of hydroquinone other developing agents may be employed. It is essential that the print before the solution is applied should have its gelatine surface flooded with water, otherwise the silver has a tendency to be deposited in the gelatine on a powdery form instead of acting as an intensifier of the image.

NOTES ON VARIOUS SUBJECTS.

Black Tones on Rapid Bromide Paper.

The difficulty mentioned by "A. J." in the last number, of getting as good blacks on rapid bromide paper as on slow, is one that I have experienced and surmounted, and therefore, perhaps, a few lines on the subject may not be out of place. Unlike Mr. Pike, who writes in your last issue, I have not made thousands of bromide prints and used hundreds of gallons of iron developer, but I have had a good deal of practical experience of bromide printing, and it confirms me in the opinion that for development on the slow paper ferrous oxalate still has a future before it.

"A. J." does not say the developer he employs with the rapid paper; but, assuming it to be ferrous oxalate, I find that by acidifying the potash and iron stock solutions with oxalic acid and sulphuric acid respectively, instead of, as many recommend, acetic acid, the mildly restraining powers of which I have observed have a marked effect on greying the shadows, a slight improvement in the tone results.

Again, I do not use an unnecessary quantity of solution, but, say, for a 12 × 10, about three ounces, as in my experience of both positive and negative work an excessive quantity of solution leads to loss of contrast.

A hint as to exposure. If "A. J." uses the same light for the rapid paper as for the slow, let him diminish the volume of light by a stop rather than simply shorten the exposure, or, for contact work, let him double the distance between flame and illuminant. For correct exposures I find the proportion of 3 : 1 answer perfectly. Some year or two back I experimented with ammonia-sulphate of iron as a substitute for the ferrous sulphate, and found that it assisted to produce tones of a deep velvety black without any tendency to greyness or rustiness. Of course, I am referring to a slow paper.

If "A. J." is using amidol, hydroquinone, or eikonogen, or a mixture of the two latter (which I have used with great success), I would

recommend him to be as sparing as possible in the use of sulphite, the effect of a large quantity of which seems to me to produce images having a combination of three undesirable qualities—flatness, greyness, and hardness. Of the fixed alkalies, carbonate of soda in my hands promotes softness and a good colour, and a sparing use of bromide will prevent the greening of the black, as the Irishman would say, which can so often be traced to its use.

Another plan of a remedial character for giving good blacks to bromide prints is that mentioned by you, namely, the immersion of the washed unfixed print in a combined toning and fixing bath. From practical experience I can endorse your recommendation to "A. J." to try this useful dodge. It is applicable to either slow or rapid bromide paper, and for those who like rich platinum-like pigment deposits (I am one of those myself) I would recommend that for this purpose the fixing bath be permanently enriched by the addition of a little alkaline gold solution (*q. s.*).

The Concentric Lens.

I was interested at reading Mr. F. H. Burton's comments on the letter of Mr. W. J. Stillmau, in which the latter gentleman states that, with the Concentric lens in his possession, he obtains as good definition with *f*-16 as with *f*-64. I, too, have one of the Concentric lenses, fitted with rotating stops from *f*-16 to *f*-32, so that I am unable to speak as to the quality of definition with the small aperture with which Mr. Stillman's lens has been fitted, but in other respects my experience tallies very closely with that of Mr. Burton. The single object with which I should use *f*-16 would be for obtaining landscapes in which the acme of definition was not required. At that aperture I find the lens give a degree of sharpness which, to slightly traverse Mr. Burton's statement, would only spoil such negatives as those of maps, or of subjects with very fine lines.

Mr. Burton appears to hint at having focussed with *f*-22 and exposed with *f*-16. This, in my experience, would give no better definition than by focussing with, and using, *f*-16 alone, if as good. Indeed, I tested the point by practical trial, and was surprised at the extent at which the focus was altered. Like Mr. Burton, I am an unknown amateur, but I appreciate a lens giving a flat field, even illumination, and fine definition. To obtain such with the Concentric I follow one simple rule, which I recommend to others who have the lens, and that is, to neglect *f*-16 for critically sharp work, and *focus with the stop you are going to expose by*. The principal point Mr. Burton touched upon, namely, that the flatness of field of the Concentric enables the camera front to be lifted or lowered without impairing definition at the edges, is an important one, which should be noted by architectural photographers.

A Suggested Backing Medium.

The application of such a backing medium as a caramel mixture to glass plates, and, indeed, backing generally, involves more trouble than the ordinary amateur cares to expend. There is a species of ever moist rubber solution, I think it is, which, when spread upon a cardboard support, I have used for attaching large films to when exposing such in the camera, and it has occurred to me that possibly the use of such cards, coated with the rubber medium in question, might answer for the purpose, especially if it proved to be readily detachable from the glass. I presume perfect optical contact could be obtained. The coated cards, of course, could be used again and again.

J. R. Hopwood, Ph.D.

IS THE PRESENT CONSTRUCTION OF PHOTOGRAPHIC STUDIOS WRONG IN PRINCIPLE?

[London and Provincial Photographic Association.]

In the construction of photographic studios, whenever possible, the chief light is obtained from the north, and the studio is principally glazed on the northern side: by this method direct sunlight is cut off from the sitter and steady illumination is obtained. Hence the light most used by photographers is that reflected by the particles floating in the air, for, if no particles were there to throw back the light of the sun, we should have the black sky sometimes witnessed in the Alps when the air is extremely dry, and then might almost as well use the light reflected by an unglazed blackboard. It is the same with the sea. Within a few miles of the shore we get different shades of green which grow clearer as the land is left behind; but farther out the sea appears of a dark indigo colour, because of the scarcity of floating particles to reflect light to the eye. If, then, Professor Tyndall's plan be tried of putting a particle of large size into the sea, by flinging a white dinner plate overboard, that particle reflects green light to the eye as it sinks, and would do the same were it broken into myriads of smaller pieces.

Before coming to the practical part of the subject, it is necessary to consider the nature of our reflecting screen in the northern sky. The floating particles in the air of towns consist of minute drops of water, innumerable spores of small seeds, greasy coal smoke, fragments of dried horse dung, influenza and other germs, and dirt of endless varieties, including dust from meteoric stones rendered incandescent by friction when entering our atmosphere at planetary velocities. These solid particles favour the precipitation of water, so also in a still greater degree does the sulphurous acid given off from our coal fires. These aggregated varieties of floating dirt are to some extent rendered visible when a beam of sunshine is reflected by them, so as to mark its track when the beam enters a dark cellar through a hole in a shutter; we also see them floating in the light coming from the projection lenses of the magic lantern, and we swallow them wholesale with every breath of air which we take into our lungs. These dirty particles, then, form our reflecting screen in the sky to the north of the studio.

Sometimes we get a better reflecting screen, consequently more light in the studio, when cumulus or other clouds in the north are illuminated by the sun. This improvement is but partial, because the clouds present also portions of their shadow sides, and do not cover the whole of the northern area in view.

The question I now wish to raise among those present who know so much more about glass studios than myself, who am not the happy possessor of one of them, is whether it would not be better to abolish the floating dirt reflector and diffuser—to abolish even the floating cloud, and to provide a cloud of our own which shall be always there, which shall present to the eye no shadow worth mentioning, and shall be of a pure white. I mean a whitewashed wall, for experience with the lantern has already demonstrated that, as a dead-white reflector and diffuser of light, nothing excels common whitewash.

Supposing these ideas to be correct, the result is that we shall have to build studios with a southern aspect, glazed high up on their southern sides. The accompanying diagram will show what is intended, for verbal descriptions of mechanically constructed objects are liable to confuse both listeners and readers, unless illustrated by drawings to show exactly what is meant. The suggested studios will be high in proportion to their breadth; for instance, let A B be the end of a little studio twelve feet wide, then the whitewashed wall, W B, say, of an adjoining building should perhaps be twenty-four feet high. The southern side of the studio is boarded up, except for special purposes, to a height, A K, of, say, ten to twelve feet all along the side, and the glazed portions are at K N W. Thus, the rays of the sun entering the studio in the direction indicated by the arrows fall upon our artificial cloud or whitewashed wall, W B, which wall under the circumstances then gives the chief light for the illumination of the sitter at H.

Into minor details it is not necessary to enter. Of course, the studio, as at present, will have to be boarded at the opposite ends, also along the roof, N W, and the side, N K, for a short distance from the ends. Blinds for regulating the major light should be of neutral or dark tint, and movable along the face of the wall, W B; blinds also at the glazed portion of the studio will be necessary. Incidentally, it may be pointed out that, if A be a garden wall with a street on the southern side at R, that wall can be raised to K, and a good studio built at A B without enabling boys in the street to make remarks for the calming of the minds of the sitters, for street boys not being ten or twelve feet high in these latitudes will be unable to see into the studio. It would be difficult to build upon the ground a good present-day studio if there were a brick wall and street to the south and a high house to the north. If the glazed roof had the pitch K W, the suggested studio of the future might do nearly as well, and would shoot off snow capitally. This kind of lighting might also be obtained

by building a studio of the usual Noah's ark shape, and taking the chief working light from the whitewashed side of a dwelling-house to the north; but, in the preferable lean-to studio pictured, a lower roof and a whitewashed house-wall outside and above it would not give as good lighting, because the light from the outside wall would fall upon the glass roof at such a grazing angle as to be largely reflected off outside without entering the studio at all. The boarded side, K A, might be made of large sliding partitions, to be pushed back into the two ends of the studio, and then expose a glazed surface so as to take direct light in from the south upon those winter days during which the photographer is glad of any light he can get.

Peradventure those portrait photographers, who have taken special notice of the extent to which exposures are shortened when the northern sky is filled with clouds illuminated by the sun, may be able to make some kind of guess as to the extent to which studios of the kind now suggested may expedite exposures, and lengthen the average photographic working day, remembering also that the whitewashed wall presents a more uniform white surface than do masses of cloud. In the remarkable weather we have had for the last six weeks of almost unbroken sunshine, I have noticed that there have been scarcely any bright clouds, at least within a circle of a mile or two of the Crystal Palace, for, being engaged in some new investigations in relation to gelatine emulsions, I have specially noticed the absence of clouds when I was frequently out of doors trying plates. Had portrait photographers had a white wall to the north, instead of the grey haze of an average cloudless London sky, they would have received even better light in the studio than during April last. Some comparative experiments on the light from a northern sky and the light from a northern whitewashed wall, made with the sensitometer of Mr. J. B. Spurge, of London, which is one of the most accurate standard instruments we possess in photography, would be exceedingly useful. They should extend over a considerable length of time, and be made under different conditions of weather and elevation of the sun.

Having raised the major question before you—who know so much more practically about glass studios than myself—whether photographic glass-houses should not be glazed on the south instead of the north, and have an artificial reflector and diffuser, it is not desirable to-night to go into minor details about studios. Many of those in existence are too short; there are reasons in portraiture as in landscape work why more pleasing results can be obtained by using lenses of longer focus than those usually employed; in fact, if a photographer had light enough, and a studio long enough, there is much to be said in favour of his using single combination lenses of long focus for portraiture. Supposing the studio to be built of glass and wood, there is much to be said in favour of making its walls and roof double with an air space between: it would be much warmer in winter and would economise fuel. Some studios are built in this way in St. Petersburg. There are considerable advantages in the use of iron instead of wooden frames for glazing. The developing room should not be a small death-trap, but, when possible, a good-sized room in the adjoining dwelling-house, and fitted up as a laboratory. When, however, it is built as part of the studio, it should be a large room at the opposite end to that occupied by the sitter, and the door should so open that the camera can be used from inside the developing room, when it is desirable to place it at an exceptionally long distance from the person to be photographed. All these, however, are matters which have been previously publicly considered; but the major problem mooted in this paper is new so far as I know, and I have recently made some search into the literature relating to glass studios. In photography it is dangerous to say that anything is new. Whether the problem before us is or is not new matters little so long as in the discussion it brings forth from your stores of knowledge some information which will be useful to the photographer.

W. H. Harrison.

PHOTOGRAPHY WITHOUT AN OBJECTIVE.

The great advance which has taken place in the manufacture of sensitised films, and the enormous increase in their sensibility to light energy has now brought photography without an objective within the sphere of practical work, and at this time it may prove interesting to note the real position of this method for obtaining photographic images.

It will be found that the present literature on the subject is very meagre, and that the accounts of the experiments are so conflicting as to be unreliable.

Experimenters have found that, with large apertures, some positions of the sensitised recipient surface in the camera are better than others, and formulæ have been published, and theories have been propounded, on account of this fact.

The best known formulæ are as follows:—Lord Rayleigh gives $f=(2r^2/\lambda)$ where f is the least distance of good definition, r the radius of the aperture, λ the wave length of G=0·000017 inch.

A Frenchman, Captain Colson, also derives a constant from a wave-length; the constant is 0·00081 on the metric scale, and his formula, $d^2=0{\cdot}00081$ F, where d is the diameter of the aperture and F the least distance of good definition. This formula means that nine-tenths of a millimetre aperture has the least distance of good definition at one metre distance.

Mr. Dallmeyer gives the formula $b=\frac{r^2}{\lambda}$ where b is the least distance in inches for good definition, and λ the wave-length G=0·000017 inch, and r the radius of the aperture.

Captain Abney gives $2\sqrt{\lambda b}$, or, in other terms, the square root of the distance from the hole, multiplied by the constant ·008, gives the diameter in inches of the aperture which will give the best definition.

The theory propounded by both Captain Colson and Captain Abney is the same; viz., that the wave-phase from the edge first meets the wave from the centre of the aperture in equal phase at the focus; the misfortune is, that the formulæ based on that theory by these two gentlemen are not in accord, as the latter gives the focus about one-half that of the former.

Another view held by some experimenters is, that if with larger apertures a shorter focus be taken than the one given by their formula, then each point of the object makes an image on the recipient surface, which has the same shape as the aperture. What I have found is as follows:—

1. All large apertures give soft pictures; small apertures, sharp pictures, regardless of the focus employed. An aperture of one-thirtieth of an inch will give just as good a picture at thirty-two inches, at sixteen inches, at eight inches, at four inches, at two inches focus, and where discs appear in the negative they have much more to do with the illumination of the object than they have to do with the short focus, as they appear like cone shadows. An aperture of one-three-hundredth of an inch will give a sharp image at any focus.

2. The photographic energy passing through an aperture is eight times greater than passes through a lens having a stop the same size as the aperture.

3. The exposure required for ordinary plates can be worked out from the datum, that where the focus is sixty-four times the diameter of the aperture the time is one second.

4. The experimental evidence is rather in favour of there being an infinite number of foci through an aperture; but, if the large apertures have distinct foci, it almost follows that the small apertures must have the same.

5. Apertures above three-sixteenths of an inch in diameter do not produce photographic images in a camera; an aperture of one-eighth of an inch appears to be in the border-land between holes which will produce images and those which will not do so.

6. The distance of the object from the aperture does not appear to have any influence on the definition or the focus.

The only theory which will embrace these experiments is the supposition that when the light energy from the object grazes the edge of a suitable aperture, then the whole vibrations undergo a change of direction, because the edge of the hole becomes a new source of vibration. In other words, the infinite number of molecules on the edge of the aperture take up the vibrations, and they form new centres, from which the vibrations of the light are transmitted on to the recipient surface in the camera.

It is not difficult to imagine the result which will follow this idea. The edge of the hole for all practical purposes becomes the object, as it is imagined to be the source from which all ethereal vibrations emanate to the sensitive plate. If the longest focus could be ascertained by direct experiment, it would follow as a consequence that another focus will be found at $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, and so on of that distance. As the number of axes of vibration are considered to be infinite, on that account the number of foci may also be considered infinite. At long distances the foci are remote one from the other, but as the distance between the plate and the aperture is approached, the foci become nearer and nearer to each other, until the point is reached where the foci follow each other so closely as to escape observation. If there is any truth in this theory, it is evident the value of this method of photography must depend on the accuracy with which the edge of the hole is drilled and upon its perfect circular form. Heretofore little care has been bestowed on apertures, and the designs of most are faulty. For example, it would be almost impossible to get a perfect image through a cylindrical or conical hole, the liability of disturbances from other surfaces or edges is too great. As our appliances for drilling holes is improved, the time may be reached when a perfectly circular aperture of one-thousandth of an inch

may be made, and a hole that size would become the best optical contrivance for enlargements.

The skilful use of apertures will enable artists to select any description of texture for their subjects, and the skilful use of foci any system of illuminating the field of their pictures.

To give a practical illustration of the views expressed in this paper, the writer has put in the market a quarter-plate camera fitted with two accurately drilled holes, the one aperture to give a soft picture on ordinary plates in one second, the other a sharp picture in sixteen seconds; and yet the focus is only two inches for both apertures. The result of this contrivance is that now, instead of using a magazine camera or dark slides, all that has to be done is to pack six, twelve, eighteen, or twenty-four cameras into a satchel, and to use a separate camera for each picture. The cameras are so light that nine cameras only weigh two pounds, and twelve cameras pack into the ordinary satchel for a camera. There is no machinery to go wrong, and the plates are in no way disturbed until they are fit to be developed in the dark room.

The only requirement these cameras cannot yet fulfil is instantaneous pictures; the time, however, may arise when plates are so sensitive that even instantaneous images will be within the reach of cameras without an objective. ARCHD. C. PONTON.

PRACTICAL REMARKS ON PHOTOGRAPHING DIFFICULT INTERIORS.

I.

PERHAPS there is no class of subject that offers so many and widely different conditions in respect of photography as interiors, for between the well-lighted drawing-room or public hall, and dark vault where little, and indeed it frequently happens, not a ray of daylight penetrates, there is a very wide difference indeed.

The remarks which I am about to offer are the outcome of much close study and practical experience derived from an intimate association with the various classes of subjects I shall refer to, and embrace cases where it was only possible to use artificial light on account of the entire absence of light.

One of the most commonly met with kind of interiors, especially on the part of amateur workers, is that of an ordinary drawing-room or other similar apartment in a private house. With many workers the photography of such is looked upon as an undertaking entailing little or no difficulty; it is so easy to run the blinds to the top of the window, place the camera in the position that will enable the utmost amount of view to be embodied in the picture, expose long enough, and there you have it. In nearly nine cases out of ten these subjects are photographed without due regard being given to the best method of lighting the room.

An idea prevails to a very large extent that it is necessary to flood the room with the utmost amount of light possible. Therefore the blinds are run up to their utmost extent, and the time of day selected when the greatest amount of direct light enters the apartment, there being no thought given to the employment of what is really the *proper quality* of light to employ.

I do not wish it understood that I am in any way advocating the employment of a poor or deficient quantity of light; quite the reverse. The more light any one can command, the better, but it must be of the proper *quality*, and this, to a very large extent, is a bright diffused light.

A very interesting operation for any one desirous of experimenting in this class of photography is the following:—Arrange any well-lighted room, and expose a plate upon it with the blinds run up to the top, so that the utmost amount of light floods the apartment, develop, and print the result. Afterwards expose another plate, with this difference, that thin muslin blinds are hung over the entire window or windows, so that every ray of light entering the room passes through the muslin; expose, develop, print, and mark the difference in the results obtained. It certainly will be instructive to any one who has not previously studied or become aware of the difference in results obtained by diffused light.

In some cases it may be desirous to allow a short duration of direct light to enter the room during the exposure, so as to gain a certain amount of force in the high lights, but this is easily accomplished by capping and uncapping the lens, and removing the muslin from the window a short time previous to the conclusion of the exposure. The first essential, however, is the employment of the proper quality and quantity of light.

Another error frequently seen in this kind of work is the overcrowding of too many articles of furniture into the room. I often think were as much pains taken to see *how much could be done without* as is generally taken to cram into the room, better results would be obtained. In this there is a very wide field for the exercise of good if indeed not artistic, taste, and it is a part of the undertaking that always enlists the attention of the ladies of a household, for they invariably like to be consulted in such matters. As a rule, however, I think it will be found they nearly all fall into this same error of crowding too many ornaments and other articles of furniture into the room; this may not be so very noticeable to the eye at the time when photographing, but after the negative is printed it becomes more apparent in the picture, and then will be seen how much better it would have been had such and such an article not been here and there, and so forth, the result being, try again.

Next to taking a picture of one's drawing-room, the amateur worker will be found to have a weakness for securing a picture of the interior of his church, and to a very great extent the remarks I have made regarding the employment of the proper quality of light will apply to this class of subject also, only with this difference, that it is almost impossible to resort to any means of acquiring an artificial diffusion of light, and hence exposures are made very probably with the sun's rays streaming through some of the windows, the results being by no means as good as they might be. Let any one carefully note the great difference in appearance which the interior of such a building as a church presents under the following aspects, viz., when no sunlight enters, but the sky is full of white fleecy clouds, and then note the change that suddenly arises when the sun shines strongly in through the windows.

In the former case, with a bright, diffused sky lighting up the interior, every minute detail will be observed even in what is considered the dark corners of the edifice; the moment, however, the sunlight comes streaming in, all this suddenly changes, the dark corners appear ten times darker, and much that was noticeable to the eye before has now disappeared, and nothing but violent contrasts prevail.

This is a state of matters that any one can easily see without much trouble, and it stands to reason therefore that sunlight should be avoided, and such times chosen for doing the work when the sky is full of bright, fleecy clouds; and, should the sun come out during the exposure, the lens should be shut off by placing in the cap until it is obscured again with clouds. If we cannot in such cases assist matters by artificial diffusion, we can at least by the exercise of untiring patience bring to our aid Nature's own method of diffusing light.

In landscape and many other outdoor branches of photography sunlight is a *sine-quâ non*, but for interior work the photographers' sheet-anchor is undoubtedly a bright diffused light.

Passing from such subjects as well-lighted rooms, churches, and public edifices, we are often brought face to face with interiors of a totally different kind, such as badly or indifferently lighted workshops, engine-shops, ships' cabins, and such like, where the amount of light at command is very small and gives no end of trouble.

Quite recently I have taken a series of views of the interior of the magnificent new Atlantic greyhound, the *Campania*, and can speak from experience of the difficulty attending the getting of good results in confined and cramped positions, and in many instances where the subjects are lighted by means of port lights only. Nevertheless, by the exercise of thought and patience, much that at first sight appears an almost insurmountable difficulty will to a great extent be overcome.

In engine shops there is generally a need for some preliminary arrangements being made so as to secure the best results. These, most likely, will embrace the covering up of some unwelcome window, and in other cases the colouring of some parts of the machinery with a suitable tint, also the toning down of any very bright portions of the engine or machine that is being photographed. Although, in one sense, machinery does not come under the category of interior work, still in numerous cases operators are called upon to photograph engines, machines, and other heavy portions of work in the positions they occupy before being taken to pieces or removed.

In cases where such are placed in close proximity to a large window or sliding door, a very great difference will be experienced in the time of exposure necessary as against the time taken of an entire interior. I have known cases where the whole interior required a day's exposure, and a machine placed somewhat close to a large side window of the shop was well exposed in ten minutes. There is a very wide range for thought in this kind of work, and a practical experience of this class of photography is of great value, differing as it does in a great measure from ordinary studio work.

From badly lighted interiors to interiors where no daylight enters at all is the next step down the ladder, and in this class of work may be mentioned bonded stores, warehouses situated under railway arches, underground workings, &c. T. N. ARMSTRONG.

SELECTIONS.

[Holborn Camera Club.]

The title I have chosen for my paper seems to me to permit a little wandering about from subject to subject, without inferring an obligation to limit myself to any particular thing, or to bore you by harping on some process or other that would of necessity be more or less stale.

My first selection is to touch on the errors of omission and commission often indulged in by photographers, not from the lofty standpoint of assumed perfection, but rather from that of one who has muddled and messed about in the sloughs of photographic despair, sometimes getting out, but sometimes sticking fast until the friendly help of a brother photographer has landed him on solid ground. There s no disputing that most of us are, or fancy we are, artistically inclined, or we should not select photography for a hobby, an amusement in which genuine success *chiefly* depends on artistic ability. Whether we become successful photographers or not is determined by the amount of scrupulous attention we give to trifling details, *guided by artistic instinct*, or whether we look at the thing as only an interesting mechanico-chemical process, whose ultimate result is a so-called pretty-looking negative. There is a gulf between the two ultimates too wide to be bridged over.

Just recently an energetic controversialist has denied our right to the name of artist, and repudiates in big letters the very idea of photography being an art, fine or otherwise. For the sake of argument, we will assume that photography is an art, and that any of us who succeed in making good pictures, however artfully, are artists. This brings me to talk about the things we do, and those we leave undone in this connexion. Since I had the pleasure of last addressing you, I have had the opportunity of seeing much photography by those who take it up for amusement rather than profit, and must confess I am surprised at the small percentage of those who make the *best* of their negatives.

Judicious Doctoring of Negatives.

Many very clever manipulators are content to print their negatives *just as they come*, and it is not till one puts the finger on such-and-such effects, and asks, "Why this?" that they perceive there might be some improvement in the direction indicated. The two most striking delinquencies are under-exposure and blank spaces, where there ought to be clouds. The universal desire for rapidity in securing representations of moving objects induces under-exposure and all the evils that follow in its train. *An under-exposed negative will never make a perfect print*, although very often much better results might be secured by judicious doctoring than by printing the negative in its untouched condition. Of the various methods of doing so, some are as follows:—In the first place, make a rough print (which, by the bye, is a much better guide than the negative itself, which is apt to give wrong ideas of its printing capacity), and notice especially those parts in which increased or reduced density would be an improvement, or where masses of shade are broken up by small points of light that would be much better absent.

The method to be chosen for treatment depends entirely on the subject. The proof may show that the high lights *throughout* are a little too dense; this indicates treatment with a weak reducing agent in the bath form, or too weak, requiring additional density, or it may show only portions that would be better for reduction, made by local action chemically or mechanically by rubbing down with spirit. The objectionable points of light may be removed by a sharp-pointed knife. We now cover the back of the negative with tracing paper—"papier minéral" is the best—cutting away the paper over the too dense portions, and working on the darker parts with lead pencil, and strengthening the lights on them where it would be an advantage—sometimes merely rubbing a little black lead over front or back with the finger's end—will be found useful to generally reduce a shadow. I have now alluded to some of the different means in general use for improving a negative. An apparently good negative might not probably require all this doing to it, but one or other of the plans might effect an improvement *on nearly all the negatives that are made*. Sometimes a mere touch or two of pencil on the highest lights on the film side will make a considerable addition to the brilliancy and scale of tone in the picture, and sometimes covering up one part, whilst another continues printing, will work wonders.

A Word or Two about Papers.

Now a word or two about papers. I find negatives that are unexceptionally good for albumen-paper printing *much* too strong for the best results on the gelatino-chloride papers, that seem to be fast superseding our old acquaintance, albumen. Of what kind a negative should be as regards density is undoubtedly regulated by the surface upon which it is intended to print it. With the gelatino-chloride papers our old-fashioned ideas of a good negative seem to be somewhat upset, a very much flatter, thinner *cliché* being required. One that with ordinary silver printing on albumen paper would only produce a poor, insipid result seems to be most suitable. With gelatine dry plates there is, undoubtedly, a large percentage of flat, muddy-looking negatives made, quite useless for producing *good* results by the old processes, but with the new they make excellent pictures. The print I now pass round was from a flat, over-exposed-looking negative, and one I should certainly have discarded for albumen-paper printing, but which comes out very fair on the gelatine paper, so much so that the question is, Ought we to make our negatives to suit the new paper as a regular thing, and at once and for all give up the standard of "wet-plate negative" as the *ne plus ultra* of perfection? At any rate gelatine paper puts *pretty* negatives at a discount. If no particular faults develop in this kind of paper by keeping (and I see no reason why there should), we may congratulate ourselves on a very valuable addition to our material, as by its means we certainly secure a better exposition of the delicate detail of a negative than was possible with the best albumenised paper, unless it was enamelled with collodion and gelatine afterwards, and even there I think the new paper has an advantage. I have experienced some little difficulty in mounting the prints when a fairly *large* batch has to be dealt with. I, possibly, have not found the best way of setting about it, not having had much practice with this class of paper. With all the collodion-surfaced papers I have tried there is considerable trouble to manipulate; their curling propensities, when wetted, are simply abominable. They may, however, vary somewhat, according to their manufacture. Perhaps they do, but the samples I happen to have tried as soon as they are wetted turn from prints into cylinders, and keep so unless forcibly held open, so that toning or working with any degree of satisfaction is out of the question. A good collodio-chloride print should, I imagine, be most permanent, if we may hazard an opinion from the behaviour of other collodion surfaces, although from time to time doubts have been expressed to the contrary. Gelatine papers do not curl, but suffer all the treatment of toning, fixing, and washing with the greatest pliability. Whether an abnormally hot summer will introduce difficulties remains to be proved.

Spectacle Lenses.

The last time I had the pleasure of addressing you, the topic was, I believe, on spectacle lenses as used for photography. Since then I have constructed several other combinations of varying foci, and really, for all ordinary work not necessitating rapidity, nothing could be better. Depth of definition, rectilinearity of lines, and covering power seem, as far as I can judge, equal to any orthodox lens. In spectacle combinations intended for wide-angle work I fancy there is less apparent distortion than in the orthodox form. Why I cannot say. Take, for example, cylindrical objects; there seems to be less disposition to the oval form if situated at the margin of the plate; not that it is quite absent, but that there is less of it; also, objects in the near foreground and near to the lens are not rendered so large *in proportion* to the rest of the picture. These prints I pass round will illustrate my meaning. In the interiors the nearest objects shown were not more than five measured feet away from the lens, and in the church view the tomb in the foreground was about nine or ten feet away. Now, with an ordinary wide-angle lens in the same position, I fancy the perspective would appear much more violent, also the lines forming the upper angle of the tower would be more acute, for the camera was tilted, the lens pushed up high as it would go, and swing back used. Still, with all this, the picture has to me more the effect of being taken with a narrow-angle lens removed to a greater distance. This, I must confess, is not at all a scientific or convincing method of argument; but, as I had no other lens at hand to test the accuracy of my impressions, I give you them for what they are worth. The combination was five and a half inches focus on a whole plate, with a stop one-sixteenth of an inch in diameter, so you can draw your own conclusions.

The exposure was about ten or twelve seconds; but, in the matter of exposures, I am somewhat of an impressionist, that is, I trust to judgment rather than giving a definite number of seconds, for, with regard to outdoor work, with all its varying lights, I often do not quite decide about an exposure until it is actually taking place, and then may elect to slightly lengthen or curtail my previous judgment, according to circumstances. I have found a one-sixteenth of an inch stop the best working stop for *all* combinations of spectacle lenses, although, with the long-focus ones, a tenth of an inch is useful. Twelve inches focus and one-sixteenth stop makes the working aperture *f*-192. This seems as if it would necessitate *very* long exposure, but in reality ten seconds on an Ilford ordinary plate is ample time in a fair light. The two Thames-side views I pass round were taken under such conditions; in fact, less time would have done, as I found they did not require the full amount of

alkali to bring them up to printing strength, and they developed rapidly, indicating that with a normal developer they would have been over-exposed. The advantage of the small stop is getting beautiful definition all over the plate, and, when an exposure is required of more than one or two seconds, it matters, I think, very little if it is ten or twenty. In the old collodion days half a minute was considered an average exposure on an ordinary landscape, such as these are, and it was often very much longer, and even then not considered very protracted. I am aware that many think the use of an exceptionally small stop prejudicial to atmospheric effect, an opinion I cannot altogether endorse, as, with a *proportionate exposure*, I have in this respect found no falling off, and I quite believe atmosphere and definition may go hand in hand. Where it does not, I think the fault may be fairly attributed to under-exposure.

EDWARD DUNMORE.

(To be concluded.)

PHYSICAL DEVELOPMENT.

THE substitution of bromide of silver without free nitrate of silver, and the consequent development of the image from the haloid itself for iodide, or bromo-iodide of silver with free silver nitrate as the sensitive material, along with its accompaniment of development of the latent image, not from the haloid, but from the extraneous silver nitrate, was undoubtedly the especial point of change when about twenty-five years ago the wet-collodion process was gradually displaced by the dry-plate process.

In the wet-collodion process, as well as in Daguerreotype, the silver deposit which constituted the developed image was not the product of a chemical reaction, as is the case in modern photography by the use of alkaline developers, but originated by a peculiar physical property of the latent image, called photographic attraction. The developing agent—in the wet-collodion process the free silver, and in Daguerreotype the mercury vapour—formed a compound with the reduction product and not with the unaltered haloid, without altering the chemical constitution of the former.

But, even in one of the modern photographic processes, the development of faintly printed gelatino-chloride printing-out paper, this old method of physical or molecular development plays a part. In this process, as well as in the collodio-iodide process, the sensitive film itself contains the soluble silver salt, which in contact with the exposed silver haloid is reduced by the developer. It may, however, be equally well added to the developer, especially if the silver salt of the sensitive film has been exhausted, as, for instance, in the process of intensifying collodio-iodide plates with silver. If any other suitable sensitiser is added to the sensitive film, as in the case of the iodide of silver dry process, the silver nitrate needs to be employed only in the developer.

It is intended by the following lines to draw the attention of the readers to a number of interesting applications of physical development, which, after very careful and extensive experiments, have been described of late by Herr R. Ed. Liesegang, in the *Photographische Archiv*:—

1. *The Employment of Gallate of Silver in the Process of Developing Gelatino-chloride Printing-out Paper.*—In developing gelatino-chloride printing-out paper the excessive silver nitrate can be removed from the film by washing, when a mixture of the developer, which may eventually be acidified, with the former can be employed. Upon this observation the following method, described by Herr Liesegang, is based: If faintly exposed aristotype paper is freed from the excessive silver nitrate, and from other soluble compounds by washing in several changes of water, the image printed on it will develop in a concentrated aqueous solution of gallic acid to which a slight quantity of silver nitrate has been added, equally well as on paper of the same kind which is developed without washing in plain gallic acid. Whilst, however, in the case of the latter method the prints are reddish-brown before fixing, the washed prints will become intensely black by development in the gallate of silver solution. Over the older method, with plain gallic acid, this new one has the advantage, that the deposit formed in the developing solution is considerably slighter. Mixtures of slightly acidified hydroquinone, pyrogallic acid, and of other organic developers with silver nitrate will act in a like manner.

2. *Acid Developers for Gelatino-bromide.*—Though, in the gelatino-bromide dry process, the chemical developing method has been exclusively used hitherto, the exposed gelatino-bromide film may also be treated with a physical developer, if either a mixture of silver nitrate with a developer, which may eventually be acidified, is used, or if the plate is treated at first with silver nitrate, and then, without washing previously, with the developer. If a normally exposed gelatino-bromide plate is placed in a mixture of—

Hydroquinone (2 per cent. alcoholic solution) ..	5 c.c.
Formic acid	5 „
Water	50 „
Silver nitrate (5 per cent. solution)	5 „

a faint yellowish-brown image will be obtained after eighty minutes. The developing solution remains perfectly clear. To obtain negatives of sufficient density it will be necessary to expose the plates from three to four times longer than those to be treated with a chemical developer. If in the above formula the acid is omitted, a reduction of the silver salt of the liquid soon takes place.

As mentioned above, a similar result may be obtained if the plate is at first placed in the five per cent. silver nitrate solution, and then, without washing, in the developer. In the case of taking a one-half per cent. hydroquinone solution as the latter, a brownish-red image will appear after about half a minute, but afterwards a metallic powder is precipitated, which, however, does not in the least adhere to the film of the plate. If acetate of soda is added to the hydroquinone solution, red fog will be produced. Silver nitrate mixed with metol very soon gives an olive-brown image, whilst, if mixed with para-amidophenol, a yellowish-brown image is produced, development being, however, slower. Gallic acid with silver nitrate does not at all develop, and with amidol at once red staining of the film is produced, together with a considerable precipitate in the liquid.

3. *Developing the Plates after Fixing.*—If a gelatino-bromide film which has been exposed to light is fixed, the sub-bromide of silver is very likely decomposed to bromide and metallic silver; but, in a normally exposed gelatine film, the contents of metallic silver are so slight that, after fixing, not the least darkening at the exposed parts will be visible. With nascent silver the molecules may, however, be rendered considerably larger, and the image becomes then visible.

If a gelatino-bromide plate which has been normally exposed in the camera is placed in a solution of hyposulphite of soda and, after fixing and well washing, treated at first with a ten per cent. solution of silver nitrate, then, without washing, with a developer consisting of hydroquinone and sodium acetate, a blue to bluish-violet image of slight intensity will be developed in the latter solution. The process after fixing may be carried on at daylight. Para-amidophenol, metol, or pyrogallic acid, may be substituted for the hydroquinone developer, or silver nitrate and hydroquinone may be mixed to a single bath if the latter be slightly acidified.

4. *Intensifying Negatives by Acid Development.*—If a sensitive film which has been exposed in the camera is treated with nascent silver, the latter is precipitated not only on the exposed silver haloid but also on finely divided metallic silver in absence of halogen silver. For this reason it will be possible to intensify a gelatine negative with a physical developer by separate treatment with silver nitrate and gallic acid, or hydroquinone, &c. The separate employment of silver nitrate and developer has the advantage over a mixture of the two, that in the case of the former substances may be added by which the keeping qualities of the developer are improved, for instance, sodium sulphite, and also substances by which the process is accelerated, for instance, sodium acetate. The following method has been used by Herr Liesegang:—

The gelatine negative is very thoroughly washed and then placed in a five to ten per cent. silver nitrate solution. After a few minutes it is transferred, without washing previously, in a diluted mixture of hydroquinone with sodium acetate, known as "aristogen:"—

Hydroquinone (7 per cent. alcoholic solution)..	4 c.c.
Sodium acetate (15 per cent. solution)	8 „
Water	60 „

and allowed to remain until it has acquired the desired density. It it well to place it finally in a solution of hypo. Other organic developers, in plain solutions or mixed with sodium acetate, may be substituted for the above hydroquinone developer. The intensification which may be obtained by this method is said not to be as considerable as with bromide of copper and silver nitrate.

5. *Intensifying Fixed Prints.*—According to the same principle as described *sub* 4, also fixed prints on various printing-out papers may be intensified after fixing by physical development. It makes no difference whether they have been toned or not; but it is, of course, necessary to wash them previously very thoroughly, since the least trace of hypo in the film causes yellow fog. The following experiment has been made by Herr Liesegang:—

A finished print on aristotype paper was placed in an aqueous solution of hydroquinone, citric acid, and silver nitrate. The proportons of these substances are of no importance; however, a sufficient

quantity of acid should be present, to prevent the reaction between the hydroquinone and the silver salt. At first no intensification of the print took place, on account of the fact that no precipitate of silver was produced in the liquid; but, as soon as a few drops of ammonia were added, so as to render the bath just neutral, a slight precipitate of silver was formed, and, at the same time, intensification of the image took place. If the latter was not sufficient, a few drops more of ammonia were added. In this way the prints may be strengthened to any degree. For hydroquinone all the other silver intensifiers may be substituted. It is necessary that previously to the above treatment the prints, especially those on gelatine-emulsion papers, should be well soaked in water, in order to prevent the silver deposit adhering to the film. In adding the liquid ammonia, care should be taken that it does not drop directly on the print, because it would otherwise produce yellow spots.

6. *The Application of Physical Development to Various Other Surfaces.* — From the experiment described *sub* 5, it will be seen that not only the silver molecules have the property to attract the nascent silver of the developing liquid, for in the case of a toned and fixed print, which therefore contains no more silver haloid, the gold has the same function as the silver. In like manner, in a freshly prepared mixture of silver nitrate with a suitable developer a purely physical intensification will take place :—

(*a.*) Of finished chloride of silver positives in which gold, platinum, osmium, iridium, and other precious metals have been substituted for silver.

(*b.*) Of finished platinotype prints, carbon prints, Woodburytypes, of prints obtained by the powder process, and of similar prints, provided that no greasy substance has been employed in combination with the pigment, as in collotypes, letterpress prints, &c.

(*c.*) On glass, celluloid, ebonite, and on several other substances the silver is deposited, if they have previously been freed from the gas or water atmosphere condensed on them.

7. *Intensifying Finished Platinotypes.* — As mentioned above, *sub* 6 *b*, finished platinum prints may be successfully intensified by the application of physical development. The print, after being wetted with water, is placed in a mixture of—

Aristogen (see above, *sub* 4)	10	parts.
Citric acid (2 per cent. solution)	5	„
Water	150	„

to which, just before use, ten parts of a five per cent. nitrate solution have been added. After a few minutes finely divided metallic silver will be precipitated in the liquid, which, however, does not alter the qualities of the bath. The platinotype will very soon gain in density, and at the same time it turns intensely brownish-red, the whites remaining perfectly clear. The precipitate of the bath will adhere to the paper only in cases where the print has not previously been moistened with water. Afterwards the print is treated either with hypo or with any combined toning and fixing bath. In fixing, the brownish-red tone of the print is preserved, though it will be reduced to some degree. With the toning and fixing bath the colour of platinum is nearly obtained. Instead of aristogen, para-amidophenol, pyrogallic acid, metol, and other developers may be employed, if they are previously rather strongly acidified. With pyrogallic acid the black silver modification will be obtained in place of the brownish-red one.

8. *Silvering Glass.*—By aid of a quite freshly prepared, still perfectly clear mixture of slightly acidified pyrogallic acid, or of para-amidophenol, aristogen, &c., with silver nitrate the silvering of glass is a matter of great simplicity, provided that the surface has been previously freed from the adhering gas or water atmosphere by rubbing it vigorously with alcohol or ether. The glass surface will then be covered in a few minutes with a thin layer of tightly adhering silver. Should the thickness of layer be not sufficient, pyrogallic acid or para-amidophenol, aristogen, &c., respectively, and then silver nitrate solution should be added alternatively. The experiment will be still more successful if the glass surface is at first poured over with the concentrated alcoholic aristogen solution, as it is sold by the manufacturers, and then, after the excessive liquid has been allowed to drain, placed in a diluted aqueous solution of silver nitrate. For the aristogen strong alcoholic solutions of other developers may be employed. The silver deposit is produced within a few minutes.

The glass may be equally well silvered if it is at first moistened with an alcoholic solution of silver nitrate, and then placed in a diluted developer; for instance, in aristogen 1 part, water 12 parts. The operation, as a rule, must be repeated in order to obtain a sufficiently intensive deposit.

In conclusion, it may be mentioned that Herr R. Ed. Liesegang gives the following explanation with regard to the action of the physical developers :—Soon after the pyrogallic acid, or the para-amidophenol, metol, &c., has been mixed with the silver nitrate, the silver is suspended in the liquid in the finest state of division. The result is not a solution as it is generally understood, but a kind of emulsion. The portion of the liquid which encloses the single particles will, however, not be able to perfectly separate the silver molecules, the power of the latter for uniting themselves being greater than the adherence with the liquid atmosphere. Consequently, the silver particles unite to form larger particles. HERMANN SCHNAUSS.

A NEW TELE-PHOTO LENS.

Our attention has been specially drawn to a new lens of the "tele-photo" *genus* just received by Messrs. George Houghton & Sons, 99, High Holborn, W.C., and we have before us quite a number of views that have been taken by its agency. Having been afforded an opportunity of examining the lens in question, we are enabled to give the following description, aided by the drawing underneath.

In the first place, there is what seems to us a well-made "rapid rectilinear," eight inches in focus, fitted with iris diaphragm, and which, when unscrewed and used alone, fits the flange, A, of the tele-photo system screwed on the camera front. This lens covers a half-plate to the corners, judging from a specimen of its work sent us. When screwed into the outer flange, C, of the tube (which is four inches long), carrying at its nearer end that which is next the camera, the tele-photo system is now complete. The image on the focussing screen is seen magnified up to eight times; but, by operating a rack and pinion, the concave lens B, can be brought nearer to or farther from the rectilinear lens in front, and can thereby be made to increase or diminish the telescopic effect to the desired extent.

In the views submitted to show its various powers, there is, first, a print from a negative by the rapid rectilinear alone, and this, we may say, leaves nothing to be desired as regards definition. We have next four other photographs, taken from exactly the same standpoint, showing degrees of enlargement, respectively three, four, five, and six times that of the primary picture. These, as they ascend in magnifying power, show a corresponding increase of detail, ornamental ironwork which is merely suggested by the original lens now showing its pattern with very desirable distinctness; while distant trees, still more feebly suggested in the primary picture, are shown individualised in the tele-photo ones.

An engraved scale on the sliding tube which is actuated by the rack and pinion permits one to see at a glance to what extent the camera has to be extended in order to produce the degree of magnification that is to be adopted in any special case, and this, in our opinion, is a great convenience.

The lenses, of Parisian make, are by the house of Clement & Gilmer (late Laverne), whose reputation is good. The concave lens, which acts such an important part in tele-photo combinations, is of the same diameter as those forming the rapid rectilinear. It is a crossed double concave, the deepest curve being to the front, the surface to the back being concave in only a slight degree. They are all said to be formed of Jena glass, and the price (5*l.* 5*s.*), which includes the rapid rectilinear, will be considered strictly moderate.

To magnify three times, the camera requires racking out six and a half inches; six times necessitates sixteen inches, and so on, according to the indications on the scale.

Messrs. Houghton & Sons supply the trade and the public in this country.

BIRMINGHAM PHOTOGRAPHIC SOCIETY'S EXHIBITION.

THIS Society held its annual Exhibition last week, nearly 400 exhibits being shown.

In instantaneous work the silver medal fell to Mr. William Rooke for a Christiania street scene, and Mr. J. P. Heaton, Mr. H. W. Southall, and Mr. T. Taylor (Staffordshire) received honourable mention. Mr. J. Simkins was the medallist, and Mr. J. H. B. Manly is honourably mentioned for cloud photographs. For landscapes Mr. H. W. Southall carried off the chief award with a clever little bit of work—*Chadbury Mill*. Mr. W. Jones was the medallist for enlargements. For portraiture the silver cup went to Mr. Leeson. Mr. J. Simkins was the medallist for interior work, his exhibit being the tomb of Sir Fulke Greville, in Alcester Church, honourable mention falling to two productions of Mr. G. F. Lyndon and to one of Mr. W. T. Greatbach. Mr. Simkins was again the medallist for exterior architectural work with a view of the *Chapter House, Much Wenlock*. He was also honourably mentioned, as was Mr. C. J. Fowler, who also obtained the chief award in *genre* work, Mr. Southall being also mentioned. In hand-camera work there were only three exhibitors, consequently there was no award. In the seascape exhibits Mr. A. J. Leeson was the medallist. Mr. M. H. Chubb was the successful exhibitor both in the champion class and in that for three prints, any subjects, any size. Mr. T. Taylor took the bronze medal for the third award in the champion class, the second not being allotted, while Mr. H. C. Manton took the corresponding prize in the class for any three prints, Messrs. W. S. Aston and C. H. Barnsley being honourably mentioned. Mr. William Rooke took the silver medal in the section for photographs not included in the above classes, with a hoar-frost picture; Messrs. J. Simkins, P. T. Deakin, and W. Topham were mentioned. Mr. H. W. Southall was the medallist for bromide prints, with a view of the Avon at Cropthorne. Mr. E. C. Middleton was successful in the class in the survey section for three doorways in Warwickshire, and Mr. E. Underwood, who alone seems to have understood the object of the class, the medallist for a nonagenarian in *Warwickshire Peasantry*. The last-named gentleman was also successful in another open class in the survey section, while Mr. Middleton obtained a second medal for a view of Stretton-on-Fosse, in *Characteristic Village Scenes*. The medal for church windows was not awarded. Mr. J. H. Pickard received the medal and two (the only) honourable mentions in the class for architectural details. Mr. E. C. Middleton added one more to his successes by securing the medal for lantern slides.

THE summer season of the Polytechnic School of Photography will include a series of lectures by Mr. Horsley Hinton, Mr. Charles W. Gamble, Mr. E. Howard Farmer, and Mr. Gamble, particulars of which will be found in our advertisement columns. We are pleased to find the Polytechnic is so popular as an agency for diffusing a knowledge of photography.

Our Editorial Table.

THE MARTIAL ANNALS OF THE CITY OF YORK.

By the Rev. Cæsar Caine, F R.G.S. London: Chas. J. Clark, 4, Lincoln's-inn-fields.

As a former A. C. to H.M. troops, York Garrison, the author has had exceptional opportunities for qualifying himself for the task he has undertaken, and which has culminated in this work. The Eboracum of the Romans, York can boast of having been the residence of a Roman Emperor, Severus, in A.D. 208, having dwelt here while his troops were constructing the great wall of defence across the island. For a long period York was the capital of this country, and it, or its vicinity, was the scene of several battles. It is gratifying to find that a historian of Mr. Caine's abilities and powers of research has undertaken to give in a single volume the succinct and methodically arranged account of this ancient city, its martial annals, and incidentally its antiquities. It is to be regretted that the temples, palaces, theatres, and similar public buildings with which the Romans adorned their cities, have long ago disappeared, but one cannot take even a brief walk through this city without realising that he is still in the presence of antiquity. As a clever and discriminating photographer, Mr. Caine has most copiously illustrated his book with the archæological remains, for the possession of which the ancient city enjoys a proud pre-eminence over every other town and city in this country; and in one or other of the sixty illustrations which embellish the book we have the most of them. Many of the bars or gates through which the city was entered are imposing structures, and make good pictures. This is especially true of Micklegate Bar and Monk Bar, which present the appearance of high towers on the city walls, for York is one of the few walled cities now remaining in this country. In addition to the various bars, Mr. Caine has laid under contribution all the other subjects of interest, such as the Multangular Tower, St. Mary's Abbey, Stamford Bridge, Clifford's Tower, and the Old Baile, the Red Tower, St. Mary's Tower, Marston Moor, Fishergate Postern, &c. Of these Bootham Bar is perhaps not the least interesting, on account of the fine view of the Minster seen in the background. Of these various illustrations we here present an example, the Manor House of King Henry the Eighth, in which Charles the First resided for a brief period in 1639, a few years before the battle of Marston Moor, so disastrous to this king. The work is classified into periods, opening with the Roman Period, from A.D. 50 to A.D. 426, terminating with the Hanoverian Period, from A.D. 1714.

Amateur's Developing and Toning Outfits.

Messrs. Arthur Schwarz & Co., of Dashwood House, E.C., are sending out sets of Dr. Andresen's developing, fixing, and toning cartridges, which should be handy for travellers and amateurs. The boxes include metol cartridges, the contents of which being dissolved in water form the developer; fixing cartridges; and toning and fixing cartridges for use with either albumen or chloride papers. We have before spoken of the excellence of these preparations, which in this form will, no doubt, be welcome to many.

The Dallastype Shakespeare.

Duncan C. Dallas, 5, Furnival-street.

Of the Dallastype *Shakespeare*, which is a photographic reproduction of the famous first folio (1623) edition, the complete play of *The Tempest* has just been published. We have before commended the excellence of the reproduction, which, when complete, should be much appreciated by lovers of the national bard. We understand that Mr. Walter Crane is preparing a number of illustrations for the series, which should make it additionally valuable.

The Studio.

16, Henrietta-street, Covent Garden, W.C. Monthly, price 6d.

This, the first number of a monthly magazine to be devoted to fine and applied art, is beautifully got up, printed and illustrated, the latter being charmingly unconventional, and, in some cases, highly original in style. Among the illustrated articles are: "Sir Frederick Leighton as a Modeller," "The Growth of Recent Art," "Spitalfields' Brocades," by Mr. Liberty, and "A new Illustrator—Aubrey Beardsley," whose peculiarly original style affords Mr. Joseph Pennell material for a laudatory article. Mr. Pennell says: "The criticism of art to-day is merely the individual expression of persons who mostly know nothing about their subject." His own article is purely critical.

The Lomberg Dry Plates.

E. Stiepel & Co., 80, Bishopsgate-street Within.

Samples of the "Lomberg" dry plates having been submitted to us for trial, we find them of medium rapidity, yielding, with normal pyro-soda development, images of good quality, cleanness, and density. Their rapidity, according to Watkins' system of speed measurement, is 80°.

RECENT PATENTS.

APPLICATION FOR PATENT

No. 9499.—"Improved Hand Camera, by the Use of Hexagonal Drum or Box in Interior." A. T. Davey.—*Dated May* 12, 1893.

PATENT COMPLETED.

Improvements in Apparatus for Regulating Photographic Shutters.

No. 12,029. Henry Hill, 20, Tradescant-road, South Lambeth-road, London, and Arthur Lewis Adams, 81, Aldersgate-street, London.—*April* 1, 1893.

This invention relates to apparatus for pneumatically regulating the speed or travel of shutters for photographic purposes, and consists of a pneumatic regulating device which can be readily adjusted or altered so as to give longer or shorter exposure as desired.

The pneumatic regulating apparatus according to this invention consists of an air chamber capable of having its internal area increased or diminished as desired, by means of an adjusting device secured or affixed to that end or part of the apparatus which is away from, or detached from, any working part of the shutter, while another part of this air chamber is permanently attached to some working part of the shutter so that the leverage between it (the air chamber) and the spring actuating the shutter is never varied, the regulation being obtained according to this invention by varying the size of this air chamber—and this may be done in either of the following manners:—

1. A tube (either cylindrical or of other suitable form) closed at one end and open at the other is permanently connected at its closed end to some working part of the shutter, while its other and open end slides over (or, if desired, slides into) another tube of corresponding form and length (or the length may vary), which it closely fits, the one working within the other after the manner of a plunger.

The outer end of this second tube is closed likewise, and has connected to it a crank arm (like a bell crank) turning on a pivot—the free end of this arm acting as a handle by which to move same, and a dial or index plate may be mounted in combination with the same so as to show exactly the speed at which the shutter is set.

Thus, by moving this regulating handle to its extreme limit on one side, or in one direction, the second tube is drawn out of the first, and thereby the internal area of the combined tubes is greatly increased—thus allowing the shutter to work with more freedom, and consequently greater speed.

By moving the index handle to the opposite extreme, the one part of the air chamber is moved closer into the other part, and consequently the area of said air chamber is reduced, and when the one part or tube is drawn off the other by the movement of the shutter the air is more attenuated, and consequently the speed of the shutter is greatly retarded, while at intermediate positions of this index handle or regulating arm between the two said extreme points intermediate speeds are obtained.

In place of this crank arm for altering the positions of these tubes one upon the other (*i.e.*, altering the internal area of this air chamber), as hereinbefore described, other equivalent mechanical means may be used for doing this; for instance, a slide moving in a line parallel or thereabout with the axial line (*i.e.*, the length) of the air chamber, and having a dial or index, as before, to show the speeds or other equivalent mechanical devices, may be readily applied in order to draw the one tube off the other, or out of the other, so as to vary the internal capacity of said air chamber, as and for the purposes hereinbefore described.

2. A tube of cylindrical or other suitable shape, and open at each end, may be pivoted or mounted so as to be capable of swinging at about the centre of its length, and the moving part of the shutter has a tube or cap (corresponding in shape) attached thereto to slide over, or slide into, this pivoted tube at one end thereof, while at the other end thereof another tube or cap of corresponding shape may be mounted or arranged to slide over, or slide into, this said pivoted tube, this third tube being drawn in or out by means of a slide, bell, crank lever, or other suitable device, so as to vary the internal area of the air chamber thus formed as before described, each of these two slide tubes or caps being closed at their outer end as before, the only difference from the first arrangement being that the air chamber is formed in three parts instead of two.

3. In place of having tubes or the like devices sliding upon one another (as previously described), a regulating action can be obtained by a bellows or the like arrangement, one side or part of the bellows being connected to some working part of the shutter and another side or part of the bellows connected to a device as before, for varying the position of same, so that the internal area of the air chamber in said bellows is increased or diminished.

Thus the air chamber is compressed or extended or both (when the shutter is actuated) in any of the three above described manners, or in any mechanically equivalent manner, and the speed of the shutter can be thus regulated in a very simple manner and without in any way varying the leverage between the air chamber and the operating spring.

The index handle or regulating arm, slide, or lever by which the internal area of the air chamber is varied can be held in position by set screw, or clamp, or in any other suitable manner, as desired.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 23	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 23	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 23	Hackney	206, Mare-street, Hackney.
,, 23	Paisley	9, Gauze-street, Paisley.
,, 23	Rochester	Mathematical School, Rochester.
,, 24	Leytonstone	The Assembly Rooms, High-road.
,, 24	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 24	Southport	The Studio, 15, Cambridge-arcade.
,, 25	Camera Club	Charing Cross-road, W.C.
,, 25	Glossop Dale	
,, 25	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 25	Hull	71, Prospect-street, Hull.
,, 25	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 25	Liverpool Amateur	Percy-buildings, Eberle-street.
,, 25	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 25	Oldham	The Lyceum, Union-st., Oldham.
,, 26	Cardiff	
,, 26	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 26	Holborn	
,, 26	Maidstone	"The Palace," Maidstone.
,, 26	Swansea	Tenby Hotel, Swansea.
,, 26	West London	Chiswick School of Art, Chiswick.
,, 27	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

May 11,—Mr. W. E. Debenham in the chair.

Mr. E. H. Bayston was elected a member.

Samples of the Lomberg dry plates were distributed among the members.

Potassium Bromide in Mercurial Intensification.

The following question from the box was read: "Why is potassium bromide used with mercury bichloride for intensification?"

Mr. R. P. Drage thought it gave greater clearness to the image.

Mr. A. Cowan said it was recommended with Monckhoven's silver cyanide intensifier.

The Chairman said that Mr. Spiller had stated that the bichloride, unless made acid, formed a combination with the gelatine, and therefore clogged the shadows. A reason for its inclusion in Monckhoven's formula might be that silver bromide was more amenable to treatment with cyanide than chloride.

Mr. R. Beckett used a drachm of hydrochloric acid in twenty ounces of mercury solution. It worked well when followed by cyanide of silver.

"Is the Present Construction of Studios Wrong in Principle?"

Mr. W. H. Harrison read a paper on this subject (see page 310), in which he suggested a south light reflected from a whitewashed wall on to the sitter, the light being controlled by blinds, in preference to a north light.

In the course of the discussion which followed Mr. Cowan said he thought the sun falling across the room would interfere with the sitter. He did not fancy the arrangement would work at all.

Mr. Beckett objected to the plan as likely to cast too strong a light on the backgrounds.

Mr. P. Everitt thought it would give too much top light. Would not the outlay for renewing the whitewash and the cost of construction generally be considerable?

Mr. W. Cobb said he would not like to depend on reflected light alone.

Mr. W. D. Welford said the point was whether reflected light was equal to direct light.

Mr. Cowan said the question whether the reflected south light was more powerful than the direct north light could be tested by printing from a negative in it against one printed in the north light.

Mr. A. Haddon said that photographing a white screen towards the north, with a portion of the sky included, would also answer the purpose.

The Chairman thought Mr. Harrison made a mistake in supposing a north light to have little photographic value when there were clouds about. The light from the northern sky was much more considerable than he had any idea of. If the light, as was said, was chiefly reflected from the floating particles of dust that were always present in towns, more so than in the country, then we should always have more rapid exposures in towns. He (the Chairman) did not think this to be the case. He thought the light greater from a northern sky than from a whitewashed wall, and certainly so when the sun did not shine. Mr. Harrison's suggestion would, it seemed to him, lengthen the exposure. The amount of glass required would be enormous, and the alteration of angle would be exceedingly great. The light from the sky would be less dazzling to the sitter. He did not think the present construction could be remedied.

Mr. E. W. Parfitt asked if, in using a reflector screen for enlarging in the open, the exposure required would be more than would be required if the light from the sky alone were used?

Mr. Welford had tried to print a cracked negative with reflected light from a very white screen, and it did not answer the purpose of diffusing the light. He had also found by experiment that diffused light did not print as quickly as the northern light.

Mr. Harrison, in replying to the various points raised, said that the plan would necessitate the employment of suitable blinds. Two reflections instead of one would be utilised. The north light was light reflected from a dirty screen. The point was, whether the reflected south light was better.

After other discussion a vote of thanks was passed to Mr. Harrison for the paper.

MANCHESTER PHOTOGRAPHIC SOCIETY.

May 11, the President (Mr. Abel Heywood) in the chair.—The syllabus for the summer outdoor meetings was laid before the members; these have been arranged to take place on the Saturdays immediately following the ordinary monthly meetings, thus affording members an opportunity of making arrangements to take part therein. It having been thought by several of the Council that members should have the use of a large camera, a proposal was laid before the meeting for obtaining a 12×10 outfit complete, the scheme propounded being somewhat on the co-operative principle, subscribing members to have the first use, the Society as a whole to have the option of purchasing all the shares. It was considered by such a scheme a first-class apparatus could be obtained without the cost thereof falling on those who did not desire or require its use. After some discussion it was decided to lay the matter more fully before the members by circular, to be sent out before the next meeting. The subject of discussion was the *Development of Hand-camera Exposures*. Mr. Wrigley and Mr. Lawes contributed notes. The former, in addition, gave his experience of working the Frena camera, the only drawback that he experienced being the defective films at present supplied for this ingenious camera.

North Middlesex Photographic Society.—The fourth of the series of Elementary Technical Classes given by the above Society was held on Wednesday, May 10, the subject being Intensification and Reduction of Negatives, by Mr. J. McIntosh. Several of the negatives brought by those interested were operated on with excellent results, formulæ given, and the processes explained in a manner suitable for a beginner. These classes have been greatly appreciated, and interest shown by both instructors and those gentlemen attending is evidenced by the great improvement in some of the work lately exhibited at the Society's outings competitions.

Hackney Photographic Society.—May 9, Mr. T. H. Smith in the chair. Mr. Maxwell was elected a member. Mr. Hensler said he had broken his focussing glass when in New Zealand, but, as he had previously marked his camera in distances, the difficulty was overcome. Mr. Beckett advised using a xylonite film (which would not easily break), but said, in having distances scaled, as mentioned, the trouble was getting the principal focus, *i.e.*, foreground or distance. Mr. Grant used, on emergency, a plate put in hypo till nearly clear, then washed out. Mr. Hudson protected his focussing screen by using a piece of thin wood. From the question-box: "What can be done with hydroquinone formula (Ilford) in which crystals had not dissolved?" Mr. Roofe had had markings on his plates under such circumstances. Some discussion ensued, but filtering was eventually recommended. Another question was asked: "Was it necessary to rock during development?" The reply was: "Yes, as particles might cause stains, and mottled appearance would sometimes result." Mr. Hensler asked for amidol formula for lantern plates, and was recommended, by Mr. S. J. Beckett, to use any, but with plenty of bromide. Mr. Grant asked for probable exposure for ordinary room. Several replies were given, but *f*-22, Sandell plate, ten minutes, was mostly favoured. Mr. A. Barker asked: "Were uranium-toned prints permanent?" Mr. S. Beckett said it was doubtful. He thought that, if developed in the first instance with ferrous oxalate, they would deteriorate. Mr. Sodeau startled the Society with showing a shilling hand camera. He proceeded to explain it worked at *f*-22, amidst much mirth, and numerous questions were asked of an hilarious kind. Mr. T. H. Smith asked what plates were best to use for cloud negatives. Mr. Hensler had used iso. Mr. R. Beckett said they were good when there is a yellow sunset, but for a bright, blue sky the yellow screen should be used. He made an exposure last week on a Barnet rapid *f*-18 one-fortieth of a second, and had a good result. Clouds, he said, were often printed in too deeply; what was wanted was delicate, not hard, clouds. Mr. Cross showed a print from a cloud negative, the negative of which he had taken by cap exposure, using slow plate and developer weak in alkali.

Leytonstone Camera Club.—May 10, Mr. H. E. Farmer in the chair.—The advantages of the multiple film known as the Sandell plate was demonstrated by Mr. Herbert Fry. The lecturer opened by passing round some very fine prints produced by Mr. Sandell. The exposure given evidently showed that the inventor had put the plates to some very severe tests. Their advantages over other plates for hand-camera work was clearly shown and explained, some very fine snap-shot negatives being passed round, the clouds having been retained in the second film. Mr. Fry classified the advantages of the multiple film in the following order, although he considered that No. 4 was the most important:—1st, "Hand-camera Work," in which the top film being rapid allowed for slight under-exposure, the second film absorbing the high lights and preserving the picture in over-exposure; 2nd, "Interior Work," in which the top film takes up the shadows, and the second the high lights; 3rd, "Halation." They almost entirely do away with this bugbear, as the under films catch the rays of light, and, being a very slow emulsion, with a medium exposure, they are retained; but, even if very considerably over-exposed and they have penetrated right through the film, they still have to be reflected back through this very slow emulsion; 4th, "Gradation." The double film gives a much longer scale of the various tones and half-tones compared with the resulting flatness of the single film; 5th, "Exposure." The enormous amount of latitude allowable; in fact, the best results were to be obtained with extended exposure and weak development. The development recommended was that known as Cyclol, consisting of hydroquinone, 30 grains; eikonogen, 100 grains; rodinal, 9 drachms; sulphate of soda, 2½ ounces; carbonate of potass, 2½ ounces; water, 20 ounces. In winter to be used one to three, and in summer one to seven. The Hon. Secretary asked the question as to what extent development should be carried, as he had found that when developing with pyro-ammonia the top film veiled over, and the back had to be watched as to the progress. The Chairman said he had had the same difficulty. Mr. Fry in reply said that the developer had been used too strong, and that by tentative development they should come up as an ordinary film, but required a strong fixing bath, eight ounces of hypo to the pint.

Rotherham Photographic Society.—May 10. Mr. T. Scotton, of Derby, read a paper on *The Platinotype Process*, and afterwards developed a number of whole-plate prints by the cold-bath method. The demonstration was most successful, and the resulting pictures were much admired for their artistic as well as their technical excellence. Dr. Baldwin (President) occupied the chair. On Tuesday, May 2, the members had under their notice Dr. P. Jeserich's *Detection of Crime* paper.

Photographic Society of Ireland.—May 12, Mr. M. Hedley (Vice-President) in the chair. Subject: *T. C. D. Tercentenary and Dublin Views.*—A collection of lantern slides, the joint work of Dr. E. MacDowel Cosgrave and Mr. L. R. Strangways, M.A., was exhibited on the screen. Part I. illustrated the tercentenary festivities which took place in connexion with Trinity College last July. Some very good interiors and exteriors of the University buildings were shown; amongst others the Examination Hall, the Library, the new buildings, &c.; portions of the procession which took place between the College and St. Patrick's Cathedral were also exhibited, in them many well-known figures can be recognised. Part II. comprised familiar and important buildings, monuments, and views in the city, as well as some very amusing scenes in the back streets; these latter, mostly done by Mr. Strangways, caused a good deal of merriment. Dr. Cosgrave acted as lecturer all through the evening, and kept his audience alive with interest, explaining important and historical facts connected with the University and Dublin City, many of which were quite unknown to the majority of those present.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

FRILLING OF PLATES.

To the Editor.

Sir,—During the recent few weeks of hot weather which we have had there has been some trouble caused in my developing room by the frilling of plates, and, after careful observation, I have noticed that in nearly every case there was one or more edge of the film entirely free from any tendency to frill. This is not an exceptional experience, but one which all those who are constantly using dry plates will be able to corroborate. It occurred to me that there must be some reason for the plates not frilling on all sides alike, and, after a few experiments, I found that the

edges which had been cut with a diamond after coating the film, were much more inclined to frill than on those which had been coated right up to the edge, and not cut afterwards. Let me add to this the fact that I am seldom or never troubled with frilling at all in large-sized plates (say 15 × 12 and upwards), and never on more than one or two sides.

It is, I believe, the practice of manufacturers to coat large sheets of glass and cut them up afterwards to the sizes required, and I should like to know if there is any distinct advantage in this method over that of cutting up the glass first.

Alum and other astringents are altogether unsatisfactory in use, and often result in even greater annoyances than frilling by being carelessly applied, and, since some makers are able to supply a plate *entirely* free from the tendency to frill, there seems no reason why others should not also do so.

I am quite convinced that plates cut up after coating are more inclined to frill than those coated the size they are intended to be used.—I am, yours &c., ERNEST LAMBERT.

Manager of Lambert & Lambert, of 32 Milson-street, Bath.

[Usually, we believe that all sizes under whole plate are cut from larger-sized sheets of glass, the latter being more convenient to coat. —ED.]

GELATINO-CHLORIDE *VERSUS* ALBUMEN PAPER.

To the EDITOR.

SIR,—As you have invited correspondence *re* the working of printing-out paper, I should like to know how the mounting is done. Seeing a statement some months ago respecting the working, a correspondent said that everything was done just the same as for albumenised, and, liking the paper, a batch of prints was made on it. Now, the way I mount albumenised paper is to make a heap of twenty, and, pasting the top one, to lay on mount and press down with a sheet of paper and roller squeegee; but, on serving the printing-out paper in the same fashion, the gelatine surface sticks to the paper and leaves the mount. I have had the same thing told me by other photographers, and feel surprised no one has mentioned this.

On reading your article on *Rapid Drying of Prints by Centrifugal Rotation*, I turned my tricycle on its side, and fastened a wet negative with two clips to spokes. It dried in three and a quarter minutes. This may be useful to some one in a hurry.—I am, yours, &c., W. R. F.

May 15, 1893.

THE PHOTO-CORRECTOR.

To the EDITOR.

SIR,—May I venture to express an opinion upon the "photo-corrector?" Now Mr. Van der Weyde's appliance is before us, the discussion it gives rise to is of great interest to photographers. It is sufficiently evident that it will require "artistic" judgment in application, but its possibilities are great. Argument about the identity of optical and visual truth can be readily disposed of; the style the portrait lens treats such details as nose, hand, and feet, shakes all belief in that dogma. When a figure approaches the normal eye no violent distortion is observed; the visual angle is, perhaps, twice that of the portrait combination. The eye projects its small image of external objects upon the concave spherical surface of the retina, free from the defects of projection upon the flat sensitive plate. Psychological influences no doubt are at work; but our ideas of form and distance are in great part due to experience and comparison. Pinhole perspective we accept, and get as near it as we can, but here the portrait lens is out of it—it wants help, and we have in this appliance of Mr. Van der Weyde a means of approaching more closely "visual truth" than the portrait lens permits; further, great latitude of posing and arrangement of subject appears possible with it, and the exaggeration of portrait photography can be brought under control. Such, I think, may be taken as the value of the "photo-corrector."—I am, yours, &c. OBSERVER.

33, *Westcroft-square, W, May* 8, 1893.

IRON CARBONYL IN GAS.

To the EDITOR.

SIR,—May I correct two *errata* in my article on above? It was one "gram" produced from 100 grams, or grammes, not "grains." And at the end, I referred to the use of a "lucky" cylinder, not "necky," but referring to the great *difference* observed in some cylinders in this respect, in which difference (and its cause) lies, perhaps, our best chance of a remedy.

I have since been told that coal gas is sometimes "purified" by means of ferric hydrate, and that such gas, even before compression, has been found occasionally to contain iron carbonyl and deposit iron oxide, on ordinary steatite burners. If this is true, we have another possible cause of variation, and another complication. But, however all this may be the question is urgent, and needs to be faced, or we shall be ultimately driven to pure hydrogen, with all its decided disadvantages.—I am, yours, &c., LEWIS WRIGHT.

May 10, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Exchange Lancaster half-plate Instanto, oxygen generator and gasometer, parrot cage, bamboo tripod, for Burr's C.-D.-V. lens, or two cases for canvassers, 12×10 box for washing negatives, Archimedean studio stand.—Address, L. DIXON, Photographer, Market-street, Colne.

Will exchange several "Seavey" backgrounds lighted from the left for others lighted from the right; also 15×12 camera, one double and one single slide, and 12×10 camera, two double slides, for four-back posing chair and 12×10 camera with three double backs.—Address, LONDON PHOTOGRAPHIC COMPANY, 21, Station-street, Sittingbourne.

Will exchange Thornton-Pickard time shutter, four-inches diameter, for *Magazine of Art*, 1889-90-91, and THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC from 1884 to 1890, all in good condition.—Address, J. DUNN, 1, Laygate-place, South Shields.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

PHOTOGRAPH REGISTERED:

Rev. Henry Howson, Belmullet, co. Mayo, Ireland.—*Photograph of the late Most Rev. Hugh Conway.*

JOHN S. HELSBY.—Yes, to all of your queries.

A. G. HAYWARD.—Marion & Co. keep such lamps as you describe.

HORACE W. NICHOLLS (Johannesburg).—Thanks. We should be pleased to have the promised article for the ALMANAC.

CHARLES H. HEWITT.—Willesden paper may be obtained of the Willesden Waterproof Paper Company, 72, Watling-street, E.C.

T. HOWELL.—We cannot advise on the matter. We may say, however, that it will be a little difficult to secure a legally good patent for a hand camera just now.

CYMRO BACH.—For neutralising the acid in the paper, bicarbonate of soda is to be preferred to the ordinary carbonate. For the fixing bath carbonate of ammonia is preferable.

T. DAVIES.—1. The experience is not exceptional. A solution of gelatine, by repeatedly being heated, gradually loses its setting properties. 2 We have not heard the rumour. We doubt if it has any foundation in fact.

HIGH PEAK.—You will succeed better in cleaning the Daguerreotype if you employ a stronger solution of cyanide, and allow it to remain on for only a shorter time. The tongue ought not to be allowed to touch the picture.

LIGHTS.—We have known white spots occur on prints such as yours, by tiny air bubbles attaching themselves while in the water. Try the effect of sponging one or two, while otherwise treating the remainder as usual.

C. J. W.—Probably the best photographs in imitation of sepia drawings are those produced by the carbon process, particularly when they are made by the single transfer method on rough drawing-paper, either white or tinted.

E. MARTIN.—A level, such as shown in the sketch, will prove useful to photographers and others, but we attach a good deal of importance to the opinions expressed by the Sheffield makers. Better submit the matter to some of the more energetic London supply firms who advertise in our outer columns.

BIRMINGHAM.—If the paper has a metallic lustre and shows metallic spots when purchased, it should be returned to the vendor. It will be quite futile to attempt to get anything like good prints on such paper. Probably the paper has been in stock for a long time; if not, its preparation was faulty. In any case, the user cannot remedy the evil.

F. M.—1. No copyright exists in Hogarth's engravings, nor does there in those of Bartolozzi. 2. There may be a copyright in a modern engraving or photograph of an old picture, though that in the picture itself has ceased to exist. In that case you may copy the picture, provided you can have access to it, but it would be illegal to reproduce the copy.

W. A. T.—1. Assuming the plate to have been rightly exposed, the pyro solution should be allowed to act, say, for a minute or so before the addition of the alkali. Development in separate solutions is practised by many experienced workers. You should study the *rationale* of development. 2. Swedish filter papers, to be obtained of any dealer. 3. See the toning formulæ given in the ALMANAC.

A. AMERLY.—If by your new process, whatever it may be, you can get a perfect relief in guttapercha, sulphur, or similar materials, there is no difficulty in obtaining a counterpart of it in metal by the electrotype method. Simply blacklead the relief and deposit the copper in the ordinary way. If our correspondent is not conversant with electrotyping himself, any professional electrotyper will do the work for him.

T. BROWNING.—To obtain permission to photograph any of the paintings in the National Gallery, application must be made to the Trustees. This can be made in writing. With regard to the Royal Academy, the exhibitors themselves must be consulted, or the holders of the copyright in the works if that has been disposed of; but, then, we surmise, the work, supposing permission is obtained, cannot be done till the close of the exhibition.

A. T. C. (Liverpool) says: "In works on the wet-collodion process it is sometimes recommended to acidify the silver bath with acetic acid and sometimes with nitric acid. Which is right?"—At one time, when pyrogallic acid was the developer used, acetic acid was generally employed; but, when iron came into use, nitric acid was, as a rule, adopted. For glass positives, by reason of its yielding a brighter image, it was employed from the beginning.

S. I. M. O.—If broken glass could be heard in the parcel before it was opened, the railway man's attention should have been called to it at the time, and the package opened in his presence. By signing the delivery-sheet without comment it is implied that the parcel was received in good condition. The County Court is the only legal remedy, if any, after so great a lapse of time. We should certainly, under the circumstances, have accepted the Railway Company's offer.

B. G. B. will be glad to know whether being a lady receptionist in a photographer's reception-room and wife of a photographer, disqualifies her for competing in amateur classes in photographic exhibitions. B. G. B. has been taking photographs, developing, retouching, and printing them entirely herself without any aid whatever. Being very fond of the work, she has been successful.—In reply, we fear that our lady friend will be disqualified as an amateur.

REPAIRING LEASE.—If the lease specifies that the outside of the studio and premises are to be painted twice, and the inside painted and repapered once during the term of tenancy, and this has not been done, the landlord's claim is quite legal. Through the lack of the painting the woodwork has possibly suffered more than it otherwise would have done, and that has caused the estimated cost of the repairs to be higher than they would have been. Before defying the landlord, as advised, better consult a respectable solicitor.

AN INQUIRER asks:—"1. Is it the place of the apprentice to make good accidental breakages? 2. If the master deducts money from the wages of the apprentice to pay for such loss, what action can the apprentice take?"—In reply: 1. Unless this is a condition in the indentures, we should say it was not, in the case of accidents. 2. Supposing the stoppage to be illegal, the apprentice, if he be under age, must sue the employer through his parent or next friend, we surmise. Perhaps some one better versed in the matter than we are will give their opinion on the subject.

LEWIS writes:—"I have made a lot of opalines with gelatino-chloride paper, which does away with the ordinary gelatine solution, but occasionally a few will begin to peel at the edges; is there anything I can prepare the glasses with to aid the two to stick? A man I know puts on a weak solution of silicate of soda, which has the desired effect of making the paper adhere. Does the silicate affect the permanency of the prints?"—We have had no experience in mounting gelatino-chloride prints as opalines. We see no reason why the silicate should influence the permanency of the picture. However, a weak solution of gelatine flowed over the glass, and allowed to set, would secure perfect adhesion, and that would certainly not affect the stability of the print.

ARTHUR JOHNSON says: "Having been greatly troubled with bubbles appearing on the prints in first water after fixing, I would be glad if you could tell me the cause and remedy. To prevent them I have tried borax in fixing bath, also methylated spirit in both fixing bath and first washing water after fixing, but with no diminution of bubbles. Strength of sensitising bath forty grains; also keep albumenised paper in a cool, damp place this hot weather, to prevent it becoming bone dry. Shall be very grateful indeed if you can help me."—There are several causes that conduce to blisters in albumen prints. Sometimes it is in the paper itself, sometimes in the albumenising, and at others in the sensitising. We should recommend the trial of a stronger silver bath. If that does not prove a remedy, adopt Mr. Richmond's plan, namely, immerse the prints, before washing out the silver, in a bath of methylated spirit. This remedy has never failed in our hands.

R. SHARP.—Calico, under the name of "unbleached sheeting," suitable for backgrounds, can be had up to seven foot six, if not wider, from any of the large drapers or house furnishers. Brown paper, so far as we know, is not sold wider than about five feet. Any paperhanger would canvas a frame and cover it with paper, which could afterwards be coloured for a background of any size that might be required. If the background is for outdoor use, to be fixed against the wall of the building, it might be better to convert the wall itself into the background, by having it cemented over and afterwards painted. That is often done.

PHOTOGRAPHIC CLUB.—May 24, *Halation, its Cause and Cure.* Bank Holiday Outing, Burnham Beeches and Stoke Pogis.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical Meeting, to be held on May 23, at 50, Great Russell-street, W.C. *The Daguerreotype Process*, a demonstration by Mr. W. England.

WE are informed that Mr. Thornton, of Messrs. Hunt & Thornton, Enlargers, 347, Lordship-lane, Dulwich, having retired from the business, it will in future be carried on by Mr. Hunt and his son, under the style of Hunt & Son, at that address.

Apropos of some recent articles on studio construction, Mr. Van Dyk, of 20, Ladbroke-grove-road, Notting-hill Gate Station, whose studio is built on the principle advocated by Mr. H. P. Robinson, will be happy to allow visitors to inspect it on production of visiting card.

LEYTONSTONE CAMERA CLUB.—May 20, Wanstead Park and Flats; leader, Mr. D. G. Riddick. The Club will proceed from headquarters at three o'clock. 24, Demonstration, *Reproducing Negatives*, by Mr. Alfred J. Newton. Chair taken at eight o'clock. 27, Zoological Gardens; leader, Dr. W. Pickett Turner. The Club will assemble outside Portland-road Station (Metropolitan Railway) at three o'clock.

MESSRS. G. HOUGHTON & SONS' 1893 Shuttle Hand camera has several improvements on the original pattern, including a speed accelerator to the shutter, a dial which automatically records the number of plates that have been exposed, and shutters for closing and opening the lens and finder-lenses simultaneously. The camera is now issued in three series—A, for holding twelve plates or cut films; B, for twenty-four cut films; and C, with twelve plate sheaths and twenty-four film sheaths.

THE summer ramble card of the Oldham Photographic Society is embellished with an excellent small group of the members of Council. The following extract from the card may give a useful hint to other societies holding outings:—"Parties of not less than ten third-class passengers are granted return tickets at a single fare and a fourth, upon giving two days' notice to the railway company. To take advantage of this concession, members who intend joining any ramble should advise the Hon. Secretary three days before the date of the excursion."

CENTRAL PHOTOGRAPHIC CLUB.—The capital of the Club Company is 1000*l.*, and not 100*l.*, as we stated last week. We are pleased to hear that a large proportion of the capital has been subscribed among well-known photographers and others, and that the list of intending members is increasing. The Hon. Secretaries—Messrs. W. Fenton-Jones, 12, King Edward-road, Hackney, and C. H. Oakden, 53, Melbourne-grove, East Dulwich, S.E.—will be pleased to receive applications for membership or answer inquiries.

A PHOTOGRAPHIC SOCIETY FOR WOOD GREEN.—A meeting was held at Wood Green on Saturday, May 6, to consider the advisability of forming an Association of those interested in photography and other scientific pursuits. It was unanimously agreed that a Provisional Committee be appointed, with power to add to their number, to make all the necessary arrangements for the formation of such an Association, and twenty-one gentlemen at once undertook the duties in question. It is proposed that the Association may be utilised by those wishing instruction in photography, and that under its auspices, during the season, there will be a course of popular lectures delivered by gentlemen of eminence in their respective branches of science. It was agreed that ladies be admitted as members. Forty-nine names were given in to the Hon. Secretary. Ladies and gentlemen desirous of joining the Association are requested to communicate with Mr. P. D. Coghill, 252, Wightman-road, Hornsey, or with the Hon. Secretary, A. S. Murrow, 32, Park-avenue, Wood Green.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1725. Vol. XL.—MAY 26, 1893.

NOTICE—PICTORIAL SUPPLEMENTS TO "THE BRITISH JOURNAL OF PHOTOGRAPHY."

The first of the pictorial supplements to be issued with The British Journal of Photography will be given with the number for Friday next, June 2, 1893.

The subject is *A Yeoman of the Guard* (Tower of London), the negative being by Mr. William Brooks. The reproduction is by the process of Messrs. Thevoz & Co., of Geneva, and it is printed on a specially prepared paper, which greatly enhances its artistic effect.

As a largely increased sale of the next number of the Journal is anticipated, the Publishers would be glad to receive orders for extra copies and advertisements as early as possible.

DAGUERREOTYPING REDIVIVUS.

The demonstration of the Daguerreotype process given by Mr. Wm. England on Tuesday evening, in the rooms of the Photographic Society of Great Britain, convinced those who witnessed it that, although care and skill were necessary, there was no difficulty in producing works of the greatest beauty by this discarded but ever-charming photographic process.

Unlike all other systems of photography, the personal skill of the operator is the sole factor in the achievement of success. In other methods much is dependent upon the productions of the manufacturer, as in the case of the collodion or the dry plates employed; but in this the elementary substances must be applied by the operator himself, and upon his methods of doing so depend the position he occupies in the technics of Daguerreotyping; for we are for the moment putting out of sight the artistic element, the skill in posing and arranging a sitter, or in selecting a point of view in a landscape.

In its simplest form, and as it left the hands of Daguerre, the process briefly consisted in exposing a metallic plate with a silvered surface to the vapour of iodine till it became yellow by the formation of iodine of silver, then transferring it to the camera to become impressed by the action of light, developing the latent image by exposing to the fumes of mercury, finally fixing by immersion in hyposulphite of soda solution, and washing and drying. This was the process as it emanated from Daguerre, but it was slow and required a long exposure in the camera; moreover, the image was delicate, and could not withstand the most gentle touch without being destroyed. Both of these objectionable features were speedily removed. An enhanced degree of sensitiveness was imparted by the employment of bromine in addition to iodine in sensitising the plate, while permanence (speaking from the mechanical point of view) was ensured by a species of gilding.

As we know that there exists a hankering among our readers to try the Daguerreotype process on account of certain qualities *sui generis*, we will here give some practical directions by which they can most easily do so without the necessity of importing special apparatus for their trials, for such now are not readily obtainable. In doing so we shall take occasion to speak of some of the bye-paths of the process not to be found in the recognised manuals of that art.

Daguerreotype plates, not being now articles of manufacture or commerce, can only be obtained as a bye-product from the stock of old-established dealers, or from others who may happen to have a few gross, or even dozens, by them as relics of former times. The copper backing is merely the support for the very thin facing of silver in which the picture is formed, hence the plate may be made of brass or any other metal capable of being electro-plated with silver. By whatever means obtained, it is essential that the surface be flat, and after being polished with rottenstone that it receive a high finish by a few strokes of a buff charged with dry rouge. Some prefer the use of lampblack, which, to ensure freedom from grease, should be heated to redness before being bottled for subsequent use. A flat-bottomed vessel of glass or porcelain is necessary for holding the iodine. In proper iodine boxes this pan is encased in wood with an opening in one side to hold a small mirror which, when the plate has been laid face down in a holder over the top of the box, enables one to watch the progress of sensitising, for, after a little dry iodine has been placed on the bottom of the box and the plate exposed to the vapour which arises therefrom, the pure white silver rapidly acquires a golden tint, which passes to a deeper colour on to blue. At the yellow stage the plate is ready to be placed in the camera, provided the subject is a landscape or a copy in which the time of exposure is no object; but for portraiture an enhanced sensitiveness must be given, to which end it is only necessary to transfer the plate from the iodine box to a similar one containing either a little bromine greatly diluted with water enough of which to cover the bottom of the dish being sufficient, or, by preference, lime, to which a few drops of bromine have been added, and shaken up till the whole is of a uniformly pink colour. When the plate is iodised to a deep yellow bordering on rose, and is then bromised to a blue, it has attained great sensitiveness, and a curious thing is that it may be examined at this stage by a light sufficiently strong to entirely destroy it for photographic purposes, but the effects of which exposure are totally destroyed by holding it over the iodine fumes for a few seconds, when the maximum of sensitive-

ness is thus attained. When in the camera and the sitter is seen to have moved during the exposure the value of this will be apparent, for all that is necessary to undo the latent image is to step into the dark room and hold the plate for a second or two over the iodine, when it may be again exposed, the sitter not having left his chair during this bye-play. This is an advantage not to be lightly esteemed. Just here let us pause for a moment to say that some of the finest Daguerreotypes we have seen were made without proper iodine and bromine boxes, ordinary porcelain jelly or jam pots having been used as substitutes, the progress of the sensitising being watched by lifting up the plate and examining it directly.

The development is effected by exposing the plate to the invisible vapour arising from mercury which has been heated to a little over 100° Fahr. The hotter the mercury the quicker the developement, and *vice-versâ*. This discovery is said to have been made by Daguerre's having by the advent of evening placed a half-exposed iodised plate in a drawer over night, and finding in the morning that the image was visible, a search in the drawer revealing the fact that some globules of mercury previously therein had still found lodgment in the chinks. Proper developing boxes have a thin iron bottom with a cavity in the centre for the mercury into which a thermometer bulb dips, the tube of which is carried outside to a scale graduated from 100° to 120°. A spirit lamp placed underneath heats the mercury, and a small square of glass in front near the top enables the progress of development being watched, the plate being placed in a frame on the top and fixed at a slope. A yellow pane in one side permits the flame of a lamp or gas to illuminate the plate while development proceeds. It is here where the skill and experience of the operator comes in, for, if the development be carried too far or not far enough, the picture suffers.

The fixing is done with hyposulphite of soda; but, in course of considerable experience with the process, we found a rather weak solution of common salt answer rather better. All that is necessary with this latter agent is to immerse the plate in the solution and touch it either at the back or one edge with a strip of zinc, when the iodide will disappear like magic. The hyposulphite acts by dissolving the iodide, this by decomposing it. Without allowing the plate to dry, it is then rendered permanent by the application of gold. A soluble salt of gold, composed of hyposulphite of soda and chloride of gold (*sel d'or*) is applied to the surface after washing, enough being poured on the levelled plate to cover it completely. Heat is then applied underneath by the spirit lamp, when, curiously, the image darkens almost to disappearance, which will alarm the tyro; but a slight continuance of the heat causes the darkening to disappear and the image to stand out in a brilliance it did not formerly possess. The lights have now become much brighter, and of a peculiarly delicate pearliness, while the blacks have become intensified; and, whereas formerly the whites and all parts of the image could be removed by the feeblest touch even of a hair pencil, they are now so fixed as to be irremovable unless by polishing powder. Instead of effecting this by heat, it suffices to add a modicum of ammonia to the hyposulphite of gold solution, when the same result is obtained by time—say, ten minutes.

The brilliancy of the image may also be much improved by pouring on the surface a solution of chloride of ammonium and applying heat, by which the solarised portions, which otherwise would be of a bluish colour, become a pure white.

We recommend those specially interested in this suggestive and charming process to visit the rooms of the Photographic Society of Great Britain, and inspect Daguerreotype apparatus of the most approved construction, together with numerous beautiful specimens of Daguerreotypes, coloured and uncoloured, which are there on exhibition, where they will remain for the next month.

THE PERFECT FIXATION OF NEGATIVES.

Considerable stress has been laid upon the necessity for the perfect fixation of gelatine negatives, not only so far as regards the removal of the unaltered silver haloids, but also as regards their conversion into completely valuable bye-products that are capable of elimination by subsequent washing. In order to effect this, it is usually recommended and considered sufficient to allow the negative to remain in the hypo solution for a certain period after the apparent removal of the silver bromide, in order that the more soluble form of the double hyposulphite of soda and silver may be produced.

But there is one peculiar condition of the film, or it may be of the fixing solution, in which mere continued immersion fails to bring about the necessary clearance; and, as we do not remember to have seen special attention directed to this particular phenomenon, we take occasion to notice it here, on account of the increasing liability to its occurrence that the use of thick or double film entails. Most users of gelatine plates, particularly in the earlier days of their preparation when less attention was paid to the evenness of their coating than is now the case, will have noticed, and perhaps been puzzled, by the occurrence of a yellow or brown skin over a portion of the negative some little time after it has been printed from, although when first put out no such discolouration was apparent. In some instances where a more than usually thick corner or edge occurred, the fixation of that portion of the film would be unduly protracted; and, even after the disappearance of the insoluble silver salts, an opalescent appearance would remain in the shadows of the negative quite different from that of the haloid salts.

The phenomenon that we refer to consists in the presence of such an opalescent veil over the whole surface of the gelatine film however thin and even, and which remains even after a more than usually prolonged soaking in the fixing bath. We have noticed this peculiarity in years gone by, and studied it in connexion with certain brands of plates that seemed more prone to it than others, although even they were not invariably attacked by it. On the other hand, it has cropped up unexpectedly with plates that did not usually show it, and with scarcely any clue to guide us as to its cause. Finally, we have recently renewed an acquaintance with it in conjunction with the specially thick films that are now coming into vogue.

It is not, we would have it at once understood, the result of imperfect fixation in the ordinary sense, that is either from too short an immersion in the hypo bath or the use of too weak a solution or one that has become exhausted. On the contrary, if anything, it is more likely to appear with a strong and fresh solution than one that has been in use some time. Nor is it the result of precipitation in the film by the imprudent use of alum or acid "elimination," although in result the appearance is very similar. It seems rather to be due to the deposition in a partially crystalline or precipitated form within the pores of the gelatine of the products of the fixing operation, and in such a condition that temporarily they are not

readily acted upon either by the fixing bath itself or by plain water.

We first noticed the peculiarity some ten years ago, though without considering it a fault, in a particular brand of rapid plates. In these, after fixation, or rather after removal from the fixing bath, the negative presented the opalescent appearance in the shadows to such an extent that it almost seemed to have been treated with some semi-opaque varnish, and this effect was rather intensified than diminished by prolonging the fixing. But directly the plate was washed, especially if under a rose or tap, the veil disappeared, and the shadows became as clear as the glass itself.

Some time after that, we noticed a precisely similar behaviour on the part of some plates of our own make, the emulsion having been prepared by a peculiar modification of the ammonia process. Whether that circumstance had any bearing on the result we cannot decide, but it is a significant fact that it is chiefly with rapid plates, and since the introduction of the ammonia process of preparation, that the peculiarity has been noticed.

In our earlier experiences, as we have said, the opalescence disappeared entirely and without trouble in the ordinary course of washing; but, just recently, we have met with it in an aggravated form, in which simple washing has absolutely no effect whatever. In fact, we have a negative which, after washing for half an hour or so, was found to be veiled in this manner, and was returned to the fixing bath, but without result. No alum or other matter had been used, and, though nothing out of the usual way had occurred to cause such a result, we were inclined to set it down to a precipitation of lime in the gelatine. The plate was, however, well washed for several hours and dried, by which time a decidedly yellow tint pervaded it, and this, after a very short time in the printing frame, developed into a strong brown stain.

Now, at any rate, the matter began to assume a serious aspect, for we found several other negatives beginning to show similar symptoms. A fresh strong bath of hypo was made, and the result was decidedly worse. Believing that the temperature might be in fault, the bath was artificially raised to nearly 70° Fahr., when the veil was reduced, but did not wholly disappear. As before, neither prolonged immersion in the hypo nor washing effected any improvement, and we began to suspect the hypo; but this was from precisely the same stock that we had been using without trouble for a long time past, while it was only with the particular lot of plates that it acted in this manner! So we were forced to lay the blame, if blame there was, to the plates, and to seek a remedy.

After beating about the bush for some time, we found that the trouble arose mainly from the use of too strong a fixing bath; that is to say, that in increasing the strength of the hypo, in order to fix the thicker films within reasonable time, the other trouble was set up; in reducing the strength of the bath a perfect remedy for the opalescence was found, but then we had to face an inordinately protracted fixing. However, this difficulty was surmounted by fixing in the strong bath raised to the temperature of from 60° to 65°, and afterwards removing the plates to a much weaker solution of not more than three or four ounces of hypo to the pint of water.

Another remedy was subsequently found in the acid fixing bath, that is a solution of hypo containing free sulphurous acid. The particular bath we prefer is made by adding two or three ounces of bisulphite of soda to the strong bath of eight ounces of hypo to the pint.

Whatever the material may be that composes the veil, it seems to be mechanically combined with the gelatine in such a manner that the *dense* hypo solution cannot penetrate to remove it. Water has no effect, and it is only by reducing the strength of the fixing solution, and thus giving it greater penetrating power, that it is reached. The free acid, we assume, prevents the formation of the precipitate in the first place.

PHOTOGRAPHY AS A BUSINESS PAST AND PRESENT.

It is, we believe, generally admitted that photography, commercially, so far as regards portraiture, is at the present time in a very depressed condition. Any one conversant with professional photography during the past thirty years can recall a gradual sequence of events that have conduced to this more or less unsatisfactory state of things. It may, however, be interesting, if not useful, to our younger readers to refer to some of the points that have led to the depreciation of portrait photography as a business. Let us go back to the early days of collodion, say, to the time when it had generally superseded the Daguerreotype.

Up to about 1855 the collodion process was more largely practised for glass positives than it was for negatives. Then the price generally charged for a small positive was from half-a-crown upwards. Several houses who worked the negative process then charged from three to four guineas for a whole-plate portrait. This was almost invariably on salted paper, and slightly finished in monochrome. About this time a firm commenced business in the City, and made a speciality of whole-plate portraits on albumen paper for half a guinea, and copies at about three shillings each. Another firm followed soon afterwards with the whole-plate at the same price, and with the half-plate at five shillings, and the quarter at half a crown, with duplicates in each case at half price. These were then classed by some of the older houses as cutting prices. For some time after the *carte-de-visite* became popular, prices were well maintained—they varied from about twelve shillings to two guineas per dozen, and very large businesses were done at these rates, some establishments taking fifty and upward sitters a day. One house at the West-end we have in our mind did a large business in vignetted *cartes*, the price being a guinea and a half for six. Then *employés* all round were paid liberal salaries.

Perhaps the first real step in reducing prices was the introduction of the club system. This, as at first worked, was not so very objectionable. By contracting to take tickets for a dozen portraits—each of, say, twenty persons—a reduction of twenty or thirty per cent. off the regular tariff was made. Competition in this phase of the business soon increased, and eventually the recognised club system, with its enlarged coloured portrait, came into vogue in second and third-rate houses. *Par parenthèse*, this innovation has now culminated in the "Coupon" business, in which a dozen portraits each of four sitters are supplied for ten shillings. This was in the collodion days, and, as we have just said, *employés* were, as a rule, well paid, for they had to possess greater knowledge and ability than is requisite for analogous work at the present time. The plates had to be prepared at the time of using, and considerable skill—only gained by long experience—was necessary in the preparation of the chemicals and in keeping them in the best working condition. Consequently at that time experienced hands were seldom long disengaged.

Twenty years or so ago a good-class photographic business could be commenced with a much smaller capital than now, as then more modest furniture and fittings sufficed. Quality of work counted for more than the appearance of the appointments, and this led many operators to commence business on their own account, generally with prices below those of their former employers. Still, while collodion was the only process, trade, on the whole, notwithstanding competition, continued good and fairly remunerative to most engaged in it.

It is often said that, in the early days, the cost of material was higher than it is now. That is true, but only to such a trifling extent as not to make more than a penny or two difference in the cost of a dozen pictures; indeed, it is doubtful, if the cost of mounts and finishing is considered, if it was so much as now. Good plain white cardboard, with a plain black imprint of the artist's name and address, sufficed for the most expensive portraits. At the period when the highest prices ruled, retouching—an important item in the cost of portraits—was unknown. Hence it will be noted that when prices were at the highest the cost of production, except, perhaps, for labour, was at the lowest.

The introduction of gelatine plates has been of immense advantage to photography. Of that there is no question, but whether it has benefited it from a business point of view, as regards portraiture, is open to question. With a few months'—in some cases weeks'—practice with dry plates sufficient experience is acquired to enable some people to style themselves operators, and offer their services as such. Consequently, the labour market, as advertisements show, is much overstocked, hence reduced wages. Added to this, a system is largely prevailing of obtaining labour for nothing, or next to it, by taking "articled pupils," apprentices, and learners for a term of years, with a premium, at a merely nominal salary. This system is not confined to operators and printers, but extends even to girls for such subordinate work as mounting and spotting. This, of course, has not only brought down wages, but keeps experienced hands out of employment. It may, however, be mentioned that it is not the cutting houses that resort to this means of obtaining cheap labour, they find it more to their advantage to employ experienced hands.

The present unfortunate depressed state of business amongst portraitists is mainly brought about by the continued influx into the ranks of photography both of employers and *employés*. It has induced undue competition in every direction. Prices have been gradually reduced lower and lower, except, perhaps, in some few high-class establishments, that, unless a large business is done, they are no longer remunerative. Added to this, the demand for portraits is far more restricted now than it was some years ago. The contrast between portraiture as a business now and a few years back is great. How is it to be reduced?

Reducing Silver Chloride to the Metallic State.—In conversation with the chemist of one of the most important assay offices in the country, he informed us that, for showing this on a large scale, not for analytical purposes, he greatly preferred the use of iron to zinc. He found it most difficult to remove the last traces of the latter substance, while with iron he experienced no difficulty.

New Filter.—The *Scientific American*, a short while since, described a new filter which, though intended for water for potable use, would be equally serviceable for photographic purposes. It consists of a large porous tube made of exceedingly fine mineral flour; the water is filtered by passing through the minute pores of the cylinders into a compartment below it, into which the cylinder is fitted, the water passing from the outside to the inside of the cylinder. The latter, when beginning to work less freely, can be cleaned by simply brushing the outer surface. The filter as constructed for sale embraces an arrangement for holding ice to cool the water during filtration.

Testing for Bromine, Chlorine, and Iodine.—There is a useful practical note on this subject in the *Journal of Applied Chemistry*, by Mr. F. P. Dunnington, which gives the necessary routine in a nutshell. His process is as follows:—"From a solution acidified with nitric acid, precipitate the silver salts of these acids with silver nitrate solution. Having filtered off and washed this precipitate, test it in a test glass with a few drops of very dilute sulphuric acid on a bit of zinc. When the dark spongy mass of metallic silver is formed, pour off the solution of the zinc salts and examine it for iodine, bromine, and chlorine by the method of Professor Edward Hart."

Mr. Whipple's Successor at Kew.—The post rendered vacant by the loss of the Superintendent, Mr. Whipple, whose lamented death deprived science in general, and photography in particular, of a valuable helper will be filled by Mr. Chas. Chree, Fellow of King's College, Cambridge. It is "one for which," as *Nature* says, "the combination of high mathematical capacity with a practical experience of the apparatus and methods of physical research is especially needed. Mr. Chree obtained in 1884 the hitherto unequalled honour of a First Class in the most advanced parts both of the Mathematical and of the Natural Science Triposes, and he has since been much engaged at Cambridge in experimental and mathematical researches." It is, therefore, evident that the latest additions to the Kew examinations of philosophical apparatus—that of photographic lenses—is not likely to be of any the less value from his accession to office.

"Safety Paper" for Bank Notes, &c.—The *Paper World* does not take sufficient account of photography. We read in its columns that "the large and continually increasing demand for paper which cannot be duplicated by unauthorised parties for use in printing certificates of bonds, drafts, or notes, has led to the production of peculiar designs." It then goes on to describe a new patented process for making paper of this description which is said to produce designs of such infinite variety of configuration and shade that reproduction, except from the original plate, is practically impossible. The process is ingenious enough; it consists, in effect, of applying the inked faces of two lithographic or other surfaces, when varieties of more or less regular smears will be produced; and they can then be printed from to form the ground pattern. It will occur to any reader of this JOURNAL that such a pattern is one, above all others, that could be reproduced with absolute fidelity by means of photography, and in any colour.

Solution of Gold in Cyanide of Potassium.—The last issue of the *Chemical Society's Journal* contains the full text of Mr. R. C. Maclaurin's paper on this subject. The conclusions he arrives at are that, first, "the presence of oxygen is necessary to bring about dissolution; and, secondly, depends upon the strength, a remarkable fact being that the maximum amount lies between the weakest and the strongest solutions tried." It has been recommended that the gold from waste albumen prints might be recovered by the aid of cyanide, the prints being allowed to soak for some time in the solution, then pressed to expel most of the liquid, and the gold recovered by the addition of a suitable reducing agent. There is no doubt that a large amount of gold passes into the "hypo" solution used for fixing prints, and may be satisfactorily recovered, for we have seen assay notes for silver so reduced by eminent refiners in which the value allowed per ounce for the silver has been, on account of the gold present, almost ten per cent. "above" that given for the silver from chlorides.

MM. LUMIERE'S EXPERIMENTS IN "COLOUR PHOTOGRAPHY."

PENDING the publication of the precise details of the modification of M. Lippmann's plan, adopted by Messrs. A. & L. Lumière in their recent experiments in colour photography, the results of which have caused some slight commotion in Paris and elsewhere, the following particulars of the sensitive emulsion employed, which were supplied by MM. Lumière in a paper recently contributed to the Société Française de Photographie, may be of interest. The novelty, or point of departure, in the preparation of the emulsion consists of mixing gelatinous solutions of silver nitrate and potassium bromide, as recommended by Herr Valenta, of Vienna.

The emulsion was constituted as follows :—

A.

Distilled water	400 parts.
Gelatine	20 „

B.

Distilled water	25 parts.
Potassium bromide	2·3 „

C.

Distilled water	25 parts.
Silver nitrate	3 „

One half of A is added to C, and the other half to B, the silver solution then being added to the bromide.

The emulsion is then treated with a solution of a colour sensitiser, such as cyanine, methyl violet, or erythrosine, the plate being coated with the emulsion at a temperature of 40° C. When the plates are set, they are passed through a bath of alcohol, and are washed in water for a brief period, the films being very thin.

This method, according to Herr Valenta, obviates coarseness of grain, and gives a film of great transparency. A too great excess of bromide is to be avoided.

When the plates are dried, they are treated for two minutes with the following solution :—

Distilled water	200 parts,
Silver nitrate	1 part,
Acetic acid	1 „

which augments the brilliancy of the image and increases the sensitiveness of the plate, which, however, loses keeping properties. The plate is again dried, and exposed according to the method given by Professor Lippmann.

The developer employed by MM. Lumière is as follows :—

1.

Water	200 parts.
Acid pyrogallic	1 part.

2.

Water	100 parts.
Potassium bromide	10 „

3.

Ammonia	D = 0960 at 18° C.

The developer being thus mixed :—

1	10 parts.
2	15 „
3	5 „
Water	70 „

The importance of a standard solution of ammonia is clear, as the least variation in strength affects the results. After development the plate is washed and fixed in a solution of cyanide of potassium, 5 to 100. MM. Lumière say that a developer consisting of an ammoniacal solution of copper chloride has given them good results, but they have had to abandon it on account of its instability.

MM. Lumière added that in photographing coloured objects the ultra-violet rays were cut off, and the violet and blue diminished by placing in the path of the luminous rays, in the camera, a vessel with parallel faces, containing a solution of yellow colouring matter, such as Victoria yellow, uranine, or primuline. This was how they obtained the results that have been recently referred to.

AMERICAN NOTES AND NEWS.

Peculiarities of American Journalism.—The American journalists have a neat way of imputing to their rivals any departure from such a branch of ethics as takes cognisance of the coincidence of phrase with fact. One of our New York contemporaries, the *Photographic Times*, is in his current issue admonishing his brother who edits *Wilson's Magazine* for his mal-ethics in recording something of minor and local interest. He does not stoop to that directness of expression not unknown to or unpractised by some accredited journalists in the south and west of the American continent, and which provokes the rejoinder, "You're another," but mildly states that the flagellated rival is losing his sight and must be provided with spectacles. And why? Because they are not agreed as to the titles on a row of books in the background of a portrait, said titles being altogether illegible. It is the scene in the war between the Big-endians and the Little-endians (*vide Gulliver's Travels*) enacted over again.

The Philadelphia Exhibition.—There can be no doubt that the recent Photographic Exhibition in Philadelphia must have been a good one. The names of the competitors in the catalogue, and the critique in the *American Journal of Photography*—a model of terseness—assures us of that. It appears, however, that the exhibits from this country stood out in commercial contrast with those from America, inasmuch as a preponderance of the former were labelled "For Sale," whereas the latter were not; and it is said that the pictures of the two nationalities could be distinguished each from the other by this label alone without necessitating an appeal to the catalogue. But has it not long since been said of us that we are a nation of shopkeepers? It behoves us to speak quietly of the Customs Taxes levied in America on goods entered for exhibition, but which are at the same time "for sale." Of the twenty-six medals (silver) awarded, one went to Germany, while thirteen came to the United Kingdom, the other twelve being captured by Americans. The Photographic Society of Philadelphia are certainly entitled to the honour of having issued the finest and most ornate catalogue yet known in the history of the art science. It is adorned with six full-page illustrations by members of the Society.

The Photographers of America.—A firm of engravers and publishers in Chicago are about to prepare a work on the photographers of America. They anticipate that at least 5000 photographic artists will visit their city during the Convention of the Photographers' Association. It is to contain the portrait, name, address, and biography of every photographer who subscribes five dollars (1*l.*, payable in advance), who in return will receive a copy of the book, which is to be got up in the highest style of the art, printed on heavy enamelled paper, bound in gold and black, 12 × 9 inches in size, containing at least 400 pages and twenty full-page illustrations from prize photographs. Each photographer furnishes his own portrait and biography, the engraving being done at the expense of the Company. Three hundred and sixty dollars (over 70*l.*) are to be given in prizes for the best pictures entered for competition.

The Kodak Victory.—It is known that for some time past an important lawsuit has been going on in the United States of America. The Rev. Hannibal Goodwin, of Newark, N.J., claimed priority in certain processes in the manufacture of sensitive films as employed by the Eastman Company, and he went for the latter in the law courts, in one of which he gained the day. But the decision has been reversed by the Commissioner of Patents, who, it seems, has decided not to grant Mr. Goodwin his patent. Probably by this decision something like a million dollars will remain undisturbed in the coffers of the American Eastman Company.

METOL.

WITHOUT committing oneself to the absolute statement that the last new developer is better than anything before it, it is, perhaps, possible

to claim that it possesses good features that none of its predecessors do. I have tried most of, if not all, the modern introductions that have been intended to supplant pyro, but have not yet found the one that will, to my idea, do so. In metol I think we have the nearest approach to a developer possessing the same range and power as pyro, while it is undoubtedly free from the objectionable features of the latter, notably its dreadful staining proclivities.

It has, however, I think, one feature which will be considered by many a decided advantage over pyro, a feature which, although I am not a believer in "one-solution" developers, I cannot help recognising as having its value. I refer to the power it gives of modifying the character of the image by simply varying its strength without altering the proportions of its constituents. This is a quality possessed to some extent by pyro, and, indeed, more or less by all the newer candidates for favour; but in none, so far as my experience goes, is the range of power so great as in the case of metol. By varying the proportions of the stock solutions (where separate solutions are employed) as recommended in the formulæ issued with the metol, a great alteration can be made in the character of the image; but this is, of course, impossible where a one-solution developer is employed. In this case, however, if the stock solution be made of such a strength that, used alone or with a given proportion of water, it represents the highest degree of energy desirable, and with a given exposure renders the greatest softness, simple dilution with a further proportion of water will effect all that is necessary in the way of giving greater contrast.

As regards the necessity for the use of bromide, although I am always partial to a small addition even in commencing development, I think metol shows less absolute want of such addition than any other. For short or normal exposures, indeed, if the dish be well shaded during development, I can see little difference if the bromide be omitted from the solution until all the details are well out; at that stage, or where intensification begins, bromide is a necessity with every developer, but more especially with pyro. On one occasion, after mixing up a fresh stock solution of soda with hot water, I inadvertently applied the mixed developer in a quite lukewarm state, but the only effect was that the image appeared almost instantly and developed as rapidly as one on collodion. A strong addition of bromide, however, instantly checked it, and brought it within easy management.

Those who are not greatly enamoured of one-solution developers are more likely to take to the system with metol than with any other, for, strange as it may appear, repeated use to the extent of three or four times, at any rate, does not seem to greatly alter its action. But a better plan than relying on the single solution, where economy is to be practised, is to employ two separate developers, or one developer and one intensifier. Thus, say, half a dozen plates are to be developed, I would set aside one portion of developer sufficient, to cover the plate, with which to bring out the details of the picture, using it at its full energy. To another portion, in more dilute form, I should add a few drops of a ten per cent. solution of bromide, and use that as the intensifier, as it will continue to operate upon the image after the details are out without any further development.

This plan can be followed either with single or separate stock solutions, and, if only half the work of finishing the negative be thrown upon each of the two working solutions, they will hold out very well for half a dozen developments, provided always the exposures have been sufficient. In my own way of working, I prefer to use a fresh quantity of solution for each plate, and this I apply at full strength—*i.e.*, the fullest working strength—until details are out, and then dilute it according to the appearance of the image, adding promide as the action proceeds. The latter must be carefully used, as it is very powerful in stopping the action of the solution on the finer details, and if added in excess will produce hardness.

The published formulæ for use with metol are rather puzzling in their nature, but may be greatly simplified. I take it that for normal development from two to three grains of metol, and about twenty grains of carbonate of soda to each ounce, form suitable proportions. If a stock solution of metol containing six grains of that substance and a drachm of sulphite, and one of soda crystals containing two ounces to the pint, be used, they may be conveniently mixed to form any desirable combination. Let the stock solution be :

A.

Metol	120 grains.
Sulphite of soda	1200 grains.
Water	1 pint.

B.

Soda crystals	2 ounces.
Water	1 pint.

For normal development use equal parts, and add a little water if the subject is one that wants contrast. For under-exposure use more of A than B, and *vice versâ*, bromide also being added in ten per cent. solution in the latter case.

A single-solution developer, where such is preferred, is made as follows :—

Metol	120 grains.
Sulphite of soda	3 ounces.
Soda (crystals)	2 „
Bromide of potassium	10 grains.
Water	20 ounces.

One part of the above diluted with an equal volume of water forms the normal solution, more or less water being used in proportion to the length of exposure. W. B. Bolton.

JOTTINGS.

To call an exhibition of photographs a "Photographic Salon" is a piece of affectation bordering on snobbishness. To add another to the already plethoric number of photographic exhibitions that are held in the autumn in and about London invites and deserves failure. To run an opposition show to the Photographic Society's Exhibition practically at the same date and only about 500 yards away is the mean revenge of a vindictive clique still smarting under their whipping of two years ago, and made furious by the circumstance that the Society they deserted is getting on better without them than with them. To say that the photographs to be hung will be of "pictorial merit" only, and will be selected by a Committee, chosen, of course, by those we can all easily guess at (with power to add to their number), and that therefore "the puhlic" will have an opportunity of seeing "the best productions of photography from a pictorial point of view," implies that no such opportunity has before been given to "the public," which is untrue.

Habitual readers of these "Jottings" will remember that I foreshadowed the "Photographic Salon" last August—nay, even gave the name of the street in which it is to have its home, Piccadilly. On one point connected with it I was, however, wrong—namely, as to the medals. There are to be no awards, it seems. But, to make up for their absence, I know what will happen. The organizers of the Salon will pay special attention to the representatives of the lay press, and trade upon their ignorance to secure effusive and puffy notices, so that the public may be deluded into the belief that the Salon really has a monopoly of the "best productions of photography," and this of course will send up the commercial value of the pictures, arrangements for the sale of which will be made "at a commission of fifteen per cent." I wonder who will do the *Times* notice? Mr. Maskell?

That the Photographic Salon is a deliberate and carefully planned attack on the Photographic Society's Exhibition nobody can deny. This is a free country, thank goodness! and I am sure the Society and its friends are not the people to be dismayed by a little opposition, so long as it is of a fair and legitimate nature. But that of the Photographic Salon is not. The support which the malcontents and their satellites are giving to it is a thing which causes no surprise, but there are many other persons on the Committee whose presence there I cannot understand, except on the ground that the Society, according to their ideas, *has* neglected "pictorial merit," and has *not* shown "the public the best productions of h ography from a

pictorial point of view," a proposition which, of course, is absurd. Hence the Society has a grievance at seeing so many of its best men in league with its enemies, and I therefore beg to invite the various members of the Photographic Society of Great Britain who are on the Salon Committee, to explain to the photographic public how it is that, having themselves been successful exhibitors, or judges, of the Photographic Society for years past, they are now supporting a rival show whose only claim to attention is the coolly impudent way in which it is trying to arrogate to itself the right or duty of taking "pictorial merit" in photography under its wing? The attitudes of these gentlemen are so equivocal that explanation is almost imperative in the interests of their own reputations.

"Audacious Operator," in the JOURNAL for April 28, does me the honour to ask me for a "critique to the point" on the question of the determination of the speed of plates, and at the same time he points out with some force that the sensitiveness of a plate probably varies with its age, but that the speed number originally given to it remains. The vastness of the subject deters me from attempting to tackle it in the course of a single paragraph, and I can therefore only deliver myself of a brief reference to it. By far the larger quantity of dry plates made are manipulated by professional photographers and habitual plate-users, among whom I fancy the only kind of plate speed required is uniformity of rapidity. Let a dry-plate maker send out plates which do not appreciably vary in speed and quality, and the photographer will be quite content to work them without the assistance of speed and sensitometer numbers. It seems to me that the adoption of different speed numbers for each batch of emulsion made puts a premium on irregularity of rapidity without assuring that the relative rapidities with which the plate boxes are marked will be confirmed by the camera test. Thus it is conceivable that a given brand of plates may, within the space of a few days, possess half a dozen degrees of sensitiveness, and be put on the market by the maker without a pang, whereas in pre-Hurter & Driffield days he might have hesitated to use an emulsion which showed an appreciable decrease or increase of sensitiveness for a plate of standard rapidity. Both sellers and buyers would, I fear, be likely to be confused by the multiplication of speed numbers which would follow upon the universal adoption of the Hurter & Driffield system, which, however, is not likely to happen yet.

I must thank Mr. H. W. Peal for his courteous reply to a former jotting of mine, asking for evidence upon which he based a statement that amidol allowed one to reduce the exposure to about one-third that required for pyro. It seems that Mr. Peal was not comparing the two developers for general work, but for very slow plates used for copying, the pyro developer against which amidol was pitted being, he says, very well restrained, the amidol having only a very small quantity of bromide. This, of course, is no comparison, and had Mr. Peal been reported in the sense in which he writes I should not have commented in the matter. Amidol will no more allow a photographer to successfully give a third of the exposure required with pyro than hydroquinone, as claimed upon its first introduction a dozen years ago, will allow him to give one-half. I have proved both statements wrong by simple experiments; and as regards amidol—which possesses many good points, especially in rapidity of working, suitability for bromide paper, and possibly some advantage in bad cases of under-exposure—the opinion I expressed a month ago as to its not allowing one to reduce exposures for pyro two-thirds is curiously confirmed by one or two speakers in your report of the meeting of the London and Provincial Photographic Association for May 4, which is given on page 301, May 12.

In pointing out that a plate which has been simply exposed in the camera and, without development, fixed, leaves a deposit which may be intensified as it were by acid development, Mr. Hermann Schnauss, in his paper on *Physical Development*, suggests the equally interesting fact of the known difficulty of entirely destroying the developed image in a plate. I have applied all kinds of reducing solutions to gelatine negatives without obtaining perfectly clear gelatine free of some kind of deposit which did not admit of slight accretion under intensification. An image of some sort remains behind, the precise nature of which is open to doubt, although it is possibly a compound of gelatine and silver. This opens up a field for speculation as to whether development is responsible for the whole of the deposited image, or whether the exposure does not at once reduce a portion of the haloid to metallic silver in some unfamiliar form, which at once enters into combination with the gelatine, the development of the sub-salt acting as an intensifier of the original image, to which the term latent is therefore a misapplication. At any rate, the undoubted presence and persistence of the undeveloped and developed impression in a plate seems to me to be a point worthy of notice in any theory which seeks to explain the nature of the photographic image.

The idea of the Manchester Photographic Society in providing a large camera, with the "usual trimmings," for the use of members, on the co-operative principle, is one that other Societies might adopt. Most photographers at some time or another feel the want of a large camera, and, if it could be obtained from their Photographic Society, the small fees charged would help to pay for its cost. Optical projection and enlarging apparatus are also things which every amateur cannot afford to possess himself, and for the loan of which he, no doubt, would be willing to pay a fee to his Society. When such things are wanted, they are wanted badly. Certainly Photographic Societies could do worse than add to their attractiveness and usefulness in such a direction. As regards a large camera, I should think it only the correct thing for a Society to possess a camera of its own for official use, as, in case an exposure by artificial light is desired to be made, it is a handy thing to have. Might it not also be an inducement to beginners to join a Society in which a camera was kept with which they could take their first plunge into the small sea of troubles which photography has in store for all its votaries? A further addition to the usefulness of Photographic Societies would be the general adoption of a systematic plan of laboratory and field instruction for novices, such as I am glad to see put in practice by the North Middlesex and other Societies.

I rub my eyes at reading a complaint of frilling in your last number. I do not think that Mr. Lambert's suggestion that the evil of which he has had such recent experience, after all of us had grown to regard it as a thing of the past, can be, except in extreme cases, due to the cutting of the plates. Otherwise every quarter, five by four, half, seven and a half by five, and the many intermediate "odd" sizes issued from the manufacturers would be open to suspicion on that account—an idea which does not hold water. COSMOS

SELECTIONS.*

THE SKY PORTION OF A LANDSCAPE.

WE will now consider the treatment of the sky portion of a landscape. Many photographers capable of doing most excellent work content themselves with turning out prints with white, or only slightly tinted, skies, instead of supplying proper cloud effects. The trouble of adding these is so very trifling, in comparison with the improvement they effect, that I am surprised not to see them more universally adopted than they are. Cloud negatives themselves are very easily made, although there seems to be a genuine and wide-spread idea that cloud photography requires some special skill, different from the usual kind. Given clouds, it is quite as easy to photograph them as anything else, perhaps more so. The only *imperative* condition is *absence of haze*. A white dress, covered with white lace, is infinitely more difficult to deal with; only, start fair, knowing the kind of negative wanted, which will be a thin one, with good contrasts. Stop the lens down to *f*-64, use a moderately slow-backed plate, and give about half a second exposure. Use a well-restrained developer, and the thing is done. A very rapid plate, with a drop shutter exposure, will *not* produce such *suitable* negatives *for printing-in* skies as the slower process.

Plates containing iodide are to be preferred. One precaution is never

* Concluded from page 314.

to have the sun itself visible on the negative unless covered by clouds of more or less density, or something equivalent to them. If a sun or moon is wanted in the picture, put a small, round, opaque spot on the negative to do duty for it, using artists' licence as to the size, which will be two or three times as large in proportion as it would be if photographed. Moreover, with the sun full on the lens, there is generally fog or a patch of blurring in addition, quite spoiling the negative. Clouds, although less effective as "cloud effects," are more useful for printing in if taken looking *away* from the sun, and at the same time more appropriate, the majority of landscapes being more often than not lighted at varying angles from one side or the other, and not from the front. In a great many negatives the sky is so cut up by foliage that mere indications of clouds are sufficient, and if the lighting of them is different to the landscape, unless it is very pronounced indeed, the error would rarely be noticed, if at all. I am afraid I lay myself open to a wigging for making such an assertion; at the same time, I believe it to be a fact. If we are to be so critical in respect of clouds in a photograph, why not be equally so of those in a painting? Artists of the brush and palette I am afraid err as much as those of the camera in this respect.

In close connexion pictorially with the sky in the photograph is water, especially large sheets of it. If it happens to be still with a good reflecting surface, only sky reflected in it, the clouds should be printed on it *lightly in reverse*—that is, by turning the negative over and printing from the wrong side—but in proper position with regard to those clouds of which they are supposed to be reflections. If only a small patch of water comes white in the print, that can be rubbed down with spirit or a tint printed on, for a white spot of that kind is always an eyesore. Rubbing down or tinting will harmonise it with the rest of the picture.

Exposure and Density.

"Exposure and density" has been a somewhat contentious subject, so I will say little about it more than that a *full exposure* for all general work gives us better results than we can *possibly* get with the least under-timing. A negative, perfect from a chemical point of view, does not always produce a print perfect, in an artistic sense, with respect to atmosphere. I have an idea that the best prints are *always* from *slightly* over-exposed negatives, from the pretty negative point of view. It is a popular fallacy that by *fully*, not over, exposing a landscape the distance is buried. In an under-exposed negative, this *is* generally the case if the detail in the darker parts is properly brought out. The time of development necessary to get out detail in these shadowy parts does assuredly over-do the distance; but in a well-judged exposure the detail in the foreground (unless in exceptional cases) comes up nicely with the distance, and the harmony throughout is retained. In some cases brush development is exceedingly useful, and indifferent exposures may be made to pass by its judicious use. Few rules have no exceptions, and in this matter, if a slight haze exists at the time of taking the negative, a shorter exposure is warranted. The least over-exposure under *such* conditions would be undoubtedly a mistake, tending to over-density in the distance.

Development.

A word or two about development. A good estimate of the quality of a developer is that it shall with the *least density*, or rather opacity, *print the strongest image*. The developer that comes nearest to this standard is the one to choose, for I prefer that the printing qualities shall chiefly depend on the colour of the image rather than on its opacity. Some negatives of a very non-actinic colour are quite ghostly in appearance, and yet produce the most charming prints. There is, in fact, a softness, richness, and brilliancy in such prints that is quite unapproachable by any other class of negatives; moreover, such *clichés* lend themselves to almost all processes better than other kinds. In development I prefer flooding the plate in the first instance with the developer minus the alkali, adding this afterwards a little at a time, according to the effect produced, my favourite mixtures being pyro-soda for indoor work, and pyro-ammonia for outdoor. For very dark interiors rodinal is, I think, as good as anything I have tried; it had rather the advantage in a competitive trial with ammonia on an ill-lighted room, half an hour being given to each exposure. It produced more detail in the shadows than the ammonia did. The chief objection to the amidol and cikonogen class of developers is, they have to be made *apparently* denser than they ought to be with pyro developers for a standard, and lose some printing delicacy in consequence, as well as being somewhat deceptive as to their printing force.

Reduction in the Hypo Bath.—Some interest has lately been exhibited in the effect on bromide prints of prolonged immersion in the hyposulphate bath. Reduction will take place in a *negative*, irrespective of the developers, if the plate is left soaking for some hours in it. I have several times found soda and ammonia and pyro images *almost entirely obliterated* by leaving them all night in the bath. At the same time, I have let similarly developed negatives remain quite as long in it with scarcely any alteration of density. Why some should fade and others remain unchanged I am unable to say authoritatively, but in all probability the bath was stronger at one time than the other, for with the hypo bath, so that it was sufficiently strong to fix in a moderate time, I have never considered the strength of much importance.

Halation.

The subject of halation or blurring has also been to the fore of late and is a matter to which I have been obliged to give considerable attention, especially since the advent of rapid dry plates. I think you will agree with me that this fault has increased in ratio with the sensitiveness of the films. With *highly sensitive* films, *no* precaution that I know of will altogether prevent or even mitigate it if the subject is highly reflective or possessing strong and abrupt contrasts. Having at one time or another had considerable experience with interior work, to which I am very partial, I do not think I can over-rate the importance of securing plates and conditions as little liable to this fault as possible. There is no doubt that careful development will mitigate the trouble, but given a very rapid bromide plate, and a subject of a trying nature, neither development, backing, nor anything else, so far as I know, will prevent it. On this account I prefer a rather *slow plate, containing a fair amount of iodide*, as best for such subjects, and calculated to give as great a freedom from blurring as we can hope to get. It seems to me that a thick film *unless heavily charged with silver salts*, is worse than a thin one, because there is more probability of, and opportunity for, lateral dispersion of the light in the film itself. Rapid films, from their colour and coarseness, favour blurring. The wider separation of the opaque particles in a transparent, or semi-transparent, medium, like thick gelatine, permits of an easier infiltration of the light through its substance than the finer and more dense conditions of the bromide, and therefore slower films.

If blurring depended entirely on reflection from the back of the glass, then a good backing would be a certain cure in all cases, which we know from experience it is not. Many plates of considerable density and yellowness without any backing are almost free from this fault, for the reason just stated. An additional drawback to very rapid plates is their tendency to *reversal*, a more annoying fault, if possible, than blurring; it does not appear so unsightly on the negative, for the image remains clear and distinct, and, unless in some conspicuous place, may be overlooked, but in the print there is no fear of this oversight. I have had some otherwise excellent negatives ruined by it, for they set doctoring at defiance, unless of the most elaborate description. When plates are very prone to this effect, they are useless for *good* interior work, and so for many reasons I prefer to work with a plate of only moderate rapidity, and think better general work is obtained on them by far than on those of the very rapid.

Edward Dunmore.

COMPOSITE HELIOCHROMY.

[A Second Paper on Photography in the Colours of Nature, read at the Society of Arts.]

The heliochromoscope was first publicly exhibited one year ago in London, before the Royal Society, the Royal Institution, and the Society of Arts, in connexion with demonstrations of the process of composite heliochromy upon which I have been working for several years. As was explained in my paper of May 25, published in the *Journal of the Society of Arts* of May 27, 1892, the heliochromoscope and its triple photograph, or chromogram, are calculated to reproduce the colours of nature as readily as the stereoscope and stereogram reproduce binocular perspective.

The photographic process by which the colours of nature are reproduced, was perfected in theory nearly five years ago, and its capabilities were demonstrated at a meeting of the Franklin Institute, in Philadelphia, in November 1888. In order, however, to operate the process advantageously, it was necessary, not only to provide a special optical lantern for superposing on the screen the three images of the chromogram, but also a special camera which would enable the triple negative to be made by the exposure and development of a single sensitive plate, as in ordinary photography. I designed such a camera in 1891, and by means of the heliochromoscope, a modification of the camera, by which the three images are blended without either lantern or screen, I reduced the method almost to the simplicity of stereoscopic photography.

Owing, however, to certain inherent defects in the photographic negative-making process, which have long been known to affect the rendering of gradations in monochrome photography, and, therefore, must also affect the colour-rendering, I have since given much study to realisi

the most favourable conditions for reducing such defects to a minimum, and to defining the nature and extent of the limitations which they impose. Much experiment has also been devoted to overcoming other difficulties which I shall mention, and, although a truly astonishing illusion of nature is realised in the heliochromoscope, I estimate that it may take another year to carry out all the experiments, and make all the measurements necessary to enable me to finally demonstrate the capabilities, and accurately state the limitations of the process, and to publish complete and satisfactory instructions for operating it.

Meanwhile, having been called to London on business of another kind, the Council of the Society of Arts honoured me with an invitation to "report progress."

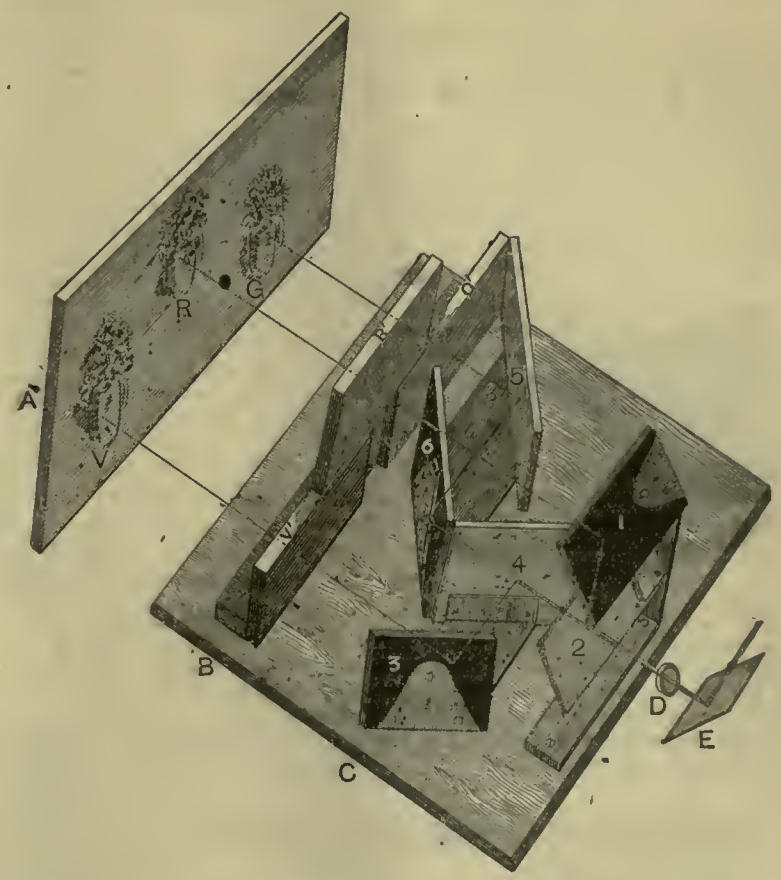
As was fully explained in my paper of last year, my own process of composite heliochromy consists, first, in the production of a triple photograph, to represent the effect of light from the object upon the three separate fundamental colour sensations, in accordance with the Young-Helmholtz-Maxwell theory of colour vision; and, second, in the blending of the three images into one, either optically, by means of the triple lantern or the heliochromoscope, or otherwise, by the superposition of three transparent colour-prints. Although the three fundamental colour sensations are red, green, and blue-violet, the three images of the triple photograph are not made through red, green, and blue-violet glasses, nor by the action of red, green, and blue-violet rays, but each by the joint action of all rays that have power to excite the respective fundamental colour sensation. Not only do the red rays, but the orange, yellow, and yellow-green rays also excite the fundamental red sensation; the orange rays affect it even more powerfully than the pure red. The photograph, to represent the effect upon the red sensation, is, therefore, made by the action of all these rays, and in due proportion, in accordance with Maxwell's measurement. The photographs of the green and blue-violet sensations are also made by the joint action of rays of various colours, in proportion to their power to excite the respective fundamental sensations, according to the measurements of Maxwell and Abney. But, when the images of the triple photograph are blended into one, by means of the triple lantern or the heliochromoscope, the photograph of the red sensation is illuminated by red light only, the photograph of the green sensation by green light only, and the photograph of the blue-violet sensation by blue-violet only. In other words, the three images of the chromogram represent the action of all incident light upon the respective fundamental colour sensations, and the light by which each image is illuminated in the lantern or heliochromoscope represents the sensation itself. The result of blending into one the three images of the chromogram—each being illuminated by the kind of light intended for it—is a faithful reproduction of the object photographed, in all its subtleties of light, and shade, and colouring.

Last year my projections on the screen were made with the lime-light, the performance of which was very unsatisfactory to me in comparison with sunlight projection which I had employed at my house in Philadelphia. Now I am provided with a lantern adapted for electric light, and will repeat my demonstration with it before proceeding to describe the colour-camera and heliochromoscope. In this lantern a single arc electric light is the source of illumination. After being collected by a condenser system in the usual manner, the light from the arc is sub-divided into three portions by means of a system of mirrors, some of which are transparent, so as to both reflect and transmit light, substantially as in the heliochromoscope camera, which I shall describe later on. In the path of each divided beam of light is placed a smaller condenser and a colour-screen; in front of these a chromogram; and then the objectives by which the images are projected and superposed. This device differs from all others that have been proposed for the purpose, in that the disc of light on the screen remains white when the electric arc varies its crater. The systems formally proposed for use with a single light would be quite useless under such conditions.

I commence by demonstrating the production of white light by mixing the red, green, and blue-violet rays. In the heliochromoscope the intermediate rays—the yellow and blue-green—are entirely suppressed, only comparatively narrow bands of red, green, and blue-violet showing if a spectroscope is applied to the eyepiece. The colours that I am now using in the lantern are not quite so pure; the spectroscope shows broader bands of colour, but they are still separated from each other by darker bands in the yellow and blue-green parts of the spectrum. With these screens the illumination is sufficient for projections of moderately large size, and the colours are pure enough to demonstrate the fact that the red and green light mix to produce yellow, and that the addition of blue to the yellow makes not green but white. The insertion of one of the chromograms shows that the infinite variety of the colours of nature can be obtained by the intermixture of the three colours, red, green, and blue-violet, in various proportions.

Scientists have known these facts about the mixture of coloured lights for a long time, but I take advantage of every opportunity to repeat the demonstration, because many people still doubt the facts.

I must also take this opportunity to again emphasise that it would be quite impossible to obtain any such result as that now shown with any



system employing the same colour screens both for photography and for projection, as was advocated by all other writers upon this subject previous to my publications in 1888. The science of composite heliochromy cannot be understood without knowledge of this fact, which I have repeatedly pointed out and explained, but which certain well-known writers have, nevertheless, persistently ignored.

The subjects that will now be projected upon the screen will illustrate the capabilities of this system of colour-photography, as adapted to lecture illustration, better than was possible with the lime-light lantern used here last year.

The illusion of nature will be found even better in the heliochromoscope than on the screen, because the colours are purer, and the illumination is better.

The method of superposing three images upon a screen, by means of three separate objectives, is sufficiently known, and need not be described in this paper. The system employed in the heliochromoscope is not only a very different one, but, I believe, quite different from anything else that has ever been suggested. I shall try to make it clear by reference to a diagram, showing the construction of the perfected instrument.

A is the chromogram, B, C a removable baseboard, carrying the colour screens, B, and the mirror system, C. D is an achromatic objective lens, and E a silver mirror.

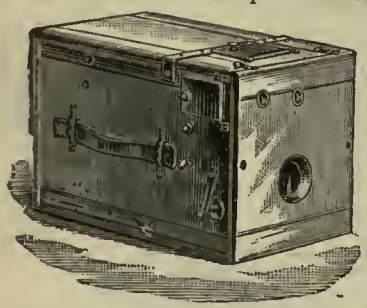
Light transmitted by the image of the red sensation, R, passes through the [red colour screen, R', to the silver mirror—1, downwards to the transparent mirror, 2, and forwards (except the portion which passes through the transparent mirror and is lost), through the objective, D, to the inclined mirror, E, and upwards into the eyepiece, under which a rednced image is formed by the objective, D.

Light transmitted by the image of the blue-violet sensation, V, passes through the blue-violet colour screen, V', to the silver mirror, 3, sideways to the transparent mirrer, 4, forwards through the transparent mirror, 2, and objective, D, to the inclined mirror, E, and upwards into the eyepiece under which a blue-violet image is formed, exactly coincident with the red image. That portion of the light which passes through the transparent mirror, 4, is lost, and also that which is reflected downwards by the transparent mirror, 2. F. E. Ives.

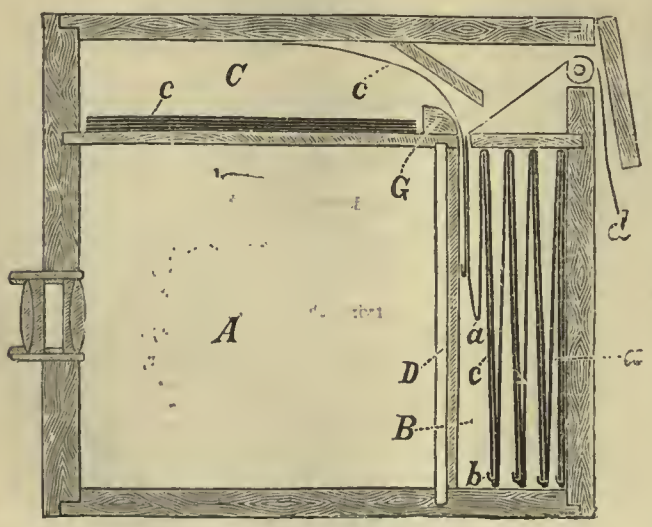
(To be continued.)

MARION'S NEW SUMMER AND SEASONABLE NOVELTIES.

On the occasion of a visit to Marion & Co.'s, Soho-square warehouses, we were shown a hand camera the invention of Dr. Krugener and possessed of excellent features. Numerous are the inventions that have been introduced to solve the problem of the transference of sensitive films to the camera and their exposure with the maximum of certainty and the minimum of risk and trouble. This is claimed by the firm to have been attained in their Simplex Film Camera, an external view of which we here give, and in which provision is made for bringing fifty films into the field, transferring them to the focussing plane of the camera, and, after exposure, storing them in a reservoir, where they remain secure from the action of light. In what way all this is accomplished we shall endeavour to explain.



The films are cut to the size required and are flexible. A long band of opaque paper is provided, and is folded to the size of the plate. At certain intervals there are narrow slips of paper pasted on the band, underneath which one end of a film is slipped. The band is then folded zigzag fashion, a, b, c, when the second of the series of paper slips comes to the proper place for receiving another film, which is retained *in situ* by a repetition of the folding of the band; and this is repeated until the whole of the fifty films have been put up in a packet, which is then inserted in a recess at the back of the camera. Meantime, the front fold of

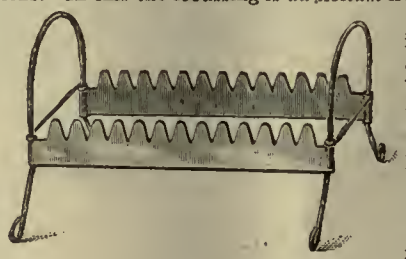


the band has been passed over a roller, and brought out through a slot behind ready to be grasped by finger and thumb. The exposing or focal plane is a plate of opticlly worked glass, and by means of a spring behind the package is pressed against it. On drawing out the projecting end of the band D, the first of the series of films is brought up, hard pressed against the glass focussing plane, B. After expoaure, D is pulled, when the exposed film, C, rises, and, caught against the sloping cover, falls forward and flat down into the reserve, C, above. A continuation of the pulling at D results in the next film in the series replacing the previous one, and in due conrse it, too, is deposited on the antecedaneous pile, C. This goes on until the last of the fifty films have been exposed and lodged in the chamber above, when the services of a dark room or a changing bag must be had recourse to in order to affect the depletion of the chamber C and the refilling of chamber B. The other parts of the camera, its lens, shutter (time and instantaneous), focussing details, and other matters, including its two finders, its level, the means for applying tension to the shutter spring, can be easily conceived of. The stand is a species of alpenstock, the limbs of which are jointed a few inches from the top, and which when expanded yields a flat solid table on which to place the camera, with a mechanical contrivance for enabling it to be pointed upwards or downwards when the ground is uneven. This stand, we may observe, is adapted for other cameras than this.

The Radial, a camera of Marion & Co. has developed into half-plate size, its dimensions being $15\frac{1}{2} \times 6\frac{3}{4}$ wide and $7\frac{3}{4}$ deep. As those who have seen it know, it holds twelve plates, any one of which may be exposed at will, and after exposure may be returned to the place from whence it came. An addendum to this system consists in having an additional set of sheaths, which may contain quarter-plates or any size intermediate up to those for which the camera has originally been adapted. This gives an additional power to the holder of this new size, in which the greater is thus made to include the less.

We were shown a large quantity of the fixing and developing cartridges of which we spoke in a recent issue, and which we are told are being much demanded.

We were also shown an exceedingly low-priced hand camera, "The Alphoto," the prices of which commence at 8*s.* 6*d.* each, with achromatic lens. In this the focussing is *ad libitum* from two yards to infinity.



The Collapsible Plate Rack is one of those handy pieces of apparatus that occupies but little space when folded up, but when expanded it affords space for a dezen plates being racked np for drying.

The foregoing cut shows the rack so well as to render further description unnecessary. It will prove convenient to pack away amongst one's travelling impediments.

A very pretty and simple way of storing and displaying negatives or transparencies was brought under our notice. It consists of a series of sheaths hinged together, capable of being folded up in small space, or of being in a moment opened out, so as to show the negative or transparency at a glance. This form of putting up negatives certainly must approve itself to those who in the rush of business desire to pick out a negative or transparency at a moment's notice. It is only necessary to undo the fastening, when at once the whole contents are displayed for examination.

In the rooms devoted to frames and mounts, we might well feel excused from breaking down altogether in our powers of note-taking. An exceedingly beautiful example of the adaptation of English-dressed antelope skins, made up as frames with corner piece and entourages in silver, are without doubt the most elegant forms we have seen in which photographs can be set. These range in sizes from *carte-de-visite* midget up to panel. We also saw close imitations of the above in other skins, mounted both in silver and in imitation, at a much lower price of course.

We have already, some time since, spoken of a series of artistic prints specially made by Downey which were sold at a marvellously low price (eight shillings a dozen). A third series of these, of larger size, 19 × 16 net size of print, is now in course of preparation, and is expected to be ready in a month. From the specimens we saw, we would suggest their great utility in the show-room.

In this department were also to be seen antique miniatures, which consisted of carbon opals, painted and unpainted, in those old-fashioned flat ebony frames of a former period. These ought to be useful to portrait photographers; ivorine frames and easels suitable for every class of pictures, and made in sizes from cabinets upwards; also an

Excelsior Album with specially thick mounts, but which, alas! will not be on the market for two months yet. We must not, however, omit to mention a series of direct sepia platinum prints, by Edwards, of English historical buildings, nor of a large variety of designs for Birthday, Christmas, and New-year's mounts, folding and plain, in which artistic and mechanical genius has been laid extensively under contribution. If these, and quite a large number of chaste and elegant forms of mounts for every size of portrait, and in every variety of tints, including some quite new, do not give a fillip to business, we know not what will.

RECENT PATENTS.

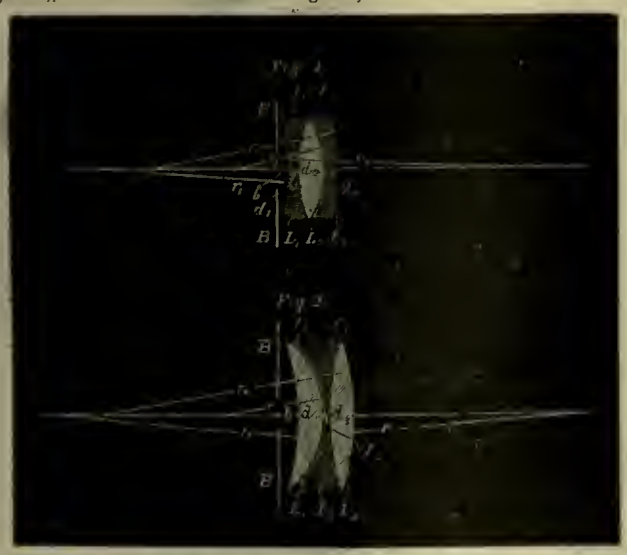
PATENTS COMPLETED.

IMPROVEMENTS IN PHOTOGRAPHIC LENSES OR OBJECTIVES.

No. 4692. PAUL RUDOLPH, Carl-Zeiss-strasse, Jena, Saxe-Weimar, Germany. *April* 22, 1893.

THIS invention relates to photographic objectives, and its purpose is to remove the indistinctness of the marginal portions of the image by reducing, as much as possible, the "astigmatic" aberration. As indicated by their name, these aberrations are caused by "astigmatism," that is to say, the property possessed by the rays of an oblique pencil of light transmitted through an objective of not uniting in one and the same point the rays lying in the primary or meridional section of such pencil uniting in one point, and the rays lying in its secondary or sagittal section uniting in another point; or, in other words, the focal length of the rays in the primary section differs from the focal length of the rays in the secondary section. Thus are formed two partial focal points. The distance of these two partial focal points, or the difference of the two focal lengths, is called the "astigmatic difference." The latter is termed positive when the focal length of the ray in the primary section is greater than that of the rays in the secondary section, and it is called negative when the focal length of the rays in the secondary section is greater than that of the rays in the primary section.

As it is possible to so compose or construct lenses as to cause them to manifest a predetermined astigmatic difference, either positive or negative, this astigmatism supplies in itself a means for obviating its prejudicial effects. With this object the objective can be constructed with two distinct or separate lenses, or systems of lenses, for example, one of which is so composed as to produce a positive astigmatic difference, whilst the other is so arranged as to give rise to a negative astigmatic difference, the said two differences being caused to neutralise each other. Such a double objective, or "doublet," as it is called, is described in the Specification annexed to British Lettera Patent, No. 6023, dated April 21, 1890. In this double objective the correction of the said astigmatic aberrations is obtained by combining an achromatic lens, the positive member of which, being the collecting lens, is made of glass having a higher refractive index than the glass of its negative member (that is to say, the dispersing lens to which it is cemented), with a second achromatic lens, the refractive indices of the two cemented members of which are contrarily graduated. The neutralising effect obtained by this reversed or inverted composition of the members of a doublet relatively to the astigmatic aberration is principally dependent on the fact that, in virtue of the said combination, the inner surface, or "surface of union," in the one member (that is to say, the surface on which the component lenses of the member are united together), is caused to act as a collecting lens, whilst in the other member the



surface of union is made to act as a dispersing lens, and so with regard to the influence upon the focal length, as well as upon the spherical aberration of the respective member.

Now, the present invention consists in a new organization or combination of achromatic lenses, whereby the same neutralisation or correction is brought about within a single system of lenses cemented together. For this purpose the system is composed of three individual lenses, in such a manner that the inner member is a collecting lens, and has cemented to it on each side a dispersing lens, one of the latter having a greater and the other a smaller refractive index than the collecting or intermediate lens, or that the said inner member is a dispersing lens and the said two outer members cemented thereto are collecting lenses, one of which has a greater and the other a smaller refractive index than the dispersing lens situated between them.

It is evident that by means of either of these two combinations one of the inner surfaces, or "surfaces of union," produces a positive refraction, that is to say, the effect of a collecting lens and the other union surface a negative refraction, that is to say, the effect of a dispersing lens.

In the annexed drawing, examples of the two new arrangements of triple lenses are represented in section in Fig. 1 and in Fig. 2 respectively.

In both figures L_1 L_2 L_3 denote the three lenses cemented together, l_1 l_2 the inner surfaces, or "surfaces of union," and B the diaphragm.

Fig. 1 illustrates that type in which the inner chamber L_2 consists in a collecting lens being biconvex, whilst the outer members, L_1 and L_3, are dispersing lenses, the former being biconcave and the latter concavo-convex. In Fig. 2 the inner member, L_2, consists in a biconcave dispersing lens, and the outer members, L_1 and L_3, are formed by collecting lenses being respectively concavo-convex and biconvex. In either case the lens L_1, being the member nearest to the diaphragm B, is assumed to have the smaller refractive index.

The letters r_1 r_2 r_3 r_4 denote the radii of curvature of the surfaces of the lenses, and d_1 d_2 d_3 the central thickness of the lenses. b indicates the distance between the lenses and the diaphragm B.

There is now no difficulty in obtaining glass of suitable quality for making achromatic lenses of the kinds required for carrying out the present invention. The practical question as to whether, in a combination of the above description, it is possible to obtain a sufficient astigmatic correction, and, at the same time, to comply with the other conditions required in photographic objectives, has been answered in the affirmative by theoretical and practical investigation of both types of the new triple lens.

Guided by the annexed drawing and the following tables, in which are given the elements of construction of two typical examples, an optician skilled in the construction of lenses or objectives will be enabled to numerically determine or calculate according to known methods those elements of construction (radii, thickness of lenses, and distance between the lenses, and the diaphragm B) which are necessary to properly compensate astigmatic aberrations.

The letters employed in the following tables correspond with the letters marked on the drawings. The kinds of glass to be employed are determined by the indices of refraction n D and n G_1, relating respectively to Fraunhofer's D. line and to the IIz line of the spectrum of hydrogen. All dimensions are expressed by proportional numbers, the focal length of the whole objective being taken as unity. A simple multiplication of these numbers with the focal length actually required will suffice for obtaining the dimensions of any objective wanted.

EXAMPLES.

Table I.

Objective, the inner or intermediate member of which is a collecting lens.

Fig. 1 represents this objective calculated for a focal length of 500 millimetres. Maximum effective aperture, 0·063. Angle of field, about 90°.

Radii.	Thickness of Glass.
$r_1 = -0·1058$	$d_1 = 0·0060$
$r_2 = +0·1210$	$d_2 = 0·0145$
$r_3 = -0·0496$	$d_3 = 0·0091$
$r_4 = +0·1043$	Distance of Diagram B.
	$b = 0·0091$

Kind of Glass employed.	
n D.	n G_1.
$L_1 = 1·51510$	1·52673
$L_2 = 1·57180$	1·58643
$L_3 = 1·62350$	1·64457

Table II.

Objective, the inner or intermediate member of which is a dispersing lens.

Figure 2 shows this objective calculated for the focal length of 500 millimetres. Maximum effective aperture, 0·077. Angle of field about 90°.

Radii.	Thickness of Glass.
$r_1 = -0·1423$	$d_1 = 0·0167$
$r_2 = -0·0547$	$d_2 = 0·0052$
$r_3 = +0·2073$	$d_3 = 0·0139$
$r_4 = -0·1260$	Distance of Diaphragm.
	$b = 0·0104$

Kinds of Glass employed.	
n D.	n G^c.
$L_1 = 1·52246$	1·53373
$L_2 = 1·46724$	1·58092
$L_3 = 1·61120$	1·62483

By correspondingly modifying the elements of construction, lenses having the same, or approximately the same, effect as the typical lenses hereinbefore described can likewise be obtained with the aid of other kinds of glass, provided that the latter enable the conditions necessary for achromatisation to be complied with, and also enable suitable differences of the refractive indices to be established on both sides of each of the two union surfaces of the triple lens. The external shape of the latter must, in every case, be either that of a meniscus or that of a biconvex lens, with very unequal external curvatures, and the surface having the least curvature must be turned towards the diaphragm B. The outer member, next to the diaphragm, may be composed of glass, having the smaller refractive index, as assumed in Figs. 1 and 2, or of glass having the greater refractive index.

An achromatic lens of the kind hereinbefore described may be advantageously employed for the construction of objectives comprising but one composite lens, such as a landscape lens or for making doublets, and in the latter case it may

either be combined with a triple lena of the same kind, or with an ordinary achromatic lena.

By combining two equal lenaes constituted according to this invention, so as to form a symmetrical doublet of the ordinary aplanatic type, objectives are obtained in which the advantages of the double objectlve described in the hereinbefore cited Specification, No. 6028 of 1890 are united with the peculiar advantage of the symmetrical systems of ensuring tne most accurate resemblance between the object and the image. According to the rules governing the construction of symmetrical syatem, such double objectives are obtained without any change in the elements of construction set forth in the preceding tables, by oppositely arranging two equal triple lenses, the place of the diaphragm indicated in the tables being made the geometrical centre of the doublet.

By the combination of a triple lens constructed according to to this invention with a second lens of the aame description but of different focal length and other curvatures or with an ordinary achromatic lena, two valuable modificatiena of the unsymmetrical (anastigmatic) double objective described in the aforesaid Specification are obtained. The compensating effects which are brought about in the said unsymmetrical system by the co-operation of its two members are obtained in the modified system in each member separately, or in one member alone for the entire system.

In employing the new triple lens in either of these unsymmetrical double objectives it is evidently necessary to modify the elements of construction hereinbefore given in the tables, because in such system the best result is obtained not by correcting each member separately, but by compensating a rest of aberration in one member by an opposed rest of aberration in the other member. The alterations to be made must depend on the requirements of each special case, and can be ascertained by means of methods of calculation well known to opticians.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—An achromatic photographic lens or objective, composed of three lenaes cemented together, the refracting index of one of the outer lenses being smaller, and the refracting index of the other outer lens being greater than that of the middle or intermediate lens, substantially as hereinbefore explained.

An Improvement relating to Photographers' Roll-holders.

No. 8503. David Roy, 6, Holyrood-place, Plymouth, Devonshire. *April* 22, 1893.

This invention, which relates to photographers' roll-holders or slides, has for its object to provide a check against more than one exposure of the same length of film, and consequent spoiling of pictures.

The invention consists in providing that the shutter, when replaced after exposure of a length of film, is locked and is not free to be again withdrawn until a fresh length of film has been unwound from the feed drum or roller.

Locking and unlocking are effected by means of a lever catch pivoted to the body of the roll-holder. This lever catch, which is acted upon at its inner end by a spring, is shaped at the opposite or outer end to form a wedge-shaped hook, which, when the shutter is locked, engages with a fixed stop provided on the shutter. When a proper length of film has been unwound from the feed roller, an arm attached to the winding indicator passes under a lug formed on the lever aforesaid, and the latter is thereby raised, causing its catch end to become clear of the atop on the shutter. The shutter is thus unlocked and made free to be withdrawn.

In replacing the shutter, after exposure of the film the hooked end of the lever is acted upon by a tongue pivoted to the shutter, and by this means the lever is turned on its pivot to a sufficient degree to withdraw the arm aforesaid out of engagement with the lug. The lever catch then falls and re-engages with the fixed atop on the shutter. The latter is now locked, and is not again free to be withdrawn until a fresh length of film has been unwound from the feed roller.

Improvements in Plate-changing Devices for Photographic Apparatus.

(A communication by Dressler & Heinemann, of 45, Theatinerstrasse, Münich, Germany.)

No. 11,149. William Phillips Thompson, F.C.S., M.I.M.E., 6, Lord-street, Liverpool. and 6, Bank-street, Manchester, Lancashire, and 323, High Holborn, Middlesex.—*April* 22, 1893.

In this new plate-changing device, the photographic plates intended for exposnre are inserted backwardly in the camera, and are maintained against a case by means of a spring attached to the removable back of the camera ; this case may be inserted in the camera from above, from below, or from the sides. This case has, at its lower hinder edge, a slot of such a size that a plate or a frame containing the same may be easily inserted in the case. Clamp springs, acting against one another, are arranged in this case. The case, when inserted, presses down a sheet spring attached to the bottom of the camera, and bent upwards at right angles, which spring, being released when the case is drawn out, springs up, and thus, as will be hereinafter described, forms a rest for the plates or frames pressed up against it ; the usual opening of the objective is provided, on which a suitable closing device may be arranged.

The mode of working of the improved plate-changing device is as follows :—

The plates already exposed are contained in the aforementioned case, those to be exposed in the space behind the same. If the front one of the unexposed plates is to be exposed, the case is simply raised up. A projecting part of the case, or other suitable device, prevents the case being entirely drawn out.

The following takes place when the case is drawn out :—

Firstly, the spring attached to the bottom of the camera springs up, which was hitherto held down by the case, then the plates in the chamber are pressed forward by means of the spring, so that the front one, which previously rested against the hinder wall of the case, now stands with its lower part against the curved up part of the spring, whilst, at the top, it rests against a projection formed by the bottom of the case. Thereupon, if the objective shutter be removed, timed or instantaneous exposures may take place, and then the case is pushed back again into the camera. The foremost plate, which has just been exposed, thereupon passes into the case through the slot in the same, where it is held by the two springs, and places itself at the back of the plates already contained in the case.

The two springs, or their points of contact, press against one another in such a way that the plates entering the case are pushed slantwise with their lower ends projecting forward, in order to keep the slot free for another plate to enter. The unexposed plates are pushed slightly backwards by means of the tapered surface of the back wall of the case, when the latter is inserted, and the plates again rest against the back wall of the case.

If a fresh plate is to be exposed, the above-described process is repeated.

Improvements in or relating to the Manufacture of Sensitised Films for Carbon Printing.

No. 11,254. Joseph Thacher Clarke, 3, College-road, Harrow, Middlesex. —*April* 22, 1893.

In carrying out thia invention I may conveniently proceed by using the apparatus set forth in the Eastman Patent, No. 19,896, of 1889, and carrying out the process set forth in the Eastman Patent, No. 19,897, of 1889, and I produce gelatino-carbon films of the usual kind made of gelatine and colouring matter, with the optional addition of soap, dextrine, or the other materials commonly used in the trade. When the film is to be sensitised in the manufacture, bichromate of potash is added.

In manufacturing such carbon films it has been customary to place the film upon a backing of paper, and after the exposure, which renders portions of the film insoluble, to dissolve out the remaining portions. As, however, this method produced the insoluble surface or image upon the outer side of the film, it was necessary to transfer the entire film to another backing, after which, on removing the original paper supports, the prints could be obtained by treatment with warm water in the well-known manner.

In carrying out my invention, instead of employing the paper supports, I form such support of a film of celluloid or transparent insoluble gelatine, sufficiently thin to allow of the image being received by the sensitive material through said film. The film is ready for use without the necessity of transferring it to any other support or removing the original support, and the soluble portions of the gelatino-carbon film may, after printing, be removed by washing in the usual manner.

A further advantage of the method is that the image it not reversed as regards right and left, as is the case in the transfer process.

Having obtained the carbon image upon the celluloid or insoluble gelatine support, the picture may be mounted upon cardboard of suitable colour, or upon glass, if it be intended to be seen as a transparency.

I do not bind myself to use only "carbon" as the pigment or colouring matter of the film, neither do I restrict myself to the subjects of the beforementioned Patents, Nos. 19,896, 1889, and 19,897, 1889, as the invention is applicable to films prepared by other processes.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—1. The combination with a "carbon" or "pigment" film or tissue of a transparent backing, whereby the image can be obtained through the back. 2. A celluloid transparent backing to a "pigment" film for photographic purposes substantially as and for the purpose described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 29	Camera Club	Charing Cross-road, W.C.
,, 29	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 29	Richmond	Greyhound Hotel, Richmond.
,, 30	Birmiogham Photo. Society	Club Room, Colonnade Hotel.
,, 30	Hackney	206, Mare-street, Hackney.
,, 30	Halifax Camera Club	
,, 30	Lancaster	Springfield Barracks, Lancaster.
,, 30	Leith	165, Constitution-street, Leith.
,, 30	Paisley	9, Ganze-street, Paisley.
,, 30	Warrington	Museum, Bold-street, Warrington.
,, 31	Bath	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 31	Burnley	Bank Chambers, Hargreaves-street.
,, 31	Leytonstone	The Assembly Rooms, High-road.
,, 31	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 31	Southport	The Studio, 15, Cambridge-arcade.
June 1	Birmiogham Photo. Society	Club Room, Colonnade Hotel.
,, 1	Glossop Dale	
,, 1	Hull	71, Prospect-street, Hull.
,, 1	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 1	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 1	Oldham	The Lyceum, Union-street, Oldham.
,, 1	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
,, 2	Cardiff	
,, 2	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 2	Holborn	
,, 2	Leamington	Trinity Church Room, Morton-st.
,, 2	Maidstone	"The Palace," Maidstone.
,, 3	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

May 23, Technical Meeting, Mr. Horace Wilmer in the chair.

Tele-photo Lenses.

Mr. G. Houghton exhibited the new telescopic lens, which we described last week, also examples of enlarged photographs produced by it.

Mr. T. Bolas said that one of the examples showed slight curvature of the field, and asked Mr. Dallmeyer whether, in his tele-photo lens, he had discarded the rectilinear lens as the primary lens on that account.

Mr. T. R. Dallmeyer said that two years ago he had adopted a form of the tele-photo lens having a single positive and a triple negative. With a single form it was impossible to correct it for the excentrical pencils throughout the field. He had succeeded in doing so, but it gave pincushion distortion and aberration towards the edges. In the later form, knowing that the front lens was corrected, it was impossible to correct it throughout the field with a single combination. To obviate the drawback of having to correct the excentrical pencils, he eventually decided upon a lens convex on both exterior surfaces, in conjunction with a particular type of portrait lens. The reason for that was that if the separation was correct for a certain distance, and the positive element be moved, the correction for spherical aberration could not be perfect. In that particular form of portrait lens the correction was perfect for a near object, and if the magnification was moderate those aberrations existing in a marked degree on a high power did not manifest themselves. The lens shown by Mr. Houghton was identical with one described by Steinheil, who employed an antiplanat. The positive element gave a rather pronounced curvature of the field towards the lens, the triple negative employed producing the opposite curvature. This flattened the field, but the lens still gave prismatic excentrical pencils. The instrument shown was not of a powerful nature; with a weaker negative he should have expected that the constructor would have made it much more rapid. He had been through this particular construction, and had discarded it on account of its difficulties; although stopped down for landscape work, it was, no doubt, a valuable instrument.

The Daguerreotype Process.

Mr. W. England prefaced a demonstration of the Daguerreotype process by a brief description of it and the exhibition of a number of examples, a collection of which was on view in the Society's rooms. Mr. England said that the polished silver plate was first treated with tripoli and the buff, and then sensitised in a box for that purpose with iodine and bromine in the order named, and finally with iodine, when the plate appeared of a steel-blue colour. Considerable skill was required to get the exact tint. If the plate was accidentally exposed to light, treatment with iodine would restore it. The exposure required was about double that of wet collodion. Development was affected by exposure to mercury vapour at 120° Fahr. for seven to fifteen minutes. The picture was fixed and gilded over heat in a solution as follows, the brilliancy and beauty of the image depending on the success with which this operation was carried out:—

1.

Gold chloride	15 grains.
Distilled water	16 ounces.

2.

Hyposulphite of soda	4 drachms.
Distilled water	16 ounces.

The solutions being mixed by pouring the hypo into the gold. After the gilding, the picture is washed in distilled water and dried over heat. Mr. England then went through the practical part of sensitising a plate, developing an exposed plate, fixing, gilding, and drying, passing round two portraits made in this manner, which were highly admired. He said the pictures were the first he had taken for twenty years. They had had a minute's exposure in a glass room. In reply to a question, he said the mercury was fixed under the gilding. If a Daguerreotype got tarnished, it should not be rubbed, but should be cleaned by flooding it with alcohol, rinsed in water, and placed in a weak solution of cyanide, five grains to the ounce; for bad cases of tarnish a strength of ten grains to the ounce might be used. It should finally be washed in distilled water and dried over heat. To tell whether a Daguerreotype was gilded or not, let the corner be rubbed with something soft, and if it were not gilded the mercury would come away. The largest Daguerreotypes made were probably 15×12, by Mayall.

Mr. W. E. Debenham mentioned that he had employed pure hydrochloric acid for removing tarnish.

Mr. J. Traill Taylor said he had practised the Daguerreotype process a good deal, and had found that he had got the best results by fixing in common salt, a strip of zinc being placed in contact with the back of the plate, when the iodine was immediately freed. The American photographers brightened their Daguerreotypes by applying, with heat, solutions of ammonium chloride, which had a marvellous whitening action; carbonate of potash, alum, cyanide, &c. To this was due the superiority of American Daguerreotypes. It was the only process that depended on the man, and not the chemicals. Sufficient credit had not been paid to Fizeau for his discovery of the gilding process. In reply to Mr. Bolas, Mr. Taylor said that cyanide would not remove colour from a coloured Daguerreotype. The late M. Claudet found that even a Daguerreotype could be produced too sharp, and so used a prism to produce a slightly fuzzy effect. As to the use of bromine for increasing sensitiveness, it was discovered by Goddard of Philadelphia, and Goddard of London, almost simultaneously, but the Americans had until recently given the credit to the Englishman.

Mr. T. S. Davis said that Daguerreotype portraits were superior to portraits now produced, as it was impossible to obtain a correct portrait from a professional, the negative being so much worked up; would it not be possible to add to the posterior portion of the lens a combination that would reverse the image in a similar manner to that adopted by M. Claudet?

Mr. Taylor said it might be done by placing a reflector in front of the lens.

Mr. Debenham said an erecting arrangement at the back of the lens (as suggested by Mr. Davis) would lose more light than a prism. The loss of light with a prism was trivial.

Mr. Taylor said the loss of light from a polished silver surface was only five per cent. In the course of further remarks, Mr. Taylor said a piece of silvered glass for the purpose might be cheaply made by purchasing a small piece of looking-glass and removing the backing with benzole.

A vote of thanks was passed to Mr. England for his paper and demonstration.

Mr. H. A. Lawrance said that in his paper on the work of the Congresaer, Mr. Warnerke had referred to a suggested method of determining the speed of plates by the changes of colour they underwent in light. He exhibited several strips which had been exposed to sunlight and had discoloured, and asked for information on the point.

Some discussion took place, but no information was elicited.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

May 18, Mr. Charles H. Oakden in the chair.

Mr. S. G. B. Dicker was elected a member.

Edwards' Varnish.

Samples of Messrs. B. J. Edwards & Co.'s cold varnish for plates and films were distributed among the members.

Mr. W. H. Barnes exhibited a film negative that had been varnished with the varnish, and had been in use for printing purposes five months.

Mr. Cowan subsequently treated a plate with the varnish, which dried very quickly.

The Lomberg Plates.

Mr. J. S. Teape passed round two negatives made on the Lomberg plates distributed at the previous meeting. They were exposed in Epping Forest at six o'clock in the evening for three and ten seconds respectively with *f*-24, and developed with pyro-ammonia. The exposures were about correct, and the negatives were of good quality.

Silver in Dry Plates.

Mr. P. Everitt alluded to the recently published results of a French experimentalist who had given the quantities of silver contained in commercial dry plates, and asked Mr. Haddon, who had promised to undertake a similar series of experiments, whether he approved of the method adopted.

Mr. A. Haddon disagreed with the method employed, and promised soon to start on his experiments.

Astigmatism.

Question from the box: "What is Astigmatism?"

Mr. W. E. Debenham said it was a difference in the focal planes of rays of light which pass from the margins of the field, and are brought to a different plane of focus by different parts of the lens.

P. O. P.

Mr. R. Beckett exhibited a portrait print on P. O. P., which had been exposed to light for about two months, one part having been covered up. The print seemed to have gained in colour in the covered parts.

A Spray Producer.

Mr. Jameson, in connexion with the demonstration of the Air Brush, given some months ago by Mr. Harrison, exhibited a spray producer, the liquid being forced out in the form of a jet by blowing through a tube. Patterns could be made on paper by the use of a stencil plate. For making sensitised paper, he thought the instrument would answer perfectly well.

Being a Lantern Night, slides by Messrs. Cooke and Freshwater were shown.

North London Photographic Society.—May 16, Mr. W. Bishop in the chair.—Mr. Herbert Fry lectured on *The Sandell Plate.*—A collection of prints from negatives on these plates was exhibited, and evidenced that the claims advanced in respect of them were well founded. The long scale of gradation and the freedom from halation were most remarked. Mr. Fry, in reiterating the fivefold advantages belonging to the plate, a statement of which has, more than once, been communicated through "the usual channels of public information," said that the multiple-coated plate was not put forward as the be-all and end-all of photography. The use of it would not make every novice a medal-taker, and it could be misused. But the introduction of it had put a better tool in the hands of the careful worker than could be obtained heretofore. If any one thought he could go one better, the sooner he did so the better for photography. Mr. Fry explained the tentative mode of development best adapted to get good results out of the plate, and inveighed strongly against the practice of using any developing solution more than once. The plates could be intensified or reduced in the usual way, but these processes were only necessary when there had been a slip in the development. In concluding, he warned his audience not to follow in the wake of certain experimentalists, who advised wilful over-exposure, followed by stripping off the top film. A vote of thanks was passed to Mr. Fry for his lecture.

Hackney Photographic Society.—May 16, Mr. R. Beckett in the chair.—The Hon. Assistant Secretary announced that the attendances at Wanstead Park the previous Saturday amounted to twenty-one. From the question-box: "Wanted, a cure for pinholes." The Chairman gave a description of pinholes as absence of films and silver, dust, and air-bells, and fragments of glass. Mr. Hensler said he used a deep dish, and gave the plate a sharp knock on the side when developing. Mr. S. J. Beckett said Indian ink was about the best thing to use if pin-holes were caused. Mr. Hensler could not dissolve the metabisulphite of soda as recommended by Mr. Dresser. Messrs. Nunn and Fenton Jones had found no difficulty in doing so. Mr. Moore asked how to clear a negative from green and red fog. Mr. Sodeau said Captain Abney recommended to convert the whole of the silver into its haloid condition, and

redevelop. Bromine water would convert, or ferric chloride. The conversion is to a grey fog, which does not matter much. Mr. T. H. SMITH asked cause and cure for iridescent marginal stains on plates. Methylated spirit on wash-leather (to rub on plate) will remove it easily. Mr. W. Fenton Jones then proceeded to open the discussion on *Plates* versus *Films*. He spoke of great portability in films, and use for carbon work—advantages over plates. Good for clouds, as they would print either way; are said to be free from halation. On the other hand, one thing which had done much to retard the progress was faulty emulsions, and tendency to curl when developing. Incidentally he said Mr. Dresser had overcome this by the introduction into his developing tray of a square, heavy framing, which rested on the rebate, and caused films to lay flat. A question that occurred was, "When developing, will films stand heat?" Mr. Sodeau explained an Eastman roll-holder, and said he rather favoured films, had easily worked his; said the films were well coated, and, by wetting his dish first, easily got them to lie flat. Mr. Hensler had taken out films to New Zealand, and found them a great advantage. Mr. A. BARKER had some good films, but others were bad. Mr. F. HOUGHTON used them in the Frena with good result, but some of the bits of film had at times blistered or floated off. Mr. GOSLING asked, "Were films advisable for a beginner?" Mr. S. J. Beckett said, "No," and generally objected to films; had thirty-three and one-third per cent. failures on films to five of plates. Mr. POULSON said, in larger sizes there was a danger of backing. Mr. W. Fenton Jones said he had found film emulsion sometimes thin, and gave, as a test for thinly coated plates, the holding of one before a gas flame, and, if the flame could be seen through, it obviously showed thin emulsion. The Chairman had not found films prevent halation, as had been stated.

Putney Photographic Society.—May 18.—The members travelled to Woking, and from there proceeded along the Basingstoke Canal in the direction of Byfleet and the Wey Navigation. As there was a bright diffused light, a number of good negatives were obtained of the beautiful scenery along the route, additional interest being given by the grouping of a few children, which the leaders had previously engaged to meet the party.

Richmond Camera Club.—March 15, Mr. Ardaseer in the chair.—The President (Mr. Cembrano) delivered a lecture on *Architectural Photography*. He divided the subject into three broad divisions—Apparatus, Process, and Subject. Under the first head, tripods, cameras, lenses, and accessories, such as focussing glasses, levels, and flash lamps, were fully dealt with; under the second were considered plates, exposure, and development; while the third comprised hints as to the choice of subject, whether exteriors or interiors, lighting, and pictorial effect. The lecture was of a most practical nature, and, by way of illustration, some of Mr. Cembrano's well-known architectural pictures were thrown upon the screen, the lecturer remarking that there was no more suitable and effective mode of showing photographs of architecture than through the lantern.

Brixton and Clapham Camera Club.—May 16, the President (Dr. J. Reynolds, F.R.G.S.) in the chair.—Mr. W. THOMAS read a paper on *A Photographic Picture, and Some Notes on its Production*. The paper dealt fully with composition, light, and shade, balance, printing in clouds, printing processes, use of stops, mounting and framing. The lecturer's remarks were illustrated by numerous specimen pictures and blackboard illustrations. Mr. Thomas himself used cold-bath platinotype paper for his pictures, and strongly recommended its adoption by his hearers as being exceedingly simple to use and beautiful in its results. He advised members to lay in a large stock of cloud negatives, and said that great care should be taken, when printing in clouds, to see that the clouds were lighted in the same manner as the landscape itself. Considerable discussion took place at the conclusion of the paper, and, in answer to a request, Mr. Thomas promised to take the members out for a practical lesson in the field, in order that they might put his principles into practice under his supervision.

Ashton-under-Lyne Photographic Society.—May 12 to 15.—An exhibition of over 100 photographs of the land of the Broads, lent by the Great Eastern Railway Company, who have a great number of these views in their railway carriages. The photographs were inspected by a large number of members and friends with very great interest, and many expressed their desire to visit the places depicted. Many also said they should visit Norfolk with the camera, so the Society may expect to see more views before very long from that most delightful county.

Gosport Photographic Society.—May 16, Mr. W. B. Smith in the chair.—Mr. BELTON, of the Paget Prize Plate Company attended, and gave an instructive demonstration on *Printing-out Opals and Plates*. The specimens handed round were much admired, and at the conclusion of the demonstration Mr. Belton was thanked for the able manner in which he had dealt with his subject. During the evening the CHAIRMAN announced that the Rev. E. Paske-Smith had been elected to a vacancy on the Council, and that Mr. Reginald E. Green had been chosen joint Hon. Secretary. The Chairman also presented Mr. T. E. Williams with the silver medal, and Mr. A. Fisher with the bronze medal, won in the late National Lantern-slide Competition, and congratulated them on their well-merited success.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE CONCENTRIC LENS.

To the EDITOR.

SIR,—I note the letter of Mr. F. H. Burton, as to which I have a few words to say. His pretended inference that "Mr. Stillman makes 10 × 8 negatives with an eight-inch lens, attached to a camera with a cracked front, and cuts out the centre of his prints," &c., with the pinhole theory, needs no other reply than that I sent no "prints," but the negatives, as he would have seen if he had read my letter. I send now two prints made from 18 × 24 centimetre negatives with the Concentric lens, one at *f*-16 and the other at *f*-64, as a practical demonstration of the truth of what I have stated. I do not say, and have never said, that the lens will *cover* as large a field with the same sharpness when used with *f*-16 as with *f*-64 but that it will focus as sharply. No lens can be made which will define a close foreground with a distant view, with a stop as large as *f*-16, nor can the Concentric be strained to cover a plate whose longest dimension is greater than the focus of the lens without falling off at the corners; but I use my ten-inch concentric on an 8 × 10 plate, always focussing with the largest aperture, and when the subject permits it, working with it, which is the case in a large majority of cases. On any given object I can focus as sharply with *f*-16 as with any smaller stop, and, if Mr. Burton cannot, it only proves, not that the lens will not do it, but that he does not know how; but his want of knowledge only proves its own existence, not that the lens in competent hands will not do what I claim for it. Any one can, of course, focus at *f*-22 and then by stopping down, get a sharper image, but any *competent* person using a finely ground screen, can get a focus, absolutely finer than the print will render at *f*-16, and I have often done it at *f*-12; but with so large an aperture there is too great a concentration of illumination to give more than a very small available field.

In the two negatives from the same point taken at *f*-16 and *f*-64 I focussed on the telegraph-pole at which I have put a cross; but lest this should not prove my case I send some other prints from negatives taken within a few days. If I were asked to make negatives for enlargements, as I often do, I should use the smallest stop as a rule, but for any other purpose I only use a smaller stop than *f*-16 when I find the light too strong for my shutter as ordinarily and conveniently arranged, to adjust the exposure accurately. The prints I send are the ones I happen to have by me, none having been taken with especial care.

Of course I, too, advise duffers to "stick to the *f*-22 to *f*-32"—that is safe and requires no especial delicacy of hand or eyesight, but at the same time I must say that a man who can't get a sharp picture with *f*-16 *has* "no claim to the title of an expert."

Another word of explanation! The view which I send in double has in the extreme distance the palace of the Quirinal, with the flag flying, to denote the presence of the king. This is just a kilometre in a straight line—the dark window in the nearest building is about forty feet from the position of the camera. Save that the *f*-16, though made with a drop shutter, is much over-exposed, I do not think that Mr. Burton could tell the difference with his naked eye in the sharpness of either.—I am, yours, &c., W. J. STILLMAN.

Rome, May 17.

P.S.—As prints are somewhat unsatisfactory as to absolute definition though good enough for gelatine, I have made two negatives especially as trials of *f*-16 as against *f*-64, which I enclose, and which I beg you to hold open to the inspection of any one interested in the question. In the prints I have sent I made no especial effort at extreme accuracy of focussing, taking it as satisfactory when it seemed so on the screen, and not using a focussing glass. In these I have been more careful, but have only employed ordinary spectacles, which at sixty-five will be excused me —by younger men. W. J. S.

MOUNTING GELATINO CHLORIDE PRINTS.

To the EDITOR.

SIR,—In answer to "W. R. F." *re* mounting gelatino-chloride prints, any method used for mounting bromides is applicable. Our way is to place a piece of moistened *papier mineral* next the surface of the print with some ordinary paper on that, and then squeegee into contact as usual, All trouble of prints sticking to the paper instead of the card then disappears. One word of advice, dry the prints out of the way of all dust. as the surface very readily receives any that is about and does not freely give it up again.—I am, yours, &c. A. M. BROWN.

Dulwich, May 22, 1893.

To the EDITOR.

SIR,—Referring to the trouble your correspondent "W. R. F." seems to have experienced in mounting gelatino-chloride, I would say that I have found this not an uncommon mistake. But I have found that where the formula sent out with the paper was strictly adhered to, the trouble referred to was invariably overcome. I allude to the prints being soaked in *alum*, either before or after toning, and not being subjected to *too prolonged* a final washing. At the outside, one hour and a half I have found ample, with continual changes, to remove all traces of the fixing-salts.—I am, yours, &c., A DEMONSTRATOR.

May 20, 1893.

To the EDITOR.

SIR,—I believe I made the statement some months ago to which "W. R. F." refers, viz., that gelatino-chloride paper may be mounted in the same manner as albumenised; so it may, using a little "Opie's medium." Does "W. R. F." use ordinary *sized* paper? If he does, and it does not stick to the wet gelatine surface after being squeegeed on to it, he ought to have more cause for surprise.

If the blotting-paper referred to in my former letter is used, and the print rubbed down by hand, no difficulty will occur; but so much rubbing down or squeegeeing is unnecessary. Use a fine, damp sponge, which cleans the surface as well as pressing the print into contact. Never omit the alum bath, especially if the sulphocyanide bath is used; *ceteris paribus*, the method of working is the same as for albumenised paper.—I am, yours, &c., T. FITZGIBBON FORDE.

May 19, 1893.

MR. DRAGE'S RESIGNATION.

To the EDITOR.

SIR,—As the disagreement between myself and the members of the London and Provincial Photographic Association has been made so public, will you kindly favour me with a small space, as I am told many cannot understand the matter?

May I state at the outset that I am perfectly neutral as regards the "Spirit" question? and Mr. Beckett (one of our members), bringing forward a resolution repudiating statements in the Spiritualistic Press, as regards the attitude taken up by the London and Provincial, had worded it so, that, as I pointed out to him before the meeting, it was bound to cause a great deal of harm.

Out of an attendance of forty, only fifteen members voted, the rest abstaining; the Chairman duly declared the resolution carried.

On hearing, a day or two afterwards, that the Association would most certainly suffer considerably if that resolution was circulated, worded as it was, I used my utmost endeavours to stop the publication of it in the photographic journals, and I also refused to enter the resolution on the minutes, holding that, with a membership of 200, it was not right to allow such a small number as fifteen members to cause, by their votes, such an upset to the Association.

I found that I was totally unsupported in my action; the members therefore dispensed with my services, by directing the Chairman to enter the resolution on the minutes.

Acting, as I considered, in the best interests of the Association, after my experience of three years as Hon. Secretary (and which, I may say, has been a very pleasant experience for me), I regret exceedingly that the members did not support me in this instance in my efforts for the well-being of the Association.—I am, yours, &c., R. POULTER DRAGE.

95, *Blenheim-crescent, W., May* 18, 1893.

A CONFERENCE OF EXHIBITION JUDGES.

To the EDITOR.

SIR,—At the meeting of the affiliation delegates, held on March 24 last, it was resolved to invite to a conference those gentlemen who have most frequently acted as judges at recent open photographic exhibitions, to agree upon lines of action to be followed in judging, and to offer suggestions for the guidance of Societies with regard to exhibitions.

I am directed to inform you that in accordance with the above resolution, an invitation has been sent to thirty-eight of the best-known judges, but as some names may have unintentionally been overlooked, the Committee will be glad if you will make it known that any gentleman who has acted at least four times at open exhibitions will be welcome to join in the deliberations of the Conference. The meeting will be held during the month of June, and due notice will be given of its date and place.—I am, yours, &c., R. CHILD BAYLEY,

Photographic Society of Great Britain, Secretary to the Affiliation.

50, *Great Russell-street, Bloomsbury, London, W.C., May* 20, 1893.

GLACIER PHOTOGRAPHS.

To the EDITOR.

SIR,—Many of your readers must be thinking of a start for the Alps, and many must be near great ranges and extensive glaciers in New Zealand, the Dominion, and even the Himalaya. The lantern slides which profusely illustrated Mr. Conway's discourse at the Alpine Club meeting the week before last, when St. Martin's Town Hall was filled with an audience of both sexes, show what can be done in this way by travellers.

Let me appeal to those who take an interest in grand scenery to help the good cause by photographing glaciers in all parts of the world, with a view to collecting documentary evidence of their increase, diminution, advance, or retreat. Also anything bearing upon the question of the share borne by ice in formation of lakes.

Such photographs should be taken far more for these purposes than as artistic views, and even one to be shuddered at may, in spite of its atrocity, be valuable as illustrating some point. Only, pray, let the perpetrator always give compass bearings, date, and approximate distance of some prominent object in the field of view.

A sub-committee of the Alpine Club has been appointed and charged with the collection of information, more especially regarding glaciers within British territories. The contributions of prints (and negatives to be spared) will, it is hoped, assist largely.

I see a letter in your last issue from Mr. Ponton, whose father so much to advance the science of photography. I have taken some negatives with the camera he mentions, which is the size, but not the weight, of those "Church Services" ladies so frequently carry. My photographs were only fair, but I have some very good ones indeed with these little boxes. It would be interesting to try one's luck with a few in the big mountains and report progress. The optical theory of pinhole work will have to be worked out much further than at present, and a difficult problem it is! The pinholes are beautifully true and circular in those I have seen. Their insignificant weight is a great thing in their favour. Personally, being of somewhat lazy habits, I have never carried anything larger than a 5 × 4 hand camera on any fatiguing expedition. But I leave such details to the sundry writers who have already given us valuable *wrinkles* on traveller's work.—I am, yours, &c.,

Easterton, Parkstone, R.S.O., Dorset, May 20, 1893.

MARSHALL HALL.

REGULATORS.

To the EDITOR.

SIR,—In reference to R. R. Beard's communication in yours of the 12th, I really do not know what he means, as I never mentioned "600 lbs. pressure," "lubricant," or "fatty matters," and the drawing of the apparatus I sent him, instead of only four inches, has a possible pressure of thirty inches, and I have never seen a lime that would stand thirty inches of water pressure. What have I to do whether gas compressors favour or condemn the use of grease? Then he begins to prophesy about the failure of my anti-friction cock, the construction of which he is wholly ignorant of; then he advises me to get a cylinder of compressed gas. Really, if Mr. R. R. Beard has any friends, they should keep an eye on him.

According to published evidence, I am the first person who ever used a regulator for the limelight. In conclusion, let me say that a man may be able to make clear to other minds what is clear to himself, but it is very difficult to make clear to others what is not clear to oneself.—I am, yours, &c. WILLIAM BIRRELL.

Airdrie, May 22, 1893.

THE PHOTOGRAPHIC SALON.

To the EDITOR.

SIR,—As chairman of the Organizing Committee of the Exhibition or Salon of photographic pictures, to be held at the Dudley Gallery next October, may I say a word to correct the impression that there is intention to clash with the usual Exhibition of the Photographic Society?

The same reason which actuates the Photographic Society in selecting the autumn compels us to take about the same period, and that reason is the difficulty of obtaining a suitable gallery at any other season. We certainly intend to have the best possible picture exhibition, but not to intrench on the usual lines of the Photographic Society, nor in any way to form opposition. Assurance on these points may be gained by a reference to the influential list of our Committee; and, further, it may be pointed out that, with one exception, all the Judges at the Photographic Society's Exhibition are prominent members of the Salon organization.

The two Exhibitions will probably be complementary, and even mutually helpful, by taking place at the same time.—I am, yours, &c.,

May 20, 1893. GEORGE DAVISON.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Dallmeyer's 2B, in perfect order, offered in exchange for cabinet lens of longer focus or for a 3D, Ross' Universal or other rapid lens of about ten-inch focus.—Address, H. PARLOW, Hythe, Kent.

Ross' 10×10 Spanish mahogany camera, complete, long focussing screw, as new, cost 8*l.*; exchange for light-pillared balustrade or pedestal.—Address, J. HORTON, Central Photographic Studio, Caroline-street, Cardiff.

Wray's 8½×6½ view lens, *f*-8, twelve-inch focus, also Thornton-Pickard special double blind shutter to fit above lens, works to one-two-hundredth of a second; exchange for quarter or half-plate set. Cash adjustment.—Address, J. BERNARD, 101, Goldhawk-road, W.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2 *York-street, Covent Garden, London.*

E. N. D.—The gold can be precipitated by a solution of protosulphate of iron.

H. SUSMANN.—The address is Harrington Bros., Shandon Chemical Works, Cork.

FRANK OSBORNE.—Better mix the colouring matter with varnish, and apply this to the slides.

PERPLEXED.—Information as to mounting gelatino-chloride prints is given in our "Correspondence" columns this week.

L. CLAY.—Your only course is to proceed against the shopkeeper in the County Court for the value of the picture.

LIVERPOOL.—In selecting a camera-stand, bear in mind that rigidity is the primary consideration, and portability and lightness a secondary one.

W. G. HONEY.—1. The idea is a useful one, but not, we think, patentable. 2. Communicate with the Prisons Department, Home Office, Whitehall, S.W.

DR. J. H. SMITH & Co. (Zurich).—Messrs. S. Guitermann & Co., 35, Aldermanbury, E.C., advertise celluloid in the sheet and rollable form for coating purposes.

W. COPE.—The markings are doubtless caused by impurities in the mounts—we have seen many similar cases. Without analysis it is impossible to indicate the precise cause.

F. G. HILL.—It depends upon the nature of the backing whether the stains on the front of the negative caused by it can be removed. If it is soluble in water, it probably may not be difficult to do so by prolonged washing.

L. VOSS.—No work is published on dark rooms and their fittings, and none is required. Every one fits up his dark room according to his taste or requirement, or, we might say, more often than not according to the space or apartment at command.

A. C. GODDARD.—What matters the appearance of the solution so long as it develops well? The slight discolouration was, no doubt, caused, as surmised, by the stopper being left out of the bottle for several weeks. Certainly the pyrogallic acid must not be blamed.

E. MOORE.—The positive process is usually worked with collodion. Dry plates for the purpose are supplied by Mr. Jonathan Fallowfield. Formulæ for working are supplied with the plates. Any of the dealers in photographic goods will supply dark tents for any purpose that may be required.

CHAS. KERR (Colombo).—1. We are much interested in the photographs of races, which are very good. 2. Probably Mr. Spooner, of the Strand, could obtain photographs of the finishes of races for you. 3. We know of no shutter faster than the one you mention. At present one-five-hundredth of a second is probably the greatest rapidity of English shutters.

T. MARKS.—1. A half-plate portrait lens will do quite well for enlarging from quarter-plate negatives; indeed, it will be better than the quarter-plate wide-angle rectilinear. 2. In working with daylight a condenser is quite unnecessary. 3. In making enlarged negatives, ordinary plates will do quite as well as the more rapid ones; in fact, we should prefer them.

R. W.—There is no mistake in the matter. Glycerine mixes perfectly well with alcohol in all proportions. It may be added to collodion if necessary. Castor oil will also mix with collodion, and generally is contained in the collodion used for enamelling prints. If you are so dubious in the matter, why not make an experiment or two to satisfy yourself on the point?

T. BANKS sends us some prints, and complains of their lack of sharpness. He says he is working with a fixed focus lens, and asks whether the fault rests with the lens, or the shutter not working quick enough?—It is quite clear that the lens is not set to the right focus. There appears to be no fault with the shutter, as the moving objects are quite as sharp as the brick walls and houses.

CONSTANT READER.—There is nothing to hinder you from taking out the patent yourself. The next time you are in London you can obtain the requisite forms, free of expense, on applying at the office adjoining the east front entrance of the Law Courts. You may also apply at the Post-Office of your village, but it is doubtful whether you can obtain them in such an unimportant place.

T. C. H.—It is impossible to give any idea of the cost of building a studio on the top of a house, and a staircase up it, simply from the dimensions given. It often happens that the structural alterations of the main building to receive it, and the approaches to it, entail a much greater cost than the studio itself. We can only suggest that you prepare plans of what is required, and then submit them to one or more of the local builders, who will give an estimate for the work.

C. B. writes: "Can you give me information respecting Switzerland? Are the Custom-House officers likely to examine your plates? Is it necessary to get a pass, if so, from whom?'—Perhaps some of our readers will supply the desired information. No passport is required for Switzerland, but in all cases when travelling abroad it is well to be provided with one. It may sometimes be the means of avoiding trouble.

R. A. J.—The lighting of the portrait is very good so far as the dominant light is concerned, but the shadows are much too heavy. This may in future be remedied by using a reflector to soften them. A white sheet, or a few newspapers on the domestic clothes-horse will answer admirably. With judicious management of the light, quite as good portraits are to be obtained at a large bay window of an ordinary room as in the orthodox studio.

TRURO writes: "We are having the electric light cable laid down here. What candle-power arc lamps (or other lamps) shall we require for lighting studio? Who could you recommend to fit it up? Would it cost over 40*l*?"—A light of five or six thousand candle-power will do. Messrs. Gwynne & Co., Brook-street Works, Holborn, make a speciality of electric lighting plant for photographers. Better write to them for an estimate.

CYPHER says: "I had some negatives out printing, and a shower of rain came on, and wetted the frames. They were wiped, and put away till next day to finish printing. On opening the frames, I found the paper had stuck to the negatives, and, on pulling it off, the film pulled away in places, and the other parts are stained. Can anything be done to remedy the evil?"—No, except to make fresh negatives from any prints that may be in existence.

A. S. KING.—If you imagine that you are going to obtain sharp negatives of interiors of cathedrals with a hand camera, if the camera be held in the hand, you will be greatly disappointed. If, however, the camera be used on a stand or other rigid support, then a hand camera will answer perfectly well. Pictures so obtained cannot be styled hand-camera work, and to enter it as such in any competition would not be fair.

O. M. says: "In trying the experiment of making chloride of gold, as described in last year's ALMANAC by G. W. Webster, not being able to get a digester, I used a white porcelain jug, with the result that all the gold—twenty shillings' worth—is gone into the jug. What do you advise to do with it? Is there any way to separate the precious from the vile? I have succeeded perfectly since by using an oil flask."—It is difficult to see, if a *porcelain* jug were used, how the gold could get into the ware. Probably, however, the jug was common earthenware. If the gold is still in the ware, it ought to be recoverable. Probably the most practical way will be to reduce the jug to a fine powder, and send it to a refiner.

PHOTOGRAPHIC CLUB.—May 31, *The Daguerreotype Process.* June 7, *Plates versus Films.*

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—June 1, *Angle of View*, paper by Mr. P. Everitt.

THE studio of Mr. Vandyck, of which we made mention last week, is situated at 20, Ladbroke-grove-road, Notting Hill Station, W.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—Mr. J. L. Mackrell has consented to give a practical demonstration on *Enlarging, &c.*, on Wednesday, June 7, from twelve to half past one, and on Thursday, June 8, from one to half past two. Excursion, Saturday, May 27. Bebington, half day. Leader, Mr. G. A. Carruthers. Train leaves James-street Station (Mersey Tunnel) at fifty minutes past one for two.

AMATEUR PHOTOGRAPHIC SOCIETY OF MADRAS.—The first Open Exhibition of Photographs will be held in a suitable hall in Madras during the month of December, 1893; it will remain open for a period of one week. All exhibits must be in the hands of the Hon. Secretary by December 1, and all charges for carriage to and from the Exhibition must be paid by the exhibitors. All exhibits should be clearly addressed to the Hon. Secretary, Amateur Photographic Society of Madras, of whom full particulars of classes, &c., may be obtained. The following classes are:—Open to the world, Class A.—Silver medal, for the best set of four landscapes; silver medal, for best set of four figure subjects; silver medal, for best set of twelve lantern slides; silver medal, for the second best enlargement; bronze medal, for second best of each of the first three subjects. Open to amateurs only, Class B.—Silver medal, for the best photograph, any subject; bronze medal, for second best photograph, any subject; silver medal, for best set of four figure subjects; silver medal, for best set of four other than figure subjects; bronze medal, for best set of six lantern slides; silver medal, for best enlargement; silver medal, for best set of hand-camera shots; silver medal, to be awarded by Judges for any exhibit of special merit not included in the above classes.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1726. Vol. XL.—JUNE 2, 1893.

WHOLE-PLATE BINOCULAR PICTURES, AND HOW TO SEE THEM.

It is well recognised that, the farther the eyes of an observer are apart, the greater is the increase in the perception of the varying distances of objects. By way of experiment we, some twenty years since, constructed an instrument by which the eyes were effectively separated a distance of twelve inches, and the effect obtained, while exceedingly instructive, bordered on the ludicrous, especially when the subjects examined were situated at only a moderate distance. But this increase of base gave to distant objects a real charm, inasmuch as the effect of solidity, by which all objects near at hand and seen by both eyes are characterised, was extended to those situated at a great distance.

Arising out of a number of desultory experiments entered into at the time was a telemeter, by which the distance of any object within one or two miles of the point of observation could be ascertained with approximate accuracy for those most distant, while, for those nearer at hand—say about half a mile—the accuracy was sufficient to enable the sighting of a rifle to be effected. We may some day publish this as a useful adjunct to the employment of fixed lenses of longer range than is usual.

By a principle analogous to that by which the previously expressed ideas were carried into practical effect, Sir Howard Grubb had it applied to the examination of stereoscopic pictures exceeding in dimensions those of the usual size, and we willingly accord to this gentleman the credit of this application. It is now known to every intelligent reader of stereophotographic literature that, in order to the comfortable examination of binocular pictures by one of the ordinary stereoscopes now so readily obtainable in commerce, the pictures should be mounted at a distance apart not exceeding three inches. Now, three inches is a size of picture (from side to side, for there is no fixed limit to its height) that does not give satisfaction to every one, even when viewed through eyepieces from six to eight inches in focus.

Bearing in mind the Grubb principle enunciated two decades ago, and its capabilities, we have constructed, by means presently to be described, a stereoscope qualified to show distinctly, from centre to margin, a stereoscopic print of somewhat enormous size, seeing it is composed of two whole-plate photographs placed side by side on one sheet of board. Now, seeing that the centres of the elementary pictures composing this monster stereogram measure six and a half inches apart, the height of each being eight inches, the bringing of these into coalescence evidently cannot be effected by a prismatic or lenticular stereoscope of the usual form.

Those acquainted with Wheatstone's stereoscope are aware that in this instrument the pictures were large, but they had to be mounted on separate boards and had to be inserted facing each other at the opposite sides of a large box, or, at any rate, a framework, capable of holding them in this position. They were viewed by two small mirrors, one opposite to each eye, but inclined at an angle of forty-five degrees, by which, when the eyes were directed straight forward, they saw the pictures that were mounted at the sides of the box quite stereoscopically, but reversed as regards the right and left of the picture.

Now, let it be remembered that our pair of whole-plate photographic prints are pasted side by side upon one mount, that they are non-reversed and that their centres are six and a half inches apart. In order to bring each eye virtually opposite the centre of each print, two small mirrors must, as in Wheatstone's stereoscope, be mounted diagonally, one opposite to each eye, and at three inches apart. A second pair of mirrors must next be mounted, each parallel, or nearly so, to the first pair, and at a distance of one inch and three quarters from the surface of each. These second mirrors must also be rather larger than those nearest the eyes, else will not the whole of the print be seen. With a pair of prismatic or even ordinary simple lenses in front of the eye the stereoscope is completed.

What is imperative is, that the mirrors be silvered on the front surface, by depositing thereon metallic silver by one or other of the methods described in so many of our Almanacs, and which need not here be recapitulated. The way to do it is to select a piece of patent plate, and, having cleaned the best surface, deposit the silver on it, and then, when dry, cut pieces the right size from it by a diamond.

Sir Howard Grubb's system of employing diagonal prisms, instead of mirrors, to cause the rectangular alterations of the path of the light is to be commended on account of its elegance; but it is objectionable on account of its necessarily high cost, for the glass of which the prisms are formed must be very pure and free from defects. We have sought to construct analogous ones of water by enclosing the fluid in a square tube, the ends of which were cut to an angle, and covered by cementing thereon with pitch squares of selected small pieces of glass, each of the square tubes employed being cut open to permit of small squares of glass being let in at opposite top and bottom ends, so as not to interpose any opaque matter which would bar the passage of light from the picture to the diagonal end pieces, and thence to the eye. Those who have the patience and mechanical skill to construct such a substitute for the prism will be well rewarded for their pains, for not only will it serve the special purpose for which it was made, but it will also answer for inspecting distant

objects—the prismatic eyepiece being removed—and seeing them under the circumstances alluded to in the opening sentence of this article.

It is not necessary that the whole-plate picture of which we have spoken be taken direct, for an enlargement obtained from the negatives, taken in a stereoscopic camera of the usual size, will serve the purpose equally well, for poor indeed must be the negative that will not bear being enlarged to two diameters, all that is necessary for the purpose now advocated.

OUTDOOR GROUPS.

The present season of the year initiates a period during which a vast amount of photography covered by this title is undertaken. Much of it is so capable of improvement that a short discussion upon the subject may lead to a fuller understanding of the conditions governing or limiting success. We do not propose to discuss it from an artistic standpoint, for that has been very completely done before; the mechanical aspect would, perhaps, describe best the mode it has been least treated.

Naturally the lens comes in for first consideration; and here, at the outset, let us say we have no intention whatever of singling out a particular maker as supplying the most suitable article. As need not be here said, any lens will take a group; but for general use a landscape lens gives too curved and limited a field, and an ordinary portrait lens too limited a field, hence choice will be confined to one or other of the many symmetrical or rectilinear types of instruments. But, as groups have so frequently to be taken under conditions requiring very short exposures, it is evident that a lens whose aperture is *f*-16 would frequently be put out of court, and an objective purchased specially for group-taking would advisedly be chosen from the doublet type capable of being worked at *f*-7 or *f*-8 at will.

For important groups, however, *f*-12 or *f*-16 will be the most probable aperture, for not only has flatness of field to be considered, but depth of definition. Makers vary much in their statements as to the covering power of their instruments, but, broadly speaking, it would be wise, in selecting a lens, to choose one with a focus, at the very least, of about one-half longer than the longest side of the plate it is to be used for. There are lists before us in which sharp covering power is put down at all proportions, from a plate as long as the focus down to less than the proportion we recommend. So much depends upon what is looked upon as sharpness. A degree of definition that would be excellent in a landscape would be very imperfect in a group where, for instance, the figures were not more than an inch high. We therefore very strongly recommend any lens-purchaser to see the lens itself rather than be guided by the dimensions of covering power as given in the printed lists. We do not here for a moment impugn the good faith of the makers—we draw attention to the need of understanding thoroughly what is meant by covering power.

There is another reason for choosing a lens of long focus in comparison with the size of the plate, and that is the curvature of the field. The nearer an object is to the axis of the lens, the less is this curvature perceptible; but when, say, a twelve-inch focus lens was used for a twelve-inch plate on a group of people raised, for example, on a long terrace, it would require a very small stop indeed for those sitters who came near the edge of the plate. We must not be understood as suggesting that this benefit from a small stop is produced by its flattening the field, we need scarcely say it would not do so; but the depth of definition would be so increased by the small pencils that the departure from exact focus at the edge would not then be noticed. With, however, a lens of focus double or even half as much again, curvilinear distortion would be far less troublesome.

So far as to the lens to be used; we may next discuss how to use it. A group is arranged, let us say, and the image is noted on the screen. If, as would be natural to do, the sitters are arranged mainly in a straight line, or about a line, it will be too often observed when using the full aperture that curved fields are by no means things of the past, and the sharpness will be wonderfully increased by placing the figures about a curved line. The section of a saucer is often suggested; but with some lenses, and by good makers, it will be found that a section of a horse-shoe will almost be needed for a ground plan of the group. One word or two on this point will be reasonable. Although a great increase of sharpness is discernible when arranging the group on a curved line, such arrangement is not universally applicable. The further the figures are removed from the camera, the less can the curvature of the field be reduced by this means. Many a photographer who has been in the habit of taking groups of a dozen, or two or three, and managed to his satisfaction in this manner, has been puzzled when he has essayed a hundred or two at once. They cover so much ground that, even if he could marshal them to position, they are so near the distance beyond which all objects are in focus, that to effect curvature by bringing those at the margin nearer to the lens to lengthen the focus at that part would make the whole ridiculous. We dwell upon this point, as it is of such importance when using a lens with fairly large aperture.

So far we are assuming that the negatives are to be taken direct of the required size, but it is well worth the photographer's while, when he has large groups to take, to consider whether he should not take his first negative on a small scale, and enlarge it afterwards. The enlarging of negatives has now been brought to such perfection that, not to speak of direct bromide enlargements, the results so obtained might be of high-class character. The advantages of such a mode need scarcely be enumerated. The smaller the lens used the more likely it is to possess crisp defining powers, and the less perceptible will be the curvature of field; the depth of focus will, with equal exposures, be (the standpoint being the same) far greater; and, lastly, a larger number of exposures can be made, and in more rapid succession than with large plates, while when great rapidity is needed, and there is only one available standpoint, the long-focus lens, giving the same depth as a small one, is placed completely out of court.

The Queen's Plate.—Her Majesty has given permission to our contemporary, the *Gentlewoman*, to photograph her gold plate at Windsor Castle. The pictures if well reproduced by a photo-mechanical method will prove highly interesting, particularly to lady readers. It may not be generally known that Windsor Castle contains a well-appointed photographic studio and dark room that would be the envy of many London photographers, and so would its furniture and fittings. It is here that a large proportion of the Royal portraits have been taken.

Relics of Ancient London.—Another of the old City churches is doomed. This time it is St. Mary's in the Minories. Amongst many of the City churches that have been pulled down during the past couple of decades have been some of Sir Christopher

Phototypie F. Thévoz & Co., Geneva. Negatif by W. Brooks, Reigate.

A TOWER WARDER.

(Beef Eater.)

Wren's finest examples. Were photographs of them, externally and internally, taken before they were demolished? If not, why not? Surely it is not too much to expect the authorities of the wealthiest city of the world to, in their official capacity, secure, and retain, photographic records of all interesting and instructive relics before they are swept away for ever. That the City does think of something beyond business and bustle is evidenced by the fact that since the Gilbert pictures have been at Guildhall they have proved a great attraction, from 700 to 1000 persons a day having visited the exhibition. The City is proud of its ancient traditions and relics. Why do they not perpetuate, by means of photography, the latter, before they are destroyed?

Photographic Convention of the United Kingdom.—The Right Worshipful the Mayor of Plymouth, Mr. W. Law, will open the proceedings on Monday, July 3, at the Western Law Courts, the Guildhall, after which a *conversazione* and a lantern entertainment will be given. On the Wednesday the group will be taken in the Guildhall Square at noon. On the evening of the same day there will be a second reception at Devonport by the Worshipful the Mayor of Devenport, Mr. W. Waycott. The dinner and smoking concert will, as usual, take place on the Friday, at the Western Law Courts, the Guildhall. During the week of the Convention, an Exhibition of photographs and photographic apparatus will be held in the Art Gallery of the Plymouth Institute. The public will be admitted by ticket obtained at the door. The headquarters will be the Royal Hotel and the Westminster Temperance Hotel.

Coins as Weights and Measures.—It has often been pointed out how the current coin of the realm may be utilised as weights. This has recently been done once more by Mr. Newton, late of the Royal Mint, who says that "a sovereign weighs a very safe quarter of an ounce for foreign postage," while the crown piece is just on the right side of one ounce, and the half-crown, or its equivalent in smaller coins, will do quite well for the half-ounce. With reference to bronze coins, three pennies, five halfpence, or ten farthings respectively, make up an ounce. A halfpenny is also an accurate measure of one inch. It will often be handy to photographers to know how English coins can be extemporised as metric weights or measures. A sovereign equals eight grammes, and a crown piece twenty-eight grammes as nearly as may be; while a penny, for most practical purposes, may be used as a ten-gramme weight, it being but about three grains less. As measures, the diameter of a farthing is as exactly two centimetres as a halfpenny is an English inch, while a penny is the merest fraction over three centimetres Thus it will be seen that our coins may be, on an emergency, used for both English and foreign weights and measures with approximate accuracy.

Trouble at the Chicago Exhibition.—We briefly alluded a fortnight ago to the discontent amongst the foreign exhibitors at the Chicago show, with reference to the system of awards. Instead of subsiding, the dissatisfaction has extended and taken a decidedly practical form. The Commissioners of no less than seventeen foreign countries have withdrawn their exhibits from competition for awards. Their reason for this unusual step is the unsatisfactory replies to their communications on the subject, and that they consider that it is now too late for an International jury to be formed. Amongst the countries who have withdrawn beyond the European ones are mentioned Japan, Siam, and Brazil. The Commissioners' protest is regarded as of considerable importance by the authorities, one of whom, Mr. St. Clair, of Western Virginia, when the matter was under discussion, said that the matter was a serious one, that the Exhibition was threatened by it, and, if the matter were not settled quickly, it would result, he thought, in a lasting injury to the Fair, and bring disgrace to the country. We fancy he is not far wrong. Who, out of America, ever heard of awards being made upon a testimonial signed by a single expert? Imagine photographs being so adjudicated upon at an International Exhibition! However, English exhibitors, photographic and otherwise, may be content that their interests are carefully watched by the British Commissioners and their energetic Secretary, Sir H. Trueman Wood. By the way, the "big show" is not up to the present proving, financially, the great success our American cousins anticipated. A recent telegram stated that the daily admissions did not meet a third of the day's expenses. Since writing the above the Commissioners of the foreign countries have decided to establish a board of jurors independent of those in the American section, and to issue diplomas in disregard of the American awards.

GLASS POSITIVES ON GELATINE PLATES.

At a recent Whitsun fête down in the country, one of the attractions was a booth or tent at which portraits were taken, the proceeds to be devoted to a local charitable purpose—the artist being of the sterner sex, while a bevy of fair damsels did the canvassing, flitting about amongst the crowd of country folk with specimens, and bringing the customers "up to the scratch." A brief examination of one of the samples showed that it was of the old glass positive type, but though a very fair picture, it was evidently not on collodion, being wanting in the extreme delicacy and brilliancy of the better class of that style of portrait.

Feeling somewhat interested, I accepted the invitation of an acquaintance to accompany him inside "to be taken," not feeling equal to facing the ordeal myself. On entering, I found myself in a plain square tent, entirely devoid of ornamentation of any kind, and bare of furniture except for a single chair, and the camera mounted on a tripod stand. One corner was partitioned off, and from the square of coloured medium visible, evidently formed the dark room. The first thing of importance that attracted my attention was a small heap of paper that had been thrown out of the dark room, and apparently consisted of the wrapping of ordinary dry plates; and indeed it soon became evident from the short exposures given that gelatine films were the means employed.

One portion of the roof of the tent was open to the sky, in approved country-fair fashion, and there were no unnecessary complications in the way of blinds, screens, or curtains to modify the lighting of the sitter, all that being left to the chance of the "pitch"—which may, of course, have been intentionally chosen. At any rate, in all the examples I saw, the lighting was fairly good, and free from excessively heavy shadows or contrast.

After my friend had been taken, he was requested to call back again in an hour's time, a slip of paper bearing a written number being handed to him for presentation when he claimed his picture. As the business done seemed to be fairly good, I was still more puzzled to account for how the plates were developed, washed, dried, blacked, and mounted in an hour's time; so we returned punctually, and fortunately found the "studio" empty, a lull having occurred in the business. The portrait—a by no means bad one—was at once handed to its owner, and consisted simply of the glass plate, previously blacked or varnished, and backed up with a piece of dark-coloured paper, and the edges bound after the manner of a lantern slide, an entirely novel style of finish so far as I am aware.

Explaining that I dabbled a little in picture-making by photography, I got into conversation with the artist, who turned out to be a local amateur—one of the hateful "shamateurs" again—though as there was, I was told, no professional photographer within ten miles at least, the poor fellow was perhaps doing nobody any great harm. He proved very agreeable, and in no way reticent as to his mode of working, having undertaken the task, as he explained, "for fun," and to add something to the organ or harmonium fund to which the proceeds were to be applied. He employed, he said, no special plates, a fact I had already satisfied myself of by picking up a set of developing instructions from the heap on the floor, those he used for ordinary work answering his purpose perfectly well.

In reply to a question as to how he got the necessary positive appearance so comparatively unusual with gelatine plates, he replied that the plates he used, when developed clear of fog or stains, always in his hands gave a fairly good positive after drying when viewed through the glass, but that he had been struck by the great improvement in this respect when using some of the newer developers, especially para-amidophenol, which was the one he used. So marked was this effect that he had been induced to try to still further im-

prove it for merely experimental purposes long before he ever dreamt of his present task, and this is simply how it was done.

The exposure given was a "full" one, rather over than under, what was absolutely necessary, under-exposure being fatal; the development was commenced with a solution of normal strength, but containing a good dose of restraining bromide. With this the image was brought out until the picture was visible in all its details, but without allowing a vestige of veil to appear in half-tones or shadows. When the right point was reached the plate was at once dropped into a dish containing a thirty-grain solution of bromide, where it remained for a minute or so. If, on examination by transmitted light, the image did not appear quite strong enough, another application of the developer was made, which acted as an intensifier only, producing no more detail and no fog unless needlessly prolonged. The fixing was performed in the acid bath, which my informant considered gave clearer shadows, the all-important point.

"But how about finishing in so short a time?" I asked. "You cannot have a very perfect system of washing here under present circumstances, and as for drying——" "On the contrary," he remarked, with a smile, "I pride myself upon my system, although it may not be perfect, and with the assistance of an efficient staff—but step this way, sir." I accordingly followed into the partitioned-off portion of the tent, a part only of which was dark room. Here I found the staff consisted of a couple of youngsters of about twelve and ten years, to whom I was introduced as the "manager of the drying department" and the "chief varnisher." "I am rather short-handed at present, so we have to do the best we can, and I expect my staff to make themselves generally useful; but in the early part of the day I had a 'manageress of the mounting department,' but she got tired of it."

With this brief introduction my new acquaintance then proceeded to develop, wash, dry, and finish a plate, several of which, of "sitters" he was acquainted with, were put aside for future development. The development has been described, and, when fixed, the picture was left to soak for two or three minutes (or more if there happened to be anything else to do) in a dish of water. Repeated jugs full of water were then poured over it from a bucket, the same water being used over and over again; the same operation was then repeated over a second bucket, the water in which he explained was "not quite so thick," and then, after pressing between blotting-paper, the plate was dropped into a dish of alcohol. I hazarded the suggestion that that surely was not sufficient washing, especially after many previous plates had been treated in the same water. "No," he replied, "it is not finished yet," and taking the plate out of the alcohol and holding it up to the light in the open air, he pointed out that the unremoved hyposulphites had been precipitated in the form of a fine opalescent deposit. Upon again placing the plate in water for a few minutes the alcoholic "greasiness" and the opalescence disappeared, and, after again blotting off the surplus water, a second soak in alcohol followed, and it went into the "drying department."

Here a small paraffin stove was provided, and also a simple fan rigged upon a wooden framework and worked by treadle. Holding the picture over the stove and vigorously working the fan at the same time, the elder of the two lads, sons of the chief operator, very soon had the film dry, a careful watch being kept that no symptoms of the film dissolving appeared, in which case less heat and more draught were applied. Next it was varnished by the younger boy, and in the absence of the proper mounter it became any one's duty to finish it. The whole process, however, occupied little over half an hour from commencing development.

I have brought this matter forward not merely to show that positives can be taken on ordinary gelatine plates, but also because in the *modus operandi* there are one or two points that may prove useful at a pinch, notably, the combined operations of rapid washing and drying. The use of alcohol in the removal of hypo was proposed in Paris some years ago, but has never been generally employed, although it may often prove useful.

In conclusion, I may add that I have since succeeded in turning out very respectable positives on several different brands of commercial plates, but as a rule I find the slower kinds give the best results.

W. B. Bolton.

CONTINENTAL NOTES AND NEWS.

Messrs. Lumière's Coloured Photographs.—At a meeting of the Académie des Sciences last month, M. Lippmann exhibited several coloured photographs by Messrs. A. & L. Lumière, by the interference method, on orthochromatic plates, prepared according to the formula given last week (p. 325). The subjects included the solar spectrum, a painted landscape, a bouquet of artificial flowers, a Newton's disc in coloured glass, and several chromo-lithographs. It is stated that the whites of the subjects were correctly rendered, but were only visible at the regular angle of reflection, otherwise they were seen as of a brown tone.

Absence of Halation from Photo-Micrographs.—*Apropos* of M. Monpillard's paper on *Orthochromatism applied to Photo-micrography*, which is referred to in this month's "Lantern Record," the author was asked at the meeting of the Société Française, where it was read, if he had observed that halation was absent from the objects reproduced. M. Monpillard having confirmed the observation, M. Lippmann was of opinion that the absence of halo was due to the smallness of the angle of the rays from the objective acting on each point of the plate. At the particular angle, the dimensions of the halo were so reduced as to become inappreciable.

Artificial Clouds.—What is termed a new and original method of producing artificial clouds was recently brought before the Amateur Photographic Club of Vienna by Herr Anton Einsle. He covers a drawing-board with white paper, studding it at regular intervals with long, headless drawing-pins. Inclining the board slightly backwards, he covers the drawing-pins with large flakes of wadding. Above the board is fixed a small incandescent lamp, which, in a dark place, is said to give the effect of natural clouds. The composition is photographed, with the focus not too sharp, and the cloud negatives so obtained are said to serve for printing-in clouds in photographs.

Hydroquinone and Rodinal.—The *Deutsche Photo-Zeitung* recommends the following combined hydroquinone and rodinal developer, as giving harmonious results without the hardness of the one or the want of contrast of the other.

A.

Hydroquinone	10 grammes.
Rodinal 1·10	40 „
Sodium Sulphite	50 „
Distilled Water	500 „

B.

Potassium Carbonate	30 grammes.
Distilled Water	500 „

For normal development start with A, and if it develops slowly add little by little of B; for instantaneous work take equal parts of the solutions.

Reducin.—This is the name which the Berlin Society of Chemists has given to the very newest developer, which is one of the series of which amidol is the best-known type. It develops without alkali, according to Dr. Vogel, who is also reported to have said that it is superior to pyro. The following is the formula:—

Sodium sulphite	50 grammes.
Water	1000 „
Reducin	5 „
Sulphuric acid	12 drops.

The latter neutralises the alkalinity of the sulphite, which, in an alkaline state, immediately discolours the solution. Amidol, diamidophenol, metol, glycin, reducin, in less than a year! Next, please!

The First Balloon Photograph.—In the last number of the *Paris Photographe* there is a reproduction of a view of Paris

taken from a balloon in 1858 by M. Nadar. It is said to be the first photograph of its kind.

Prefers Wet Collodion.—Herr Fritz Luckhardt, the well-known Viennese photographer, has expressed a preference for the old wet-plate process over modern gelatine plates. Since the employment of the latter he thinks that portrait photography has considerably retrograded. Dry plates, he said, do not permit the photographer to judge immediately of what the negative is like, particularly in regard to the expression and pose of the sitter, which an expert operator often sees occasion to modify. For these reasons Herr Luckhardt extols the old process. We do not, however, gather that he has decided to revert to it.

A Monochromatic Light.—For those engaged in photo-micrography the following method of producing a monochromatic light is given by the *Revue de Chimie Industrielle*. A mixture of bromide and bicarbonate of soda is agglutinated with gum tragacanth and moulded into small discs, 4 mm. by 12-15 mm. These are placed in the flame of a burner which consumes them at the rate of two or three centimetres per minute.

NOTES ON SOME PECULIARITIES IN THE ACTION OF HYDROQUINONE (QUINOL) AND PYROGALLIC ACID DEVELOPERS, AND ALSO OF WATER, ON GELATINE DRY PLATES.

It is customary with some photographers to immerse a gelatine negative plate in water for a few seconds before development, in spite of the opinion of some that such treatment is apt to lead to the formation of "air bells;" whether this be the case or not, I do not think it is generally known that such an immersion makes a considerable difference in the time the image takes to develop. The following account of some experiments which were made during an investigation not yet finished may be of some practical interest to photographers who use pyro-ammonia or hydroquinone developers.

The plates used were Ilford ordinary. All the solutions were freshly made and quite colourless. Fresh developer was used in each experiment.

1. A plate was cut in halves, one half immersed in distilled water for thirty seconds, the other half untouched. The two halves were then placed in a dark slide, exposed on an ordinary open landscape, chosen so that the picture was of sensibly uniform character as regards colour, light, and shade, and the two halves were developed together in the same dish by an ordinary pyro-ammonia developer (Edwards's).

Result: The half which had been immersed in water developed more rapidly and made a stronger image than the other.

2. A plate was cut in halves, one half (A) immersed in water for thirty seconds, the other half (B) untouched; both were exposed together in the camera, and *before development* the half A was left as it was, whilst B was immersed in water for thirty seconds; both were then developed together, when no differences were discernible in the rate of development or in the character of the developed image. Thus the action of the water in accelerating development, which is very decided, seems to be purely mechanical, for it acts as much if the water be applied after exposure as before.

The practical inference from this is that with an under-exposed plate water immersion before development may be useful, with an over-exposed plate it must make the development more difficult to control.

The remaining experiments prove a remarkable difference between the action of the two developers—hydroquinone and pyrogallic acid.

3. One half of a plate (A) was immersed for thirty seconds in a hydroquinone developer (Thomas's)—*i.e.*, both developing solutions mixed, and thus containing hydroquinone, sulphite, bromide, and sodium hydrate—the other half (B) in water for thirty seconds; exposed together, and both developed together with the same (Thomas's) hydroquinone developer. The half A developed far more rapidly than the half B, and, moreover, showed more detail.

Thus hydroquinone developer, applied wet to a plate before exposure, markedly increases its sensitiveness over a water-wetted plate, *and, à fortiori, over a dry one.*

4. A similar experiment to 3 was made with one half wetted for thirty seconds with pyro-ammonia developer—*i.e.*, containing pyrogallic acid, bromide, *and ammonia*—the other half placed in water for thirty seconds, then exposed together, and developed with pyro-ammonia. The result showed that this developer acts in precisely the reverse way to hydroquinone, the water-wetted half having fogged over before before the other had developed. The pyro-ammonia half developed very slowly, and gave an image showing all the detail visible in the other, but "strong," with remarkably clear shadows.

5. To compare a plate wetted with pyro-ammonia with an untouched plate, a similar experiment showed that the pyro-ammonia half developed *very much more slowly* than the untouched, and with much the same differences noticed in 4.

(Developer, pyro-ammonia.)

6. Similar experiment to 5. One half soaked thirty seconds before exposure in the solution of *pyro* only (*i.e.*, no bromide or ammonia), the other untouched, showed that pyro alone is a *very* powerful retarder, the untouched half being fully developed before anything was visible on the other half; and yet the action seemed one of *retardation only*, for eventually there was little, if any, perceptible, difference in detail between the two, though the pyro half gave a powerful negative, whereas the other was weak and over-exposed-looking, though both had received the same exposure.

(Developer, pyro-ammonia.)

7. A similar experiment to 6, made with a solution of hydroquinone, sulphite, and bromide only, *i.e.*, Solution I. of Thomas's developer), showed that the hydroquinone solution greatly accelerates a dry plate, and, moreover, seems to enable it to show greater detail.

(Developer, hydroquinone.)

8. Thinking that the acceleration produced by the hydroquinone developer might be due to the disodic sulphite, itself a reducing agent, a plate was cut in half, one half immersed in a solution of sulphite, the other half in water, each for thirty seconds, the two halves exposed together as before, and developed with hydroquinone, the image appeared a trifle earlier on the sulphite half, but there was little difference in the character of the two images, hence the sulphite alone has very little effect. This was repeated with the same result.

9. An exactly similar experiment—one half immersed in sulphite solution, the other in a solution containing hydroquinone only (no sulphite or bromide); result: the hydroquinone half developed its image a little before the sulphite half, so that neither sulphite nor hydroquinone *alone* produced any marked difference when compared with a plate simply wetted with water.

10. In this experiment, a solution of hydroquinone and sulphite mixed was used on one half, sulphite solution alone on the other. The result (as was to be expected from a former experiment) was that the half which had been immersed in the hydroquinone sulphite, developed far more rapidly than the other, and, moreover, produced a far more "plucky" negative, the sulphite half, in spite of its coming out more slowly, showing fog, whereas the shadows in the other were very clear.

From this it would appear likely that the sulphite and hydroquinone together form some compound whose reducing action greatly exceeds that of either constituent separately. T. C. Ponten.

PHOTO-ASTRONOMY AT THE CAPE OBSERVATORY IN 1892.

II.

As will have been noticed on the photographs already referred to, there are a series, or rather two series, of parallel lines at equal distances apart. These are produced by exposure of the plate behind a *réseau*. This *réseau* is a square of optically worked glass on which a film of silver has been deposited, and then placed in a ruling machine, where the lines are drawn with a fine diamond point at a distance apart of five millimetres. Parellel light is allowed to pass through these lines so as to impress an invisible image of the lines on the sensitive film, which is then ready for exposure in the photo-telescope. When the plate is developed, should the film either expand or contract, the lines expand or contract with the film: and as star measurements are made, not by reference to their distance apart measured direct on the film, but by their distance from the lines whose distances are already known, the expansion or contraction of the film is a negligible quantity. Thus one of the difficulties detrimental to exact astronomical measurements by photography is, thanks to Dr. Lohsë, completely done away with. A difficulty met with in all astronomical measurements by eye is found in the vibrations of the atmosphere due to ascending and descending currents of air. Now, when a photograph is taken of a star, should these vibrations be very considerable, the size of the star disc is enlarged; but the result is a circular image, the centre of which is capable of exact determination under the measuring machine. Two of the photographs sent

home give a remarkably good example of photography applied to exact astronomy. The star α Centauri, which was the first star whose distance was determined (at the Cape Observatory, I may mention in parenthesis) is in other respects a remarkable star. It is a very fine double star, the componenta of which revolve round a common centre in seventy-five years. At one period of the revolution the two stars, as viewed from the earth, appear nearly to coalesce; at another period of their revolution they are well separated. At the present time they are about their maximum distance apart. The photographs show a series of exposures of four seconds each, one-half of which exposures have been taken with the telescope with its aperture stopped down to three inches, and the other half have been taken with the further addition of a wire gauze screen. The double wavy line down the centre is produced by stopping the clock, and allowing the telescope to remain still. The two stars thus produce trails as they pass across the field of view, trails which print down, as it were, every vibration of the atmosphere. Measurements of these plates give a result which eye observations can scarcely equal, certainly not surpass.

The last photograph, that of ω Centauri, is a fine example of the powers of photography, an accurate delineation utterly beyond the powers of the observer by eye. This cluster, made up of stars of about the twelfth and fourteenth magnitudes, is one of the most beautiful telescopic objects in the heavens. It is just visible to the naked eye as a faint nebulous star. The whole area shown in the lantern slide is about equal to two-thirds of the moon's diameter. It has been enlarged from the original negative, and gives a fair representation of what would be seen in a powerful telescope such as the ten-inch guiding telescopes provided with the instruments used in the international star chart. It was exposed for three hours on an exceptionally fine night. Now, to measure and plot down all the stars in this magnificent cluster is a task that the most devoted astronomer might well shrink from. It would be a long but still a comparatively easy task to do so in the study from the photograph. We shall not live to know what changes take place in the galaxy of ω Centauri, but future generations may be able to deduce from photographic records important knowledge of the structure of a universe.

And now to leave the sensational and come to the more sober and prosaic details of the scheme, which many observatories are now busily engaged in; less sensational only in its immediate results, for it is to form the foundation for reference of all future astronomical observations, as well as to leave to the future generations a reliable record of the stellar sphere in its present state depicted with a refinement as well as speedy and economical fulfilment which by any other available means would be beyond the present resources of science.

There are two pieces of work to be done. The first is to consist of a series of plates with short exposures that shall show all stars up to about the eleventh magnitude, which series of plates shall be submitted to measurement, and every star catalogued, in order that the astronomer may have a full and complete series of points from which to refer all future observations. The second is the long-exposure series, that shall record all stars up to about the thirteenth magnitude.

Now as to the catalogue plates. The various zones have been distributed amongst the co-operating observatories, and each region has been divided upon a uniform plan. A little over two degrees square can be taken on each plate, and the centres of the plates are to be taken, as nearly as can be conveniently arranged, just two degrees apart, so that there shall be just a small amount of overlap. But, as the stars at the edges of the plate are not depicted as sharply as those in the centre, and as it is advisable, moreover, to duplicate each observation, a second series has been arranged, so that each plate of the second series shall overlap the adjoining quarters of four plates of the first series. The arrangement of the slates on a roof is not unlike the arrangement of star plates thus determined on. But it is necessary that the position of each plate shall be correct, and, as the stars are not distributed so evenly over the heavens as to give a star exactly in the centre of each plate, the nearest star to the centre as given in our present catalogues is chosen, and its distance from the centre calculated. The guiding telescope has an arrangement by which the eyepiece with its attendant cross-wires can be shifted exactly that distance away from the optical centre. The star chosen, therefore, is a means of exactly setting the instrument, as well as a guide for the observer to tell whether his clockwork is following accurately, and, if not, to apply the necessary correction.

The observer, therefore, sets his clockwork going, exposes his plate behind the *réseau*, transfers it to the metal dark slide of the photo-telescope, sets off his calculated measurements on the micrometer of the observing telescope, points the instrument, and having the star centered on his spider line, or cross wire, commences the exposure. On a night of fairly good definition he gives an exposure of six minutes, which should give good measurable images of stars up to the eleventh magnitude. He then shifts his micrometer, and also his instrument, through the small space of half a minute of arc, corresponding to half a millimetre on the plate, and gives an exposure of three minutes, which shall give him a just visible image of an eleventh magnitude star. Shifting micrometer and instrument to a similar amount, he gives another exposure of twenty seconds, which should give him a just visible image of a ninth magnitude star. This done, he puts the plate away and takes another centre. Should the night be poor for observing, he increases the exposure, always taking the proportions of eighteen, nine, and one. After a number of plates have been thus exposed, a comparison area is taken. A certain number of areas near the celestial equator have been selected by Professor Kapteyn, of Groningen, such area having an easily identified bright star in the centre, and having a moderate number of stars of the ninth and eleventh magnitudes near it, the magnitudes having been carefully determined by Professor Pritchard. The area receives exposures similar to the catalogue plates, and is at once a standard by which to determine whether the catalogue plates have received sufficient exposure, and also as a means of comparing magnitudes. It is not always a safe guide, as at this Observatory, for instance, the definition to the north may be better or worse than that to the south; it is, of course, the observer's business to note the definition, and so given some guide to the checking of the plates. A further guide is given by comparison of the overlapping images of plates taken on different nights. The area taken, work on the catalogue plates is once more proceeded with. At this observatory, all plates are developed in the morning, well washed, examined, and accepted or rejected when dry. Of course, this inspection is not final; when the plates come to be put in the measuring machine will afford the best test, but it is advisable to at once weed out ruthlessly all those that do not come near the mark. At the Cape Observatory in 1892, some three hundred or more catalogue plates were taken without counting those put aside as not satisfactory. There are nearly fourteen hundred assigned to the Cape in the zones marked out for us, a larger number than any other observatory is debited with; but it is hoped, nay, expected, that the catalogue part of our work will be finished by the end of the present year, and, in addition, some little progress on fine nights will be made with the longer-exposure chart plates.

The chart plates only number one-half the catalogue plates. It is not so absolutely necessary to obtain the second set overlapping the first. Of course, it would be better to do so, but time and money have to be taken into consideration. The chart plates will be exposed on the best nights for about one hour, and only one exposure will be made on each plate; for when so long an exposure is given, and so many stars impress themselves, the taking a triple series of exposures on each plate would only mean confusion. Even on some of the catalogue plates it is evident that some additional special plates may have to be exposed, as an occasional close cluster of bright stars is rendered difficultly measurable, owing to overlapping images.

The chart plates, with the expected multitude of stars they are likely to reveal, are not to be measured, and the method of reproduction and publication has yet to be considered. The measuring of the catalogue plates will be no light piece of work, and the means of its accomplishment will have to be considered, though the way is obvious. As to the way of measurement, I may conclude with a brief account of what is done when a plate is submitted to measurement.

The measuring machine made by Repsold for the Cape Observatory has a circular motion for measuring angles, which are read off by microscopes bearing on the graduated circle. It also has two lateral motions at right angles to one another, with scales for measuring right across the plate in both directions. The first important thing to be done is to determine the values of every distance between the *réseau* lines on the *réseau* itself; and this should be done before the *réseau* is taken into use, lest any accident happen to it in the course of work. The measuring machine has also a microscope with cross wires at right angles, capable of moving across the whole field of view, and with micrometer heads to tell exactly the amount of movement. The finished negative is put into its place, and adjusted with the *réseau* lines exactly parallel to the cross wires in the micrometer eyepiece. In the centre of the field of view a five-millimetre square is adjusted, and the cross-wires are passed over from *réseau* line to star, and to opposite *réseau* line, then back again. Every star measured in that particular square, the next one is taken, until the whole 676 squares have been passed in review, and the positions of the whole of the stars determined. The measurements then pass into the hands of the computers.

C. Ray Woods.

BACKING AND BLURRING.

One would have thought that the advantages of backing plates with some non-actinic compound of about the same refractive index as the plates themselves would have been settled years ago, considering the numbers of exhaustive experiments that were undertaken, and the invariable improvement in the results in comparison with unbacked plates when the process was adopted. Not that the effects were always the same, for it was found very much depended on the character of the film and method of development. Now, even more than formerly, our negatives become afflicted with blurring and halation, which seems to increase with the rapidity of the plates, and affects all classes of work from copying to high-class portraiture. It has been definitely proved that, in *all* cases where the subjects possess great contrast of lights and shadows, backing is an advantage; but, in less trying subjects, little or no difference was perceived *with some plates*. With others, again, it was a distinct advantage all through, whatever the subject happened to be. There is no doubt that very much depends on the emulsion itself, independent of any other cause whatever. A dense yellow film rather slow, backed or not backed, is rarely affected by halation or blurring in any except very extreme cases; but with a thin, whitish film of considerable rapidity it is almost impossible to get an image entirely free from it, and with difficult subjects and every precaution used blurring will take place.

Of course, this blurring or halation—I use the words indiscriminately—may be present in such small degree as to escape observation, or only so much that a few bright spots of light will have softened edges. It may be that there are very many small portions of a picture white or nearly so in contact with darker parts, all of which would be affected in the same way. The general brilliancy of a negative would thus be depreciated without it being possible to say with certainty it was suffering from blurring, or it might escape notice altogether, probably would. The same subject, however, taken on a plate free from this fault, would be much the better of the two. A *very rapid* plate almost *invariably* blurs under trying conditions, and often when conditions are less exacting, backed or not, no matter how the development is managed, which, by the bye, has considerable influence on the result: but, apart from this, a thin, rapid film is practically unworkable for any subject with violent contrasts, and I do not think the reason far to see. With such films the particles of silver bromide are considerably larger than with a slower preparation, and being more loosely aggregated offer less resistance to the passage of light *in all directions*, not only as reflected from the support, but in the film itself, from particle to particle. In support of this view, the bromide diffused through a large quantity of gelatine suffers halation in proportion to the amount of salt enclosed in it. A thick film, with a comparatively small proportion of bromide in an exalted state of sensitiveness will be very rapid, but the image produced will lack brilliance, even to fogginess; thus the extra difficulty of working rapid plates will be understood, as, the more rapid they are, the looser and larger are the particles of the silver bromide - a fact recognised soon after emulsions were used. An interior whose illumination is derived from a white-glass window directly in front, taken on a rapid plate, is absolutely certain to show this defect in a very pronounced manner in defiance of any precaution that may be taken to prevent it. I remember a case on which I expended many plates and every precaution I knew to avoid this trouble, but it was not until I adopted some slow plates that I could obtain a presentable result, when the affair worked like a charm, and, except in a very trifling degree, was entirely free from blurring.

Backing the plates will always *improve* the quality of the image *if the film is easily penetrable by the light*, because, light reflected from the back surface of the plate is thus rendered innocuous; but, owing to the dispersion of light in the film itself, is only a partial remedy, and the difference in plates in this respect has undoubtedly given rise to diversity of opinion on the advantage of backing. Beyond a certain point, every increase of sensitiveness is adding to the difficulties of working, and at the present time there is such an irrepressible desire for rapidity that every other quality is more or less sacrificed to it. Very rapid films, besides blurring, are much more prone to *reversal*, an equally annoying defect when an exterior view is wanted in combination with an interior—a view through a window, for instance, will show as a positive without the slightest trace of blur, but the effect on the print is equally disastrous, and more difficult to doctor.

I am inclined to think that lateral diffusion of light in the film of a gelatine plate is the chief reason why wet collodion is preferred for photo-mechanical processes, and the reproduction of line work in general. Given a *thin gelatine* film, so far as substance is concerned, well charged with not over-sensitive silver salts, the resulting image will be quite as free from veil, and the dark lines rendered as clearly as with collodion. The exigencies of much photographic work necessitates a certain degree of rapidity, especially portrait work in the studio, when other qualities are sacrificed to secure it. However, some of the finest work extant has been produced on only moderately rapid films. There is no doubt all additional speed beyond a certain point induces difficulties that the most skilful development will not always overcome. Take for instance a sitter, habited in yellow-coloured velvet and white lace, intermixed with a quantity of white silk drapery, on a very rapid, and also on a moderately rapid, or slowish plate, and compare the results, both plates being backed. The slower plate will be found to give very much more detail in the light parts, and the pattern of the lace will be well made out, sharp, and distinct, and the darker velvet will not be partially obscured by blurring; but, in the rapid, there will be considerable falling off in both respects —the lace will be less distinct, and the edges of the darker parts will be blurred, and very small portions of the dark will be almost obliterated. The effect is identical with the blurring round the windows of an interior. If this effect was owing to reflection from the back of the glass, the backing would prove a perfect remedy; but, owing to the short exposure, and the amount of light falling on the sitter, there is not so much damage to the image from this cause as from internal reflection, which is, of course, entirely independent of that from the back surface of the plate. A rapid film, on any other support than glass, is liable to this kind of blurring. I have seen films on paper entirely spoilt by blurring where there could be no possible reflection from the support.

In all probability, multiple films should be more free from this defect, so far as the lower or *less* sensitive strata are concerned; but I can scarcely think that, from the point of view I take, the more sensitive layers should enjoy immunity from it, than when such sensitive layers are in direct contact with the glass. However, this is mere supposition on my part, as I have not worked with the films in question; but I cannot realise to myself that a subject that would blur with an equally sensitive film alone would cease to do so in superposition on another slower one. But perhaps I have been misinformed on this subject, upon which I hope before long to have practical information. A very strong, sharp light impinging on a film in the camera illuminates the whole surface of the plate and interior of the camera in the form of diffused light, but is too weak to injure the image, unless the camera is filled with, so to say, a cloud of dust, vapour, smoke, or the inside of the camera itself being somewhat shiny, which would be sufficient to reflect the light partially from its direct course, and to depreciate the quality of the image. In the old wet-plate days black velvet moistened with water or glycerine and water was placed in the camera during exposure, not only to delay the drying of the plate, but to catch any dust that might be there. In outdoor photography dust, vapour, and smoke are very common conditions in which some kinds of work have to be done, and it is necessary to get the camera as free from them as possible, or the results would be anything but satisfactory. When the light impinges on the film to form the image, it becomes diffused in all directions within the film, penetrating more or less according to amount of resistance offered by the haloid in *compactness* and *colour*; very much in some cases, and in some so little as to cause no perceptible difference to the brilliancy of the image. When the particles of silver bromide are very closely aggregated together as in most slow plates, we have a barrier interposed to the reflection of the light, and the film is, so to say, opaque—the light neither passes though nor disperses itself laterally during the time necessary for exposure. But, if instead of this opacity we have a considerable body of gelatine, with the bromide particles widely separated and large in size, there is not much resistance to the passage of light in any direction, which consequently induces the faults of blurring and fogginess.

Backing stops reflection from the glass and is so far useful, but the lateral dispersion goes on just as energetically as if there was none, and we fail to get a clear, brilliant image. This effect does not occur so much on collodion films, hence the preference given them for line work. It is simply because the actual thickness of the film is so much less than with gelatine. I believe, if the collodion film was made thick as gelatine, its superiority in this respect would cease, and the effect of blurring would be the same as when the haloid is enclosed in gelatine. If the gelatine coating was made as thin, and to carry as much salts as the collodion, the two preparations would, in all probability, be very similar as far as blurring and halation are concerned. A gelatine film has always been supposed to excel collodion in rapidity, but I think, if the same attention had been paid to collodion as that given to its rival, an equal rapidity would have been secured by this time. This is, however, somewhat deviating from the subject of this paper; but one thing seems so dovetailed into another in matters photographic that we find very few effects limited to single reasons, so that in discussing one we insensibly run into

another. Whatever the real cause of halation may be, nine times out of ten backing the plates will reduce it; but, if we wish to get absolutely rid of it, the quality of the emulsion is principally to be relied on. Plates of a moderate speed, containing iodide, are best, and those of great rapidity worst, of all in this particular.

EDWARD DUNMORE.

COMPOSITE HELIOCHROMY.*

LIGHT transmitted by the image of the green sensation, G, passes through the green colour screen, G′, to the silver mirror, 5, thence sideways to the silver mirror, 6, forwards through the transparent mirrors, 4 and 2, and the objective, D, to the inclined mirror, E, and upwards into the eyepiece, under which a green image is formed, exactly coincident with the red and blue-violet images. A portion of the green light is lost by reflection from the transparent mirrors, 4 and 2.

The fact that the light rays from R, V, and G travel equal distances before entering the eye, and have a common axis after emerging from the mirror system, secures a direct blending of the images, which must otherwise be projected upon a matt surface in order to be seen as a single image. Prismatic devices, as proposed by Du Hauron and others, fail in this respect, and are therefore useless.

An optician will readily see in the instrument as described various apparent defects, none of which, however, are evident in the instrument as constructed. In the first place, in the absence of colour screens, the image of the green sensation, formed of light reflected from a central silver mirror, is much more brilliant than the other images, formed of the weaker portions of light reflected from the central transparent mirrors, which are unsilvered, plane-polished glasses. But the band of pure green light in the spectrum is very much narrower than the bands of red and blue-violet, and this apparent defect is therefore, in reality, an advantage, because it permits of the use of a screen that transmits the light of only a very narrow band of spectrum green, instead of the broader band that would otherwise be necessary to make up white light. Another apparent defect is that, if the transparent mirrors have parallel plane surfaces, they will, if clear, give a doubled instead of a single image. This defect can be removed by making the mirror 4 of canary-yellow glass, which transmits both red and green light freely, but destroys all the blue-violet light that is not reflected from its first surface; and the mirror 2 of a cyan-blue glass, which freely transmits both green and blue-violet light, but destroys all red light that is not reflected from its first surface. This method of correction is objectionable, because it reduces the intensity of illumination by nearly one-half. The method that I have adopted is to use thin glass, having the two plane surfaces inclined to each other just sufficiently to make the two reflected rays coincident at D. Another apparent defect is found in fact that the amount of light reflected from the plane glasses used as transparent mirrors varies with the angle of incidence. With the arrangement shown in the diagram, the top of the image of the red sensation will appear brighter than the bottom, and the outside of the image of the blue-violet sensation brighter than the inside. The disc of light seen in the heliochromoscope—when the chromogram is absent, and the instrument directed towards a white sky—will be white only in the centre, the outer portions showing a delicate tint of blue on the one side, yellow on the other, pink at the top, and green at the bottom. This defect has been removed by the simple expedient of inclining the colour screens, so that the stronger ray passes diagonally through the coloured glass, and the weaker ray straight through.

The mirrors are attached to brass supports, and are adjustable by small screws pressing them against the springs by which they are held in place. But the adjustment is such a nice matter that a twentieth of a turn of a single screw, having fifty-six threads to the inch, would make the instrument useless until it had been readjusted.

One of the cameras I use for making the chromogram negatives is a converted heliochromoscope, the eyepiece serving as an objective, projecting an image that includes nearly 50° angle of view. It may be readily reconverted into a heliochromoscope by substituting a chromogram-holder and *pure* colour screens for the plateholder, and *selective* colour screens. In this instrument, transparent axial mirrors are used for the images of the green and blue-violet sensations, and a pair of silvered mirrors for the image of the red sensation, because the latter must be made many times brighter than the others on the sensitive plate employed. This is a more compact and convenient form of camera than any other that I have devised for this purpose, but the aperture of the eyepiece is so small that it is necessary to give very long exposures—up to ten minutes on well-lighted landscapes with ordinary isochromatic plates.

When circumstances do not admit of the longer exposure, I use another form of camera, in which the mirror system is arranged in front of three separate objectives. This camera, in comparison with the compact inverted heliochromoscope, is somewhat clumsy, and includes a smaller angle of view, but has an effective aperture of about *f*-16 for the image of the red sensation, and requires not more than thirty seconds' exposure for objects illuminated with clear sunlight.

I now come to the consideration of the defects of the system as a means for reproducing the colours of Nature. One of the greatest photographic authorities has said that no method depending upon the production of photographic negatives by known processes can possibly be made to secure accurate reproductions of colour, because no known photographic negative-making process will accurately reproduce monochrome light and shade. This statement is strictly true, and the fact must not be ignored, even though the defect referred to affects the success and value of colour photography scarcely more than it does the success and value of monochrome photography, which can be made to give reproductions of the majority of monochrome subjects good enough to be generally accepted as true facsimiles.

In monochrome photography the contrasts in the middle shades of a correctly exposed negative are always more or less exaggerated, at the expense of both ends of the scale. The positive print from such a negative will, upon critical comparison with the original, appear more or less weakened or bleached in the lighter shades and heavy in the shadows, with undue contrasts in the middle shades, especially if the original shows strong contrasts of illumination. In composite heliochromy the same defect must evidently be present, making colours appear as if slightly faded in the lighter shades and dull in the deeper shadows, with undue strength and contrasts in the middle shades. This defect is seldom noticeable in reproductions of evenly illuminated objects when photographed upon the highly sensitive and soft-working photographic plates available for this work. The defect, however, may be offensively evident in reproductions of objects showing strong contrasts of illumination.

Another consequence of the same defect in the photographic negative-making process is undue intensification of the stronger elements of mixed colours in the deeper shades of the picture. For example, an orange, which is a mixture of four parts of red to one of green (physiologically), if it act with exactly four times the force in producing the negative of the red sensation that it does in producing the negative of the green, will be represented by more than four times the density of deposit, in case only a moderate exposure be given (because the density is always disproportionately great in the middle shades of the negative), and will, therefore, be reproduced as a slightly redder orange than it really is. A full exposure corrects this defect, and an excessive exposure, by bringing the green element into the middle shades of its negative and the red element into the high lights of its negative, either reverses the defect, making the orange too yellow, or, in case it is originally impure (*i.e.*, mixed with a small proportion of white light), may even produce a suggestion of brick-red in the reproduction.

This defect is not as serious as might be expected, because it is really only an exaggeration of effects produced upon the eye in ordinary vision, by corresponding variations in the illumination of the object, for which the judgment, from mere force of habit, instinctively makes allowance. In this connexion I quote from Rood as follows:—

"Coloured surfaces undergo changes of tint when they are seen under a very bright or a very feeble illumination. . . . . The violet of the spectrum is easily affected; when it is feeble—that is, dark, it approaches purple in its hue; as it is made stronger the colour changes to blue, and, finally, to a whitish grey, with a faint tint of violet-blue. The changes with the ultramarine blue of the spectrum follow the same order, passing, first, into sky-blue, and, finally, into white. Green, as it is made brighter, passes into yellowish-green, and then into whitish-yellow; for actual conversion into white, it is necesssary that the illumination should be dazzling. Red resists these changes more than the other colours; but, if it be made quite bright, it passes into orange, and then into bright yellow. . . . . Colour sensations, which are due to the joint action of two sets of nerves, speedily diminish when the colour is darkened, and are replaced by the primary sensations—red, green, or violet. The sensation of orange is produced by those light waves in the spectrum, which have a length such as to enable them to stimulate the red nerves strongly, and the green nerves to a lesser degree; hence, when orange-coloured light is made very weak, it fails to act on the green nerves, while feebly stimulating the red. For similar reasons the sensa-

* Concluded from page 330.

tions of yellow and greenish-yellow pass into green, as do also those of greenish-blue and cyan-blue; in the same way, the sensations of blue, ultramarine blue, and violet-blue pass into violet."

In short, we have in this colour photography imperfect rendering of the relative intensities of colour in the different shades of the picture, corresponding to the imperfect rendering of gradations in monochrome photography, and also exaggerations of the visual effect of varying intensities of illumination upon colours, due to the same defect in the negative process.

I will take this opportunity to suggest that the similarity of the photographic defect to an inherent defect of colour vision may be taken as an argument in favour of the theory that colour vision is itself essentially photographic. It appears to me that there may be in the retina three light-sensitive chemical substances, each of which, when acted upon by light, reacts upon the nerves of vision to produce a definite sensation, which is one of the recognised fundamentals. We may assume that one of these substances resembles, in its optical properties, a coal-tar dye, which is sold as "multiple yellow," and which shows an absorption curve very much like Captain Abney's curve to represent the action of spectrum rays upon the fundamendal blue-violet sensation; that another substance similarly resembles aniline magenta, which shows an absorption curve similar to Maxwell's curve for the action of spectrum rays upon the fundamental green sensation; and that a third similarly resembles an aniline blue, that shows an absorption curve similar to Maxwell's curve for the action of spectrum rays upon the fundamental red sensation. Such substances may be in liquid form, like solutions of the dyes, and the mixture, like a mixture of the dyes, would absorb all the spectrum rays that excite vision. The spectrum rays at Fraunhofer line D would be absorbed about equally by the blue and magenta substances, thereby exciting about equally the two fundamental sensations red and green, which make up the compound sensation of yellow. All other compound sensations would be similarly explained. Solarisation in one of these substances, by bleaching or destroying some of it, would temporarily weaken the corresponding sensation, but, at the same time, increase the sensitiveness of that portion of the retina to other colours by giving some of the spectrum rays freer access to one or both of the other two substances. It seems to me that no other theory will explain so much as this. But my paper is not on the subject of colour vision, and I must, therefore, reserve further consideration of this subject for another occasion.

Under favourable conditions the photographic defects which I have mentioned are so small as to pass unnoticed by the ordinary observer, to whom the reproduction seems perfection in every respect. Under unfavourable conditions the results might be quite as unsatisfactory as are sometimes the results in monochrome photography. To look for a nearer approach to perfection would be unreasonable in the present state of photographic science.

I hope to go more exhaustively into this branch of the subject at some future time, but believe that, in a general way, I may claim to have stated the case fairly. If the scientific specialist is inclined to think that I may have made out too good a case for composite heliochromy, the practical photographer will, on the other hand, be astonished to find that, in spite of all theoretical and practical difficulties, the image of familiar objects, as seen in the heliochromoscope, is as satisfying to the eye as the transient image on the ground glass of the camera which he has so often admired and dreamed of fixing.

In actual practice defects due to quite different causes have been far more troublesome and irritating to me than either of those described. Fortunately, however, they are not inherent in the process, and it was only necessary to discover their true cause in order to eliminate them. With certain developers, hydroquinone being one—the image of the blue-violet sensation commences to develop first, and goes on almost to completion long before the detail is all out in the image of the red sensation, even though the latter may appear relatively over-exposed after the development is fully carried out. Under such circumstances, the relation between the two images will vary with the time the plate is left in the developer, and it is difficult to ensure accuracy. This difficulty was substantially overcome by using the eikonogen developer, and seems to have entirely disappeared with rodinal development.

With some sensitive plates the image of the green sensation, formed principally in eoside of silver, develops more density than either of the other images, and introduces troublesome irregularities. Fortunately, some of the best makes of sensitive plates are free from this defect, and may be selected for this purpose.

For a long time, in spite of every precaution I knew how to take, my negatives developed considerable more density towards the edges of the plate than towards the middle. The consequence of this was that the top of the negative of the red sensation, and the bottom and outer sides of the negatives of the green and blue-violet sensations, would be so over-dense as to make the colours in those parts of the reproduction distinctly incorrect. I imagined this to be due to a defect in the sensitive plates, an effect of the more rapid drying of the emulsion at the edges in process of manufacture. In this I was happily mistaken. It proved to be due to access of air to the outer portions of the plate during the process of development, by constant rocking in a dish containing a rather small quantity of developer. The unevenness disappeared as if by magic when the plates were developed by deep immersion in the developer in a dipping bath. Probably the reason that this unequal action of the developer has not been noticed in monochrome photography is that the centre of the plate usually receives more light than the edges, and the action which is so injurious in the colour process is seldom more than sufficient to compensate for this unevenness of illumination.

In my earlier experiments, light objects against a dark ground frequently reproduced with a red or reddish halo, because of strong halation in the image of the red sensation, so that, even for objects that come very well in monochrome photography, I found that the plates should be "backed" for composite heliochromy.

The results which I show, taken in connexion with what I have said, will make it evident that the process has already been reduced to very successful practical operation in my hands, and that the conditions of success are such as may easily be realised by others when provided with the same apparatus properly adjusted.

The method of carrying out the process to the production of colour prints, although it will doubtless prove of great value for some purposes, cannot, by reason of its complications, difficulties, and cost, be successfully utilised by amateur and general photographers. As long ago as the year 1881, when I was the only successful producer of half-tone process blocks for the type press, and had considerably improved upon the old methods of composite heliochromy, without quite realising the true principle which I first published in 1888, I made the first photographic reproduction of a coloured subject by three impressions from process blocks. This three-colour print, a reproduction of a chromo-lithograph, was referred to in a leading article in the *Photographic News* of September 5, 1884, page 561. I have one of the prints with me now. The lines expressing the light and shade were run in different directions in the different blocks, in order to avoid the production of a disagreeable pattern—a plan which has quite recently been claimed and patented as a new invention in Germany, and adopted by Kurtz, of New York, and others. My Franklin Institutes lectures upon this subject, in 1890 and 1891, were also illustrated with examples in cemented gelatine colour prints, mounted as lantern slides and window transparencies. The latter are now in the United States National Museum at Washington. I have not followed up these developments of the process very industriously, because it has been my ambition to realise a simple and readily available method of photographic colour reproduction, perfect so far as it goes, before undertaking to fully develop the process in its more complicated form. The best fruit of my efforts in this direction is the heliochromoscope and its appurtenances, which I claim to be the first completely successful means for reproducing the natural colours by photography.

I believe that scientists who have been aware of the impossibility of escaping from the inherent photographic defects which I have described, have greatly over-estimated their importance, through quite overlooking the fact that they result in nothing more serious than an apparent exaggeration of natural defects of colour vision, for which we are already in the habit of making unconscious allowance.

While the not altogether unreasonable doubts of the true scientist have made him cautious and reticent in his attitude towards the claims made for composite heliochromy, some who write with an air of authority upon subjects quite beyond their comprehension have industriously discredited my efforts to substitute the application of true theories, definite methods, and scientific tests for false theories, wrong and indefinite methods, and unsuccessful guesswork. A well-known representative of the latter class recently went so far as to characterise my work as a mere "laying of stress upon words," "of the nature of throwing dust into the eyes of simple mortals." This is certainly a sufficiently bold and simple way of combating facts and arguments that are not comprehended. A sufficient reply to all such wilful or accidental misrepresentations, past or future, may be found, by those who are capable of understanding the subject, in the two papers which I have now had the honour to read before the Society of Arts, and in the references given and results shown.

Objection has been made to the use of the terms "heliochromy," "photochromy," and "colour photography," as applied to this process of

colour reproduction. It has been said that, because colours can be produced directly by the action of light upon certain sensitive surfaces, these terms should be restricted to processes of that character. It was to meet this objection that I named the process "composite heliochromy." If a better descriptive name can be suggested, I will readily adopt it. But I shall be greatly surprised if the public does not finally insist upon calling the production of chromograms after my method by the name of "colour photography," just as they now call the production of stereograms "stereoscopic photography." It is of comparatively little consequence what name is given to the direct processes, so long as they cannot be made to reproduce the colours of nature, and are therefore of no interest to the general public. It is the successful process that should have first choice of suitable names. The only recognised talking machine of to-day is the phonograph, although the name "talking machine" was applied to something far different—an arrangement of bellows and reeds, and pipes, and keys, in imitation of the human vocal apparatus—long before the phonograph was dreamed of. Perhaps the heliochromoscope would be more properly called a photochromoscope, a name which I like better, but have not adopted, because inventors of devices of a very different character have already been quarrelling about the right to use it.

In conclusion, a criticism of the heliochromoscope, from the painter's point of view, may be of interest. An artist friend, who leans towards the Impressionist school, on seeing the instrument for the first time, said the reproductions of nature offended him in the same way that ordinary photography did, by idealising nothing, and leaving nothing to the imagination; in short, the reproduction was "too absolute to be artistic."

F. E. Ives.

Abstract of Discussion.

Mr. J. Wilson Swan congratulated Mr. Ives on the marked progress he had made since he last showed his results in that room. He had told them plainly the limits of his ambition, that of attaining a practical method of producing what he thought was attainable in the direction of colour photography. Popularly, no doubt, photography in natural colours meant something different from what had been shown that evening; it meant a process by which not only light and shade, and the natural form, but also the colours of the objects, would be produced directly on the sensitive surface. Some sanguine people conceived that such a thing was not impossible, but many far-seeing and able men considered it to be quite unattainable, and these would certainly not be the discoverers. The path of progress and discovery was illuminated by the light of hope, and to search for any object hopelessly was not the way to find it. He believed that the feeling that colour photography was unattainable had restricted experiment, and, as without experiment very little progress could be made, it was not wonderful that colour photography, in this ideal sense, had not yet been realised. Within the last few days particulars had appeared in the newspapers to the effect that the long-desired result had been achieved in Paris, and that some few had been privileged to see it. He at once felt a strong impulse to go off to Paris and satisfy himself, but checked the impulse with the reflection that if this piece of news was true—as it was well known how deep an interest the President of the Photographic Society of Great Britain took in the subject, and as Paris was only about eight hours distant from London—it was almost certain that some examples of the alleged discovery would have been there that night. Since they were not, he feared that one more disappointment was going to crush this hope. In short, this discovery had been announced about as often as that of the "sea serpent;" and, probably, the chances of such reports turning out to be true were nearly equal. It struck him that the form of colour photography which had been described that evening had one advantage even over the more ideal process to which he had referred, viz., that it contained within itself the elements of multiplication and reproduction by means of negatives, a feature that characterised the photographic method originated by Fox Talbot, a most valuable feature, and one which he thought was hardly appreciated at its true value. He hoped that this would not be the last time they would see Mr. Ives at the Society of Arts. What had been shown and described that evening was, without doubt, the high-water mark of what had, so far, been obtained in colour photography; and one hardly knew which to admire the most, the logical clearness of Mr. Ives's ideas and the expression of them, the ingenuity of his devices, or the beauty of his results.

In reply to various remarks, Mr. Ives said the images which formed the chromogram had no colour themselves, they were only a register of colours, and might be compared to the wax cylinder in a phonograph, which contained no sounds though it registered them, and, on putting the instrument in operation, reproduced them. In the triple photograph there was a record of the colours, and when it was put into the heliochromoscope they were brought back to the eye. One image was called the red, not because it was red, which it was not, but because it represented the relative amount of action on the fundamental red sensation. It represented the effect of light coming from the object upon the fundamental red sensation. The same with the blue and the green. He had not attempted to go into the science of the subject that evening because he did so very carefully last year, when he explained what various colours of the spectrum excited each fundamental sensation. The sensation itself was of a perfectly simple colour. The screen to produce the effect of the red sensation in the negative must transmit sufficient not only of the red but of the orange-yellow and yellow-green rays, all of which had the power to excite that sensation. The exact colour of the screens in the camera depended on the colour sensitiveness of the photographic plate. If the latter were twice as sensitive to red as to orange, while, on the other hand, the fundamental red sensation was affected twice as much by the orange rays as by the red, it would evidently be necessary to use a screen which cut out some of the red rays, which would otherwise have a disproportionately strong effect. The plates actually used were many times more sensitive to orange than to red, and it was necessary in practice, in order that the red rays should have time to do their share of the work, that the colour screen should cut off a very large proportion of the orange rays. The screens were tested by photographing the solar spectrum, and it was assumed that they were right when the photograph of the spectrum showed a distribution of density which corresponded to a curve representing the power of the different rays to excite the respective fundamental sensations. The heliochromoscope and lantern screens, on the other hand, were, like the fundamental sensations themselves, of pure simple colours. The subject was very difficult to follow for any one who had not made a special study of it. As he stated in the paper, he had devised a camera with which the triple photograph could be made at one exposure of one sensitive plate. He had also explained that the tint of yellow-green on the edge of the water pitcher was due to a defect in the development, not to anything inherent in the process itself.

The Chairman said he believed he was one of the first to see the results of Mr. Ives's work last year, and he must say that what he had now brought forward showed a very decided advance, and was not only very interesting but of scientific value. One could not help seeing that Mr. Ives had worked on thoroughly scientific principles. It was not every one who would undertake to find out what the three fundamental colour sensations were, and where they were situated in the spectrum. A good many who had worked in this direction had not taken so much trouble, and some had selected colours which did not really excite the fundamental sensations. The three which Mr. Ives had chosen seemed to be very near the truth, as far as was at present known. The red sensation was stimulated by the red which lay near the limit of the solar spectrum, and when you got as far as the c line, where the red was pretty bright, there was a very small contamination of green with it, but so small that you might use it, without serious error, for over ninety per cent. of the colour sensation produced in the eye would be caused by the stimulation of the red-perceiving apparatus. The green was situated not in the yellow-green, but was a distinct green of itself; probably only one man in twenty-five had ever felt the true fundamental green sensation at all, because they must be colour-blind in order to do so; the real fundamental sensation was so much mixed up with white that we only felt the green largely diluted. The blue-violet was the one at the far end of the spectrum, somewhere about o, and was very fairly represented by the colour Mr. Ives had chosen. He was rather glad Mr. Swan had not gone to go to Paris to see the colour photographs which were reported, for had he done so he would not have been present to have made his remarks. From the accounts he (Captain Abney) had received he was very sceptical whether any real progress had been made in colour photography. What the Paris process did was to show interference colours. That was not true colour photography, and would only be achieved when actual pigments were produced. A photograph in which the same part looked red in one light and green in another was not colour photography. There were several very interesting points in the paper with regard to the modes of developing; for instance, the fact that the image exposed to the red would not develop with hydroquinone as rapidly as blue did. This he had long been familiar with, and there was a scientific explanation of it which ought to be known, but which would take too long to detail now. Again, he had always held that, in some sensitive plates, the image formed by the green rays was principally formed in the eoside of silver; it had often been combated, but he still held to it, and was glad to find that Mr. Ives's experience confirmed him. Another interesting fact was the method of applying the developer. Mr. Ives said that he first thought the fact that the plate developed more in density at one part than another was due to its not being evenly coated; but, directly he prevented the access of air to the outer portion during the process, the mischief vanished. That might teach a useful lesson to practical photographers. No one could have seen the heliochromoscope without being struck by the ingenuity of its construction, and the marvellous skill with which the reflecting surfaces were arranged. The little contrivances for getting rid of double images formed by reflection from the back and front of a plain glass mirror were admirable. Reflections from plain glass used for other work had bothered him so much that he had had to abandon such mirrors and use the surface of a prism, but Mr. Ives had got rid of the evil in another way, and made the two images coincide by using a very slightly prismatic glass. The little instrument was a masterpiece of ingenuity, and he hoped that when Mr. Ives came again next year he would have still further developed this very instructive process. The time was evidently coming when people would not be content with ordinary photographs as lecture illustrations of machinery or any

thing else, but would require all objects to be portrayed in their proper colours. He concluded by proposing a vote of thanks to Mr. Ives, which was carried unanimously.

ISOCHROMATIC PHOTOGRAPHY.

Before the South London Photographic Society, on May 15, Mr. E. J. Wall delivered a lecture on *Isochromatic Photography*. He said although the principle of isochromatic photography had been known for some years, it was not until Edwards introduced plates commercially that it received any attention in England. The sensitive salt used in the preparation of orthochromatic plates is stained with a dye, usually erythrosine, one of the eosine series. A great many amateurs think they cannot use the plates without a screen. It is seldom required; improperly used, as bad a result can be obtained in the opposite way. In the spring and autumn, when the grass and trees are more yellowish than in the summer, the value of colour-sensitive plates ought to be more appreciated. In the summer a great deal of white light is reflected from the foliage. Isochromatic plates show a great improvement in the rendering of distance, and finer detail in the shadows and water are obtained.

In snow scenes a better gradation of the whites is given. By the use of too deep a screen the sense of distance is destroyed. In sunset scenes the superiority of the plates is strikingly apparent. No yellow screen is required, and comparatively shorter exposures given than when using ordinary plates. A screen would make the shadows blacker. For clouds and seascapes isochromatic plates should only be used. For clouds, using a slow plate and stop *f*-16, an exposure of one-fourth to one-twentieth of a second will be sufficient. Thunder-clouds require one-fourth of a second, but for ordinary one-tenth is enough. Cloud negatives should be kept rather thin. The new developers, amidol or metol, are preferable to pyro for cloud work. Amateurs' snow pictures are mostly unsatisfactory. By using a colour-sensitive plate of medium rapidity and a second tint screen, and giving a comparatively long exposure, carrying out the old principle of exposing for the shadows, and then in developing get a rather thin negative, better snow pictures will be got than before.

Colour-sensitive plates are necessary in copying pictures. Sunlight is the best light to use for this purpose, next magnesium, and then gaslight, and, lastly, diffused daylight. For ordinary work gaslight is more convenient than magnesium. The lecturer used two Defries lamps, with the globes coloured with yellow varnish, and gave enormously long exposures. For pictures containing a good deal of red it was necessary to prepare plates specially for the purpose. Cyanine dye is the best sensitiser for red. To make plates that will keep, prepare your own cyanine. Oil-colour paintings require more exposure than water colours, pastels less, and illuminated addresses still less. For home portraiture the most rapid plates should be used. The only case in portraiture in which a screen, and that a very pale one, should be used is to render very pale-blue eyes.

The faults of isochromatic plates are the great tendency to too great density; but this can be dealt with in development. Ammonia is more likely to yield fog, and for this reason pyro-soda has been recommended as a developer. Pinholes.—These appear in greater numbers when ammonia is used as the accelerator than when soda or potash is substituted.

Screens of various makes were shown, but, if desired, photographers can prepare their own by dissolving one grain of brilliant aniline yellow in an ounce of amyl collodion, *i.e.*, pyroxyline dissolved in amyl acetate, and coating thin glass with it. By using two grains of the dye to the ounce, a screen increasing exposure three times will be obtained. Microscopic cover-glasses are useful in preparing screens, and two of them can be fastened together.

WATSON'S CAMERAS FOR THE SEASON.

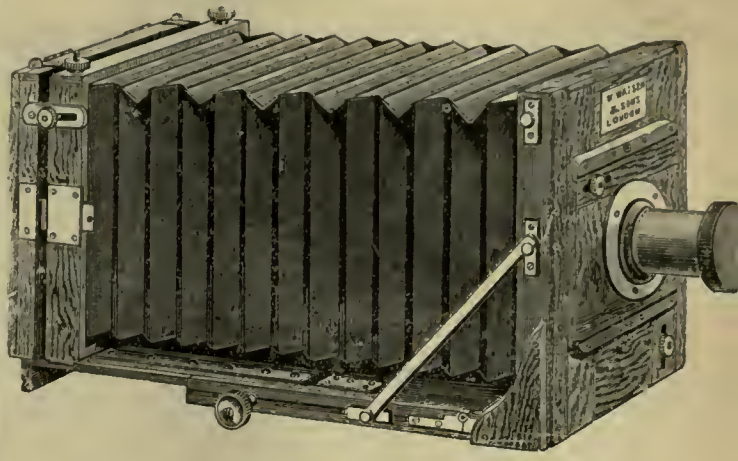
On visiting Messrs. Watson & Son's handsome and well-stocked establishment in High Holborn, we were shown several new and improved styles of cameras finished for the work of the season now before us. Among these, we were pleased to see an improvement that has recently been applied to the well-known "Acme," in virtue of which the lens, even one of the widest angle, can be raised or lowered to a greater extent than formerly without the folds of the bellows body being permitted to cut off the corners or any part of the plate.

We were gratified in being informed that a great many cameras, especially those of the half-plate size, are now being fitted up for stereoscopic work—a demand on the part of the public which attests the return from desuetude in which binocular photography has so long lain.

To prevent the possibility of light passing through the folds of the draw-slide, we were shown examples of those now made, in which the slide has been rabbeted out at the folding junctions so as to debar the passage of light; even if the textile fabric, which acts as the hinge, were to give way or be torn off in places, still would no light get to the plate.

To the "Studio" camera for 15 × 12 plates is now fitted an attachment with a repeating back, by which comparatively small negatives, such as cabinets and *cartes* can now be taken with facility, from which it follows that one in possession of a camera of this size and with this attachment does not really require a second one so long as his aspirations are confined within the 15 × 12 limit.

A peculiarity of the "Premier" camera, a class of camera which is much used abroad, consists in all the parts being made interchangeable. It is made in various sizes, from 5 × 4 up to 18 × 16. All sizes up to

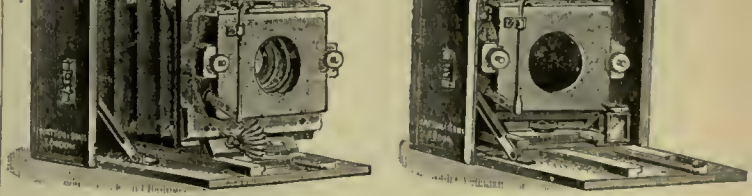


10 × 8 have movable central partitions and wide fronts, to use either for stereoscopic work or two pictures on the plate, with either one or a pair of lenses. The interchangeable idea is an excellent one for those who reside abroad and may desire to restore any damaged portion without being put to the necessity of sending the camera home for repairs.

We were given a description of two double cameras constructed expressly to order for the late eclipse expedition. The plates used in these were 15 × 18; the cameras were six feet in length and each one had a division to permit of the binocular principle being applied, for each exposure was duplicated, there being two lenses to each camera.

Although we have some time since spoken of the pretty little "Alpha" camera the following description of it as it now exists will interest the reader:—

It is made in box form, of sufficient size to contain when closed the bellows, front, the R.R. lens, shutter and finder. The front of the box falls down to form a base, and is held rigid and horizontal by a strut, which is fixed by being pressed home into a notch at its upper end; to close the camera, slightly lift the strut, and it will then fold in as the box is closed. The front of the camera is extended along the base, and there



is a scale with distances marked on it, by which the focus can be immediately set, but a ground glass screen is also supplied to use if desired. A socket is fixed in the side and base to attach to a tripod. The finder is so arranged that the view may be seen either by looking into or through it, according to the position in which the camera is held; there are two fittings to receive it—for vertical and horizontal pictures. The shutter is a specially small Thornton-Pickard Time and Instantaneous fitted with mechanical discharger. The whole apparatus is of highest quality, workmanship and finish, and is among the smallest complete apparatus yet introduced.

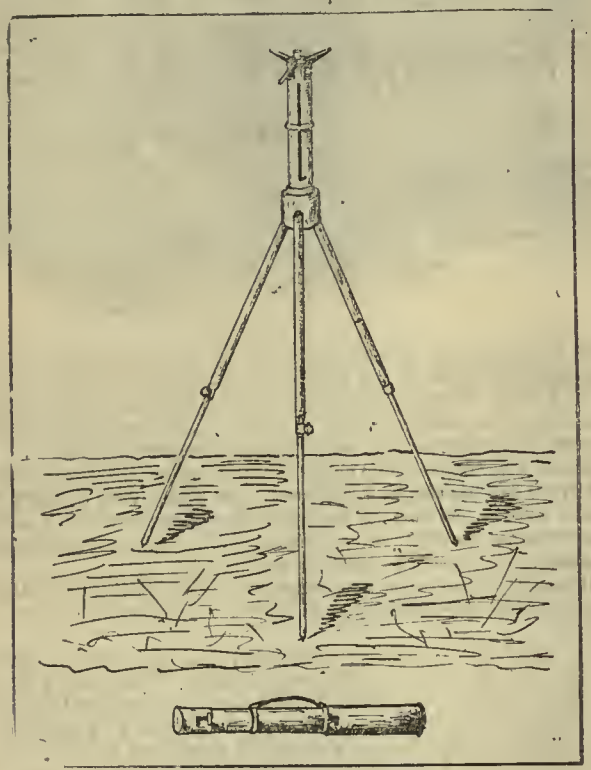
The lenses sold by this firm, at any rate those bearing their name, are all manufactured by themselves, in brass and aluminium. Although we cannot speak of their performances from al knowledge, yet from a

perusal of some Kew certificates which were shown us, we would consider them excellent. They are made in four forms, rapid, rectilinear, enryscope, portable or mid angle and wide angle.

Our Editorial Table.

The Simplex Camera Stand.

This stand, the invention of Mr. J. L. Benthall (13, Victoria-street, S.W.), comes better up to our idea of a quick-setting, portable stand than most of the class that we have seen. It is constructed of steel and aluminum, and is light conjoined with portability and rigidity. Its construction will be seen from the adjoining cut, in which is



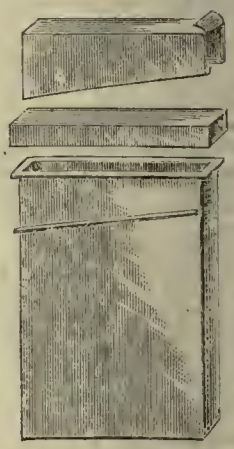
shown the stand packed for carrying and extended for use. On taking off the caps at either end the stand opens of its own accord by a species of telescopic movement. A half-turn bayonet joint ensures perfect rigidity. There are no loose parts. As the lower limbs of the tripod slide into those above, and as these can be pinched with thumbscrews, considerable range is thus allowed for pointing the camera in an upward or downward direction. Although primarily constructed and intended for small cameras of the hand class, we should have no hesitation in using it with one much larger, even to one of 10×8 dimensions, unless such were made abnormally heavy. Much mechanical ingenuity has been imported in its design and construction. An advantage, which many will appreciate, consists in the fact that by no possibility can any one guess as to the parcel being carried consisting of a camera stand, for its unconventional appearance might well relegate it to the domain of a portable ship's telescope.

Its height is four feet two inches, its diameter one and three-quarter inches, and its weight under fifty-six ounces.

Photographic Mosaics for 1893.

Edward L. Wilson, New York.

The chief feature by which this year's issue of a long-established annual is characterised is the very great number of pictorial illustrations—over eighty—it contains. A larger proportion of the text too than usual is contributed by the editor, whose first article, "The Work of the Past Year," extends over ninety-six pages, and forms a digest of what has been published during that time. Next follow practical articles contributed by about twenty or more of the editor's friends, in many cases men whose names are well known. The rest of the book is occupied by a series of six essays on topics relating to art, by the editor. *Mosaics*, with its 282 pages of text, including such a number of illustrations mainly in the art department forms an excellent book for study in the evening, or an agreeable pocket companion when one is on a journey. Dr. Wilson has acted wisely in changing its time of publication from Christmas to Midsummer.



The Primus Air-tight Box.

W. Butcher & Sons, Blackheath, S.E.

It is conceivable that a packet of plates, however seemingly well packed up, may yet be acted upon by the penetration of an impure atmosphere. To obviate this the Primus box is introduced. It is a japanned tin case capable of holding a packet of plates. After inserting this, the lid of the case, which is lined with indiarubber, is put on, and is kept pressed down firmly by a cover which slides on by wedge-shaped flanges on the sides of the box as shown by the cut. It will certainly serve the purpose intended.

Half Holidays with the Camera.

By Bernard Alfieri. London: W. B. Whittingham & Co., Limited, 91, Gracechurch-street, E.C.

This book chiefly consists of reprinted articles embodying the author's endeavour to give some indication of the character of the various localities touched on, mainly on the north side of the Thames, from a photographic standpoint; at the same time, and commendably so, he refrains from pointing out exact spots from which pictures may be obtained. From Burnham Beeches on the west to Southend on the east, the author constitutes himself a guide not only to the principal but to the less known points of interest. The book has several illustrations of familiar scenery, as well as a number of small maps, which should assist photographers desirous of arranging camera outings, to a very large class of whom it is calculated to be of great service.

Glycin-Hauff.

We have received from Messrs. Fuerst Brothers, of 17, Philpot-lane, E.C., a sample of the newest developing agent, Glycin-hauff. This differs in appearance from its congeners in being of a pale yellowish colour. We hope to try and report upon its properties in our next.

A Damp Sheet Detector.

From Mr. A. H. Baird, of 15, Lothian-street, Edinburgh, we have received samples of chemically treated paper for this purpose that should be welcome to tourists, travellers, &c. The directions for use say, lift a piece of the paper by a corner out of the box, and place it between the sheets, press the bedding gently down while you count five seconds, then examine the paper. If the sheets are slightly damp, the paper will be stained a dark red colour. If the sheets are well aired and dry, the paper will be hardly discoloured, if at all.

RECENT PATENTS.

APPLICATIONS FOR PATENTS

No. 9666.—"An Improved Means of Automatically Locking Shutters of Photographic Dark Slides." W. F. Fletcher and E. J. B. Danks.—*Dated May* 15, 1893.

No. 9766.—"Improvements in Photographic Cameras." C. Bond.—*Dated May* 16, 1893.

No. 9848.—"Holding Photographic Plates During the Process of Development, whereby any Contact of the Operator's Hand with the Bath is Prevented." S. H. Brittain.—*Dated May* 17, 1893.

No. 9896.—"Improvement in Caps for Photographic Lenses." S. Foxon.—*Dated May* 17, 1893.

No. 9923.—"An Improved Method of Mounting the Jets of Optical Lanterns." J. H. Barton.—*Dated May* 18, 1893.

No. 10,001.—"A New Multiple Revolving Photographic Dark Slide." W. WILSON.—*Dated May* 19, 1893.

No. 10,064.—"Improvements in and relating to Photographic Apparatus." RICHARD.—*Dated May* 19, 1893.

No. 10,131.—"An Improvement in Photographic Apparatus." W. J. DIBDIN.—*Dated May* 20, 1893.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 5	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 5	Peterborough (Annual)	Museum, Minster Precincts.
,, 5	Putney	High-street, Putney.
,, 5	Richmond	Greyhound Hotel.
,, 5	South London	Hanover Hall, Hanover-park, S.E.
,, 5	Stereoscopic Club	Brooklands Hotel, Brooklands.
,, 6	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 6	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 6	Exeter	City Chambers, Gandy-st., Exeter.
,, 6	Hackney	206, Mare-street, Hackney.
,, 6	Herefordshire	Mansion House, Hereford.
,, 6	Lewes	Fitzroy Library, High-st., Lewes.
,, 6	North London	Canonbury Tower, Islington, N.
,, 6	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 6	Paisley	9, Gauze-street, Paisley.
,, 6	Rochester	Mathematical School, Rochester.
,, 6	Rotherham	5, Frederick-street, Rotherham.
,, 6	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 6	York	Victoria Hall, Goodramgate, York.
,, 7	Edinburgh Photo. Society	38, Castle-street, Edinburgh.
,, 7	Leytonstone	The Assembly Rooms, High-road.
,, 7	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 7	Southport	The Studio, 15, Cambridge-arcade.
,, 7	Southsea	3, King's-road, Southsea.
,, 7	Wallasey	Egremont Institute, Egremont.
,, 8	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
,, 8	Glossop Dale	
,, 8	Hull	71, Prospect-street, Hull.
,, 8	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 8	Manchester Photo. Society	36, George-street, Manchester.
,, 8	North Kent	Gravesend.
,, 8	Oldham	The Lyceum, Union-st., Oldham.
,, 9	Cardiff	
,, 9	Croydon Microscopical	Public Hall, George-street, Croydon
,, 9	Halifax Camera Club	
,, 9	Holborn	
,, 9	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 9	Maidstone	"The Palace," Maidstone.
,, 9	West London	Chiswick School of Art, Chiswick.
,, 10	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 25,—Mr. P. Everitt in the chair.

In reply to a question from the Chairman, Mr. J. CADETT said he was experimenting with the amyl-acetate lamp for standard light purposes.

"THE SPEED OF PLATES."

Mr. R. Child Bayley exhibited plates that had been exposed to light and exhibited different degrees of colouration, as bearing upon a remark of Mr. H. A. Lawrance on the same subject before another Society. Differences in colour between the plain bromide and bromo-iodide plates were noticed, which Mr. COWAN said would depend on the composition of the films. No suggestion was made as to how this method could be availed of for telling the sensitiveness of plates.

"REVERSAL."

Mr. J. E. Smith showed a negative made on a Paget plate two years old which had three seconds exposure with *f*-8, and was developed with pyro and ammonia, development being rather forced. The plate showed complete reversal.

The CHAIRMAN asked whether the rapidity of the plate might have increased by keeping, and, *apropos* coloured fog, also inquired whether ammonia-prepared plates were more subject to it than boiled plates?

Mr. W. E. DEBENHAM observed that red fog might be removed by treating the plate with bichloride of mercury.

"FLATNESS OF FIELD—SPHERICAL ABERRATION IN TELE-PHOTO LENSES."

In reply to a question as to whether it was possible to produce a lens having a round field which could be flattened at will without decreasing the aperture, Mr. DEBENHAM said a rectilinear lens might be made to have a round field by bringing the lenses together, and flattened by separating them.

Some discussion on tele-photo lenses took place, Mr. DEBENHAM remarking that it was an advantage to have an arrangement for adjusting the spherical aberration so as to perfectly correct the combination for degrees of enlargement.

Mr. T. BOLAS approved of Mr. W. K. Burton's arrangement, which was actuated by a milled head outside the mount.

HALATION AND BACKING.

Mr. J. S. Teape showed a plate that had been backed with caramel, exposures behind diamond-shaped openings of from twenty-five inches to sixty inches of magnesium at twelve inches distance being given. No halation was apparent. A quarter of an inch of magnesium would have sufficed for a normal exposure. He also showed a Sandell plate that had been backed, and had had the same exposure without showing reversal.

The CHAIRMAN remarked that at forty-five inches the plate showed halation.

Mr. TEAPE said that perhaps little pinholes had appeared on that part of the plate, or the coating was thinner there.

The CHAIRMAN doubted whether it was possible to find a printing paper which would render the scale of gradation which it was claimed the Sandell plate gave.

After other discussion the proceedings terminated.

Hackney Photographic Society.—May 23, Mr. J. O. Grant in the chair.—Mr. R. BECKETT said he had inquired about polychromy, but doubts were expressed about it. Members' work was shown by Messrs. Dean, Gosling, Roofe, Sodeau, and Wire. Mr. Grant showed an electric lamp which would work for eight hours, and can be used as an ordinary reading or dark room light. Mr. R. Beckett showed a Swift's hand-camera lens (45*s*.), anastigmatic, covering a quarter-plate sharply to corners, five and a half inches focus, full aperture *f*-8, with iris diaphragm. Mr. Gosling showed his half-plate hand camera, which, by adding a central division to, could be used for stereoscopic work. Mr. Hudson showed the "Meteor." Mr. Sodeau showed one he had had constructed capable of being used as an ordinary camera, and had all the movements. It was somewhat large. Mr. S. J. Beckett showed the camera he used when in Italy. He used a Thornton-Pickard shutter, had a focussing scale, and double dark slides. The shutter draws right out, and by reversing when reinserting he could tell when plate had been exposed, as one side was plain and the other polished. Mr. GRANT gave his experience of a Kodak, and thought as a rule they (or his, at any rate) were not quite light-tight. Mr. HUDSON objected to the use of indiarubber bands about shutters, and preferred pianoforte wire. Mr. GOSLING thought Mr. Sodeau's camera too complicated. Mr. HUDSON said he thought the weight could be reduced by substituting part of the box by use of bellows over a framework. Mr. HAWKINS objected to the Thornton-Pickard shutter, as it gave equal exposure to sky and foreground. The members then proceeded to summarise a hand camera, and were of opinion that they should have the power of extending time of exposure to any length, being able to use different stops, and focussing on glass. The CHAIRMAN said a beginner ought not to start with a hand camera.

Tooting Photographic Club.—May 25.—The new home of the Club, situated over Mr. Mellhuish's establishment in the High-street, was opened on this date. Mr. Anderson, the President, offered a welcome to the visitors. He congratulated the Club on its new home, and thanked the younger members for the trouble they had taken to get it in order. Messrs. Dollery and Irwin then took a flashlight photograph, and the plate was developed for the benefit of visitors. A large collection of slides were exhibited by means of the lantern.

Liverpool Amateur Photographic Association.—May 24.—Mr. S. HERBERT FRY gave a lecture on the *Sandell Plate*. He explained the mode of making the triple and double layers of sensitive emulsion, also the great advantage in the latitude of exposure, which, for ordinary purposes, was equal to ten times that of the ordinary single film, also the great freedom from halation, and a special feature being their great superiority for interior work where great contrasts are experienced. On Thursday evening, the 25th inst., the fifth ordinary monthly meeting of the thirtieth session was held in the Club rooms, Eberle-street, the President (Mr. A. J. Cleaver) in the chair. The following excursions were announced to take place:—Bebington, May 27; Bolton Woods, June 10; Windermere, June 17; Ingleton, June 24. Mr. L. E. MORGAN (Fuerst Bros., of London) gave a practical demonstration of the new developer, *Amidol*, developing a negative, bromide paper, and a lantern slide with excellent results, and he gave a very explicit account of the capabilities of this powerful agent. He also gave a short description and the uses of *Metol*, and small samples were distributed among the members.

Rotherham Photographic Society.—May 24.—First excursion of the season, the destination being Ingleton, popularly known as the land of waterfalls. Special railway arrangements had been made, and the day proved favourable. The party, including several friends, numbered thirty-seven.

West Kirby Photographic Society.—May 27, Excursion by wagonette to Burton.—This out-of-the-way little Cheshire village is at all times picturesque; but, with the roses in full bloom on every side, most of the houses newly whitewashed, the sun shining, and the trees in full leaf, it could not have been seen to greater advantage. The church, the cottages, and the woods afforded plenty of scope for artistic work. Two slabs of stone, the date 1663, with certain initials, situated in one of the woodland paths, and known as the "Quaker's Grave," makes a nice picture, and was not forgotten. Another view that looks well in a photograph is to be had, viz., the approach to the church by the stone pillars on the right hand as you come from the village. Years ago we saw this view in the collection of one of Liverpool's best amateurs, and were amused to think, out of twenty or thirty who photographed that day, he alone had secured it. So it is always, we miss the pretty, unobtrusive tit-bits, and return home laden with commonplace compositions. Perhaps repeated visits to really picturesque localities is the best cure for that indifference to originality so apparent in many amateurs. Next excursion is to Hilbre Island on June 17. As the bulk of the members will probably walk, or, rather, wade over to the island, or go on donkeys, it is quite possible a "snap-shot" man with a sense of the humorous might secure some good pictures.

MR. J. LIZARS has removed to more commodious and central premises, Nos. 101 and 107, Buchanan-street, Glasgow. The optical department is on the ground floor. On the first floor will be conducted the photographic and optical lantern departments, both of which have been arranged for their special requirements.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE CONCENTRIC LENS.

To the EDITOR.

SIR,—I have carefully read Mr. Stillman's letter of May 17, much of which better supports my contention than his; but the sentence, "On any given object I can focus as sharply with *f*-16 as with any smaller stop," is just what I contend is incorrect and misleading. Mr. Stillman apparently proves to his own satisfaction my incompetence because I cannot do this, forgetting that it is open to me to retort, that it is some evidence of incompetence when a professed expert cannot obtain better definition with a high-class lens at *f*-64 than he can with the full aperture. There is no need to confuse the issue by dragging into the Controversy the power of printing processes to render the definition.

I have a letter from Messrs. Ross before me, in which occurs this sentence, "For really sharp definition we do not recommend the Concentric being used with a larger aperture than *f*-22."

Mr. Stillman gives himself away entirely when he admits that in making negatives for enlargements he uses the smallest stop. Now, such negatives are generally of small size, not necessitating the stopping down of a ten-inch Concentric to obtain covering power, so what does he stop down for? Definition, of course, which is not sharp enough for enlargement at *f*-16. Ye gods! Delicacy of touch and eyesight, following the sentence, "I always 'mark,' *always* focus at *f*-16," or full aperture, and this, Mr. Editor, after calling Mr. Stillman's attention to your very able article on the "Focal Peculiarities of Wide-Angle Lenses," for the Concentric is a wide-angle lens.

Did any practical exponent of any art ever before refer to his less-experienced fellow workers as "duffers?" If Mr. Stillman has any faith in his contention, it should be as safe to use the Concentric at *f*-16 as at *f*-22, even for the duffers, for they at least have eyesight. My protest was not made on behalf of experts—they can take care of themselves—but for the guidance of earnest, if less experienced, workers who were in danger of being misled by Mr. Stillman.

Will Mr. Stillman send his lens to the authorities at Kew for report on the single point, "Does this lens define as sharply on any given object at *f*-16 as it does at *f*-64?" If he will do so I pay all expenses if the reply is adverse to my contention.—I am, yours, &c., F. H. BURTON.

Roundhay, near Leeds, May 27, 1893.

FOCUSSING THE CONCENTRIC.

To the EDITOR.

SIR,—I am not surprised that some users of the Concentric lens have found a difficulty in getting absolute definition with it at *f*-16, and as most men consider their inability to do a thing as proof presumptive of its being undoable, it is not surprising that the unsuccessful experimenters denounce the pretentions of those who assert that they have succeeded as mere swagger, or worse, for that is what the denial amounts to. And as I have asserted in the most unqualified terms that the lens is capable of doing perfectly defined work at *f*-16, I am ready to maintain it by the best of proofs, the work itself, done with the lens at that opening. But, at the same time, I will explain to the men who fail the probable reason of their failures. Any perfectly constructed lens will have a region inside which the definition is perfect, *as lenses go*, and *with the opening for which they are calculated.* I do not say that the definition is as perfect as it would be in a microscopic lens; it may or may not be. It is as perfect as the needs of photography require, or can profit by, or the eye distinguish on the ground glass. In the old form of lens, in which the field was a concave one, the centre of the field was the point at which the focus was most easily determinable, but the moving forward of the screen brought other portions of it into focus, so that, within a certain range, some portion of the screen always showed definite detail, *i.e.*, the maximum sharpness of which the lens was capable. A slight displacement of the screen did not therefore throw the picture out of the focus, and, as it was the custom to stop down for a flattening of the field, no harm was done by a little inexactitude. While, therefore, the operator found no injury from a slight margin in his focussing, or a trivial inaccuracy in the placing of the screen in the camera (and in one case I found that the screen of my camera was the one thirty-second of an inch out of place), so long as he had the old form of lens to deal with, in the new lens he had no range whatever, the whole field lying flat as the screen itself, and, like Wordsworth's cloud, "moving altogether if it move at all," so that, if the ground glass is coarsely ground and does not furnish a surface sufficiently fine to render the delicacy of detail of the image, or the position of the screen is a fraction of an inch ever so small out of the exact position of the focus of the lens, absolute accuracy in ocussing is a matter of luck, a[illegible] range in which it is possible to find a satisfactory sharpness being diminished in proportion to the largeness of opening given to the lens, the larger that opening the more precise must be the adjustment of the screen. It will be seen that the accuracy required, both in the racking out of the screen and in the construction of the camera, so that all chance of error should be avoided, is absolutely mathematical, the one-hundredth part of an inch being enough to diminish perceptibly the definition on any given plane.

Now, it rarely happens that the screen possesses a surface of the fineness of texture that is required for perfect focussing, and in my own case I have had to wax the centre of the ground glass; and it very often happens that there is in the construction of the camera a trivial inexactitude in the adjustment of the screen which would pass unnoticed in the use of the lens with a hollow field, but ruins the definition with the Concentric. In short, who uses the Concentric, works with a tool which must be employed with a mathematical exactitude, and those who do not find it mathematically exact must find the fault in their own operations. I have not always in my own work, found that I had hit the finest definition, but when I have taken the requisite pains, I have always found that the result proved that the definition at *f*-16 was as perfect as I can get with a smaller aperture, so far as my eyesight will serve me. Of course, when the least error is made in either of the ways I have indicated, the use of the smaller aperture will increase the sharpness of definition, *i.e.*, it diminishes the effect of the error. Ross & Co. advise that the focus should be obtained with the aperture *f*-22 and then, if it is desired to use the larger, that the lens should be opened out; but begging pardon for the liberty I take in differing from the constructors of the lens, this seems to me illogical, for if the focus is obtained with *f*-22 and the image at *f*-16 is sharp, it proves only that in the other case of focussing with *f*-16 directly, the difficulty is in the adjustment, not in the power of defining, for the lens cannot define the better for the manner of focussing—if the lens will define at *f*-16 it will do it whatever opening has been used in the focussing, and if it does not, the fault is in the operator or in the camera. That the planigraphic lenses, as we may call those made with the new glass, giving a flat field, have a shorter focus than the old form of spherigraphic lens, is certain, and the proof is in the using, as I have satisfied myself by careful comparison on the camera, and the new lens, while it gives its adjusted plane with equal sharpness, also gives the nearer or more remote planes with a closer approximation to perfect definition than the old one, but this is only an approximation, for mathematically, the lens can only give one plane perfectly, which it does with the aperture of *f*-16 and all assertions to the contrary are based on misapprehension or misapplication, but this faculty of giving greater depth of focus, increases the difficulty of accurately focussing, as it makes the error resulting from a slight displacement, so much the greater as the focus is shorter.

The head of the great photographic establishment of the Italian Government, Signor Gargiolli, who employs the Concentric for nearly all his work, and the Zeiss form for the rest, confirms my statement that the former gives perfect definition at *f*-16, with the additional charm over that given with the small stops of the latter, that it gives a representation more like the actual appearance to the eye. Being obliged by the nature of his work to exact the most precise definition, he is a better witness to the power of the Concentric than I am, for to most of my work, which is merely picturesque, it is of no importance whether it be of the most perfect definition or not.

It is impossible that the difference between the results reported by other experimenters and mine should depend on the accident of a better construction of the lens; for we know, in the first place, that there is no appreciable variation in the Ross lenses, and because between the four Concentrics which I have personally used, and am using, and those of Signor Gargiolli there is no difference whatever. It is a matter of prudence for the makers of the lens to advise the use of a small stop for focussing, simply because it is easier to find the focus when so used; but the recommendation to open out to the larger opening after focussing, implies that they are confident in the definition at the larger stop, which is the question at issue. I do not agree with the advice, nevertheless, for it seems to me that the adjustment of the focus must necessarily be more exact when done with the larger opening, as it is more difficult to hit the exactitude. I see no reason for deferring to vision, which is imperfect, to manipulation, which is careless, or to apparatus which is not exactly fitted for the purpose. And the fact, which I admit, that I do not myself always hit the absolute definition of which the lens is capable, only proves that I am not always careful, while the occasional occurrence of a definition which is ideally perfect proves that it is not the fault of the lens that I do not always get it.—I am, yours, &c., W. J. STILLMAN.

Rome, 27th May, 1893.

MOUNTING GELATINO CHLORIDE PRINTS.

To the EDITOR.

SIR,—I notice difficulties are met with in this operation. Let your correspondent get an old *linen* handerchief, free from fluff. Get some lady acquaintance to sew it roughly over a few pieces of thick blotting-paper, and you have a pad that will leave no fluff on prints and never stick. I have found it invaluable.—I am, yours, &c., OTHELLO.

May 29, 1893.

METOL.

To the EDITOR.

SIR,—Since I wrote last week I discovered too late to add to my article that for the very highest quality of result with metol you must use ammonia. This gives the most beautiful image I have ever seen from any developer, though it does not answer so well if the solution is to be used over and over again, owing to the volatile nature of the ammonia.

I make a solution of one ounce strong ammonia and two drachms bromide in ten ounces of water, using the fluid drachm of this in each two ounces of developer. Say, one ounce stock solution of metol, as given last week, one drachm ammonia solution, and seven drachms water, varying the proportions *pro re natâ*.—I am, yours, &c.,

May 29, 1893. W. B. BOLTON.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

PLYMOUTH MEETING, JULY 3 to 8, 1893.

To the EDITOR.

SIR,—In connexion with this year's Convention to be held at Plymouth from July 3 to July 8, an exhibition of photographs, photographic apparatus and appliances, will take place at the Art Gallery, attached to the Athenæum Buildings.

The charges for wall space will be 3*d*. per square foot, with a minimum of 3*s*.; and those for table or floor space, 6*d*. per square foot, with a minimum of 5*s*.

Intending exhibitors will kindly apply for space, not later than June 24, to the Hon. Secretary, Mr. F. P. Cembrano, jun., 10, Cambridge-gardens, Richmond, Surrey; or to the Hon. Local Secretary, Mr. R. Hansford Worth, C.E., 42, George-street, Plymouth, stating the nature of their exhibit and space required.

All applications must be accompanied by a remittance for the amount of wall or table space desired.

Exhibits should be delivered, carriage paid, and addressed, "To the Hon. Secretary, the Photographic Convention, the Athenæum, Plymouth," not later than ten o'clock on the morning of Saturday, July 1.

The Executive, while exercising all reasonable care and supervision, will in no way accept any responsibility for any loss or damage to exhibits either in transit or during exhibition.

Exhibitors may have an attendant present to look after and explain their exhibits.—I am, yours, &c., F. P. CEMBRANO, JUN.,

May 26, 1893. *Hon. Secretary.*

SWITZERLAND.

To the EDITOR.

SIR,—If your correspondent "C. B." requires topographical information concerning Switzerland, he will find almost all that is needful in *Baedeker's Guide*.

With regard to plates passing through the Douane, I have only once had any trouble, viz., last July. Travelling by the P. L. and M., on reaching Vallorbes I was interrogated as to the contents of certain boxes, and, learning that they were sensitive plates, they charged me a small fee. I remonstrated, telling them that I had never had to pay before, but to no purpose. On returning, the Douaniers took no notice of the same boxes re-entering France at Pontarlier.

You are correct in saying that a passport is not needed in Switzerland, but I have frequently found more civility at the post-offices, both in that country and in Italy, by showing my name on my passport than otherwise. A passport can be obtained by application at the Foreign Office in London, where a paper, to be signed by applicant and countersigned by a magistrate, will be supplied, and, for a small fee, the passport will be granted. It lasts a life-time, and is always useful in case of any trouble.—I am, yours, &c., J. CARTER BROWNE, D.D.

Thurning Rectory, Oundle, May 29, 1893.

PHOTOGRAPHY AS A BUSINESS PAST AND PRESENT.

To the EDITOR.

SIR,—In reply to your article on the above important question, I should like to repeat what I have before suggested in a contemporary, that it is desirable that leading members of the profession should discuss this subject together and endeavour to formulate some course of action, with the object of endeavouring to dissuade the profession generally from practices at once unprofitable and undignified—I allude more particularly to that of indiscriminate gratuitous sittings which has so increased in recent years, and has induced, I think, in the public mind a very erroneous idea of the value of the professional photographer's services, which is greatly aggravated by the mighty army of amateurs practising the art for amusement with more or less success; and is carried, I hold, beyond its legitimate bounds when extended to other than bonâ-fide public people and professional sittings for the purpose of studies and publication.

Then again the *honour* which is so continually thrust upon us, with or without permission or payment, of having our work reproduced by a multitude of illustrated papers in various forms of process work, often the veriest smudges and barely recognizable, is a matter worthy of discussion.

These may not in themselves answer your question, but I think they are entitled to consideration, if only members can be brought together to discuss them, when others of greater importance would no doubt arise.—I am, yours, &c., WILLIAM GROVE.

63*a*, *Baker-street, Portman-square, W.*

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange 158 numbers of *Photography*, from No. 15 up, for interior background or cheap hand camera.—Address, MOORE, Buckfastleigh.

Will exchange Merritt type-writer for half-plate camera.—Address, F. HOLWILL, Quay House, Bideford.

Wanted, an exchange of backgrounds (interior), 8×7, will send photograph with pleasure.—Address, A. E. STANLEY, Lansdown Studio, Stroud.

Will exchange Duchess half-plate camera and three double slides in good condition for good quarter-plate hand camera.—Address, WILLIAM HEMING, East Cliff Studio, Whitby, Yorks.

Exchange 11×11 square camera, three double dark slides by Dallmeyer for ten or fourteen-inch "Fernando" or "Globe" enameller, differences adjusted.—Address, M. E. MALLETT, 258, Brixton-hill, S.W.

I will exchange a quarter-plate camera, with rectilinear lens, and six double slides and tripod stand for half-plate camera and lens by a good maker. Difference adjusted in cash.—Address, F. SIMCO, Chemist, Wellingborough.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

CLIFFORD E. F. NASH.—Ground rice is meant.

BRISTOL BOY.—Nothing ever eventually came of phosphorescent emulsion proposed twelve years since.

W. COPE.—Consult an analytical chemist in your town, who will undertake a proper examination of the mounts for a fee.

J. PEACH.—In the absence of details of the method referred to, we cannot, of course, say anything as to its practical value.

S. THORNE.—On the whole, No. 1 is to be preferred on account of the non-repetition of pose in the fishermen. Both are good pictures however.

A. CLARKE.—Possibly the mottled appearances will not be apparent if the developing solution be slightly warmed. See articles on the subject in last volume.

ED. CLARKE.—Try ordinary negative varnish mixed up with lampblack.

OTHELLO.—If French chalk fails to prevent sticking, try beeswax dissolved in benzole.

MONTAGUE BARSTOW.—You are probably thinking of the Optimus drawing attachment to a lantern. See p. 753 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1892.

A. SMITH.—The only way to recover silver from gelatine paper prints is from the fixing bath. For opalines, try the effect of giving a coating of dilute albumen to the glass. This will prevent the peeling off.

F. WILLS.—Granted that, according to your figures, the silver, the bromide, and the gelatine cost so very much less than the price at which the plates are sold, you have quite overlooked the glass. Does this cost nothing?

PRINTER.—The spottiness of the prints may possibly be due to the hyposulphite of soda. Be that as it may, hyposulphite that is damp and discoloured, and has an offensive smell, is quite unfit for photographic purposes, and should not be used.

MASON.—The appearance of the negative is caused by its being imperfectly washed before it was varnished. It is quite a mistake to suppose that any varnish is a perfect protection if the film contains hyposulphite of soda, and damp silver paper is placed upon it in the the printing frame.

W. SELLMAN.—The print has stood well so far, but it has been exposed only six months. If you call upon us, we can show you silver prints that have been exposed, without showing signs of fading, for eighteen years. We also possess the first platinum prints that were made, and can attest the undiminished brilliance of the same.

COLLODION.—A sixty-grain bath, that has been used for sensitising paper, is not suitable for the collodion process. In the first place it is far too strong for the purpose. In the next it is charged with organic matter which would be fatal. It might be possible to remove this, but it would not be worth the trouble when a new bath is so easily made.

DELTA.—If bulk in the apparatus is of no consequence it would be well to have a finder and a focusser in one. But if you can focus independently of the finder, it is only requisite that the image received by the working lens is correlative with that of the finder, so that when you look on the finder ground glass you know just what to expect in the negative.

R. R. E. says that, on sensitising some rough drawing paper, according to a formula given in the JOURNAL a few years back, it became covered with a number of fine spots, which began to show before the paper became dry. He asks how they are to be avoided?—The fault is, no doubt, in the paper, and, if so, can only be avoided by using another brand.

A. WALLER.—So far as can be judged from the appearance of the print, we are led to iufer that the lens was not sufficiently shielded from light during the exposure of the plate. From the direction of the cast shadows the sun must have been shining very much in the direction of the lens at the time. There is no remedy but to retake the negative. Probably more brilliant prints might be obtained from it on bromide paper than is possible on albumen.

HON. SEC.—If certain prizes are offered for "the best" photographs in any particular class, and those competing in that class are considered by the judges to be below their preconceived idea of excellence, they cannot, however, withhold bestowing a medal for the *best* of such inferior photographs unless there has been attached to the published conditions a statement that they are empowered to withhold medals at their discretion. They could, we believe, be brought to their senses by a court of law.

T. A. E.—1. The front lens of an ordinary portrait combination, worked with an aperture of *f*-8, will do quite well for taking a group of several persons, but with such an aperture crisp definition must not be expected. 2. With that aperture it will be as quick acting as a rapid combination with similar opening. Indeed, theoretically, it will be quicker. 3. The convex side of the single lens should be next the ground glass. 4. The chemical and visual foci will be coincident, so that no after-adjustment will be required.

MANCHESTER PHOTOGRAPHIC SOCIETY.—June 3, Liverpool (hand camera).

MR. NORRIS B. STEADMAN, formerly of 30A, Bold-street, has now removed to 129, Dale-street, Liverpool.

LEYTONSTONE CAMERA CLUB.—June 3, the Tower of London. Leader, Mr. G. H. Cricks. The Club will assemble at the gates at three o'clock.

OLDHAM PHOTOGRAPHIC SOCIETY.—June 3, Saturday, Chew Valley. Depart, Clegg station, ten minutes past two p.m., for Greenfield. Return fare, 8*d*. Leader, Mr. J. Greaves, jun.

RECEIVED.—The price list of Mr. C. H. Bradbrook, photographic printer and enlarger, of Chapel-street, Colchester; T. Aston & Son (Toning Powder); S. Sidey (Brilliantine). These and others in our next.

MR. SNOWDEN WARD has compiled *A Few Notes* for intending visitors to the World's Fair at Chicago, in which a great deal of information likely to be useful to photographers and others is condensed.

Dry Plates for May contains an article by Mr. J. Cadett on "Speed Determination," which gives in a clear and popular form an explanation of Messrs. Hurter & Driffield's system of measuring the speed of plates. We gather that *Dry Plates* is to reproduce Messrs. Hurter & Driffield's papers on the subject.

"OPTIMUS" 100-GUINEA COMPETITION, 1893.—Messrs. Perken, Son, & Rayment, of 99, Hatton-garden, announce a series of competitions the pictures to be taken with Optimus lenses. There are nine classes, open to both professional and amateur photographers. The competitions will not be closed until December 31, 1893. The prizes are to take the form of apparatus of great value. Full particulars and conditions of the competition can be obtained of Messrs. Perken, Son, & Rayment, 99, Hatton-garden.

EXHIBITION AT HAMBURG.—An International Photographic Exhibition will be held in the Gallery of Arts at Hamburg from October 1 to 31, 1893. The following foreign representatives have placed their services at the disposal of the Exhibition Committee for the purpose of inducing participation in the forthcoming Exhibition by their respective countrymen and by amateur photographic societies existing in the countries represented by them:—Belgium: Herr Eduard Ludwig Behrens, Consul-General. Brazil: Herr Wilhelm Pump, Vice-Consul. Chili: Herr Ad. Joh. Schwartz, Consul. Corea: Herr H. C. Eduard Meyer, Consul. Denmark: Herr Henrik Pontoppidau, Consul-General. France: M. le Comte Léopold Balny d'Avricourt, Consul-General. Great Britain: The Hon. Charles S. Dundas, Consul-General, and Mr. G. Ambrose Pogson, Vice-Consul. Greece: Herr Aug. William Gorrissen, Consul-General. Japan: Herr Martin Valentin Burchard, Consul. Mexico: Herr O. M. Vélez, Consul. Netherlands: Herr Richard von Schmidt-Pauli, Consul-General. Norway and Sweden: Herr Bernt Anker Bödtker, Consul-General. Persia: Herr Carl von Haase, Consul-General. Portugal: Le Commandeur Francisco van Zeller, Consul-General. Sandwich Islands: Herr Ed. F. Weber, Consul. Spain: Herr Tomás Ortuño, Consul-General. Switzerland: Herr Paul Edward Nölting, Consul. Turkey: Herr Rudolf Hardy, Consul-General. United States: Hon. W. R. Estes, Consul, and Mr. Charles H. Burke, Vice-Consul. Zanzibar: Herr Albrecht Percy O'Swald, Consul-General. Applications for programmes, forms of entry, and inquiries should be addressed to the above-named Consuls, or to Das Ausstellungs-Comitté des Amateur-Photographen-Verein, Hamburg, Schwanenwik 33.

PROFESSOR W. K. BURTON ON "DENSITY RATIOS."—*Photographic Scraps* for June contains a letter from Professor W. K. Burton, in which he refers to some experiments that have resulted in proving conclusively that the permissible latitude in exposure is even greater than he had supposed. He says: "It is possible to vary the exposure as one to forty, and yet to get negatives giving prints that are identical, or that are, at any rate, so nearly similar, that an experienced photographer cannot tell which is from the negative that has had the longest exposure. By this I mean that, if one second is the shortest exposure that will give a really good negative with a certain kind of plate, I can give a second plate of the same kind an exposure of forty seconds, and get a negative that has no appearance of being over-exposed, and that will give an excellent print. The negatives can generally be distinguished by the difference in colour of the image. In some cases I have succeeded with exposures varying as one to eighty. This is, moreover, using the same developer, namely, pyro, with carbonate of soda—my favourite developer now for some years—merely varying the proportions of the ingredients, and without recourse to intensification. By using entirely different developers, it would be possible to compensate for greater differences. Moreover, the subjects selected were ordinary landscapes. By selecting a special subject, mostly very deep shadow, with only a small proportion of high light, it would be possible again to compensate for greater differences in exposure. I send you herewith prints from two negatives, one of which received an exposure of three seconds (with an extremely small stop), whilst the other, exposed immediately afterwards, on a plate from the same box, using the same stop, received an exposure of one hundred and twenty seconds. The plates used were, I may mention, such as are sold as 'ordinary,' but are of very fair rapidity, even as plates of the present day go. There is no great secret in the method used. The first plate was developed with the least quantity of pyro that would give sufficient density, one grain to the ounce of developer, and a mere trace of bromide, one-fifth of a grain to the ounce, used to restrain a slight tendency to incipient fog. In the case of the second plate, the pyro was increased to eight grains to the ounce, and ten grains of bromide of potassium were added to each ounce of the developer. The development was complete in the case of the first plate in about five minutes. In the case of the second it took twenty minutes. How, it will be asked, is this statement compatible with the dogma that the density ratios cannot be altered by development? Even after allowing for the difference between 'density' and 'opacity' as used by Messrs. Hurter & Driffield, it is not compatible at all, and *it is, as a matter of fact, possible to vary the density ratios enormously in negatives by development.* To demonstrate this, it is only necessary to expose two plates on a landscape, giving normal exposure. One is developed so as to give what would be understood as a 'good' negative. That is to say that, amongst other things, it shows all, or nearly all, the shadow detail that is visible to the eye, and that the high lights are represented by a certain density. Now, it is quite easy to develop the second plate so that very little more than the high lights are visible at all, yet these high lights are much more dense than in the case of the first negative. It is evident here that neither the 'densities' nor the 'opacities' can bear the same ratio to each other in these two negatives. In fact, if two 'density curves' were drawn, they would cross each other." Illustrating the letter are reproductions from two prints of negatives that had received three and one hundred and twenty seconds exposure respectively. The difference in the nature of the results is difficult to detect.

With this week's JOURNAL *we present, as a supplement, a phototypic reproduction by the well-known firm of Thevoz & Co., of Geneva, of a study by Mr. William Brooks, of Reigate, the subject being a "Tower Warder," or, as he is more popularly termed, a Beefeater. The excellent qualities of Mr. Brooks's negative receive full justice from the process of Messrs. Thevoz, the effects of which are heightened by the grained surface of the paper upon which the impressions have been taken. We understand that photographs of the picturesquely garbed and historically interesting body to whom the custody of the Tower of London is committed are not very common, and our picture should therefore have additional value.*

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1727. Vol. XL.—JUNE 9, 1893.

VIEWING LANTERN SLIDES BY DAYLIGHT.

At a time when, as regards the prolongation of daylight, we are in the month which occupies the position of being the middle one of summer, the exhibition of slides by the lantern is somewhat impracticable unless such be extended far into the night, or, as an alternative, the exhibition take place in a place capable of being especially darkened. What, then, is to be done by way of gratifying oneself or one's friends desirous of inspecting the outcome of camera trips to choice scenery, ancient cities, picturesque villages, or fashionable watering-places? The obvious answer is, Arrange to show them by daylight. We are, of course, writing in the interest of the innumerable army of hand-camera snap-shottists, or of those wiser ones who, with whatever kind of camera they may have selected, take special care not to omit taking with them a stand as well as the camera, or those whose "be-all and end-all" is the production of transparencies for the delectation of family and friends.

No photographer is fully equipped who, in addition to his camera, is not also the possessor of a lantern for evenings and a table-stand for the parlour or drawing-room table for use during the daytime, "ere the evening lamps are lighted;" and, having just risen from taking part in a daylight entertainment, in which the last-mentioned of these has played a prominent part, we can the more strongly advocate its universal adoption.

The optical requirements for constructing a table-stand for the purpose in question are simple. It is only necessary to interpose a large magnifying-glass, of short focus compared with its diameter, between the eyes and the picture. We are, of course, assuming both eyes to be used.

But large lenses are both costly and clumsy, and the same end may be equally well attained by employing two portions from the margins of such a lens mounted one opposite each eye, taking care that the thickest portions are nearest each other. This serves the twofold purpose of magnifying the picture and sending the ray transmitted through it, so as to enter each eye under circumstances nearly approaching to parallelism, without which even the healthiest eye would be pained by the strain necessary to see, with both of them, anything brought so close to the eye.

The prisms with which even the very commonest stereoscopes are now fitted answer in an excellent manner for viewing with both eyes a lantern transparency; but they must be mounted in the reverse position to what they are in the stereoscope, that is, instead of having their thin ends next to each other, these ends must be to the outside.

Prisms of this nature, however, are open to the objection of being unable to give a great degree of magnification on account of the chromatic aberration necessarily present, eight inches being the focus beyond which it is unwise to go.

Here is a curious thing which we noticed in examining a coloured slide. Having painted it so as to give a moonlight effect, a house in the near background and a number of sub-tropical trees by which it was surrounded were painted of a tint between a pale blue and French grey, to keep up the idea of the front not being illuminated by a bright moon almost overhead, although slightly behind. The windows were scraped out and painted a warm yellow colour. On examining this through Adams' binocular pantascope, which is without doubt the best of this class of instrument on the market—at any rate, the best we have seen—these yellow windows were seen as if projecting some feet in front of the wall of the house. This is just what any one acquainted with the laws of chromatics would have expected. Had the windows been blue and the walls red, then would the contrary effect have been produced; the latter would now project, while the windows would retire. It is the application of the same law of chromatics that enables one—as we have long since pointed out and explained the reason—to see the large red flower, with its *entourage* of green leaves standing out in such stereoscopic-like relief when viewed by the large lens of the graphoscope. This is not the case when the large lens, usually biconvex and invariably uncorrected, is supplanted by an achromatic one, although, as a set-off against this, the latter is preferable for plain, uncoloured photographs.

When a pair of round achromatic lenses are employed in an instrument such as the binocular pantascope of Mr. Adams, it is advisable that they be of short focus—say, from five to six inches—while it is necessary that they be mounted so close together as to permit the eyes to be opposite a portion of the lens situated between the centre and the margin. As it is well that the diameter of these eyepieces should be large, it may be, as we have found it the case, impossible to set them sufficiently close together to enable the eyes to be at a distance outside the centre of the lens to see the picture with the requisite displacement for distinct binocular vision, and without that straining of which we have spoken. In this case, nothing remains but to grind away a small portion of the edge of one or both, in order that their centres may be brought nearer together, for, as just stated, it is the space outside of the centres—that is, between the centre and the outer margin—that forms the real eyepiece through which the picture must be viewed.

In order to conduce to comfort, it would be well that the instrument were, when in use, inclined downward at a slope

like the microscope instead of having to be directed against the sky. This position can be readily secured by hanging a mirror to the outside lower part of the ground-glass frame backing the slide under examination, and then inclining it so as to reflect the light from the sky. A white sheet of cardboard, laid flat upon the table, answers the like purpose.

SOME CAUSES OF DEPRESSION IN PROFESSIONAL PHOTOGRAPHY.

No one, we surmise, will question the opinion expressed last week by Mr. W. Grove—whose long experience in professional portraiture fully qualifies him to deal with the subject—that the prevailing system of giving indiscriminate free sittings has tended to cause in the public mind an erroneous idea of the value of the professional portraitist's services. From the way these sittings are now given, by some, on almost any pretence whatever, they must certainly greatly diminish what may be classed, if we may apply the term, the legitimate business of the portrait photographer.

When this system was first introduced—and that was in the early days of collodion—it was confined for a time, if we remember rightly, to scientific men and men of letters. Afterwards it extended to the clergy, the stage, and other persons of eminence, and, subsequently, to the ballet, &c. Still the portraits were taken expressly for publication, and that was looked to for the only source of profit. Now, however, gratuitous sittings are given by some photographers to such as members of County Councils, Local Boards, and the like, not with any idea that the portraits will ever be sold, but on the probable chance that the sitter may order duplicates for himself, or possibly an enlargement. This must very materially affect the acknowledged business of the portraitist. Here is another thing that has not conduced to the elevation of photography as a profession, namely, the practice of making "speculative enlargements," without permission, from customers' negatives, with the idea that they will eventually be purchased at one price or another. Further, competition is now so keen, that even first-class houses are frequently induced to depart from their usual tariff to secure a customer. This means a reduction in the profits, and at the same time a lowering of the status of the profession.

There is yet another point in connexion with this part of the subject that must be alluded to, as it materially injures local, photographers in the provinces. We refer to the practice, with some large houses in London and elsewhere, when it is known that a garden or shooting party, or other aristocratic gathering, is to take place at a country mansion, to obtain permission to send down an operator to take groups in the grounds, and sometimes some of the rooms in the house, free of charge, merely on the probability of selling copies to the visitors. Generally, especially if royalty is included in the group, a good sale is effected. This is hard upon the local photographers who would otherwise, as formerly, have been engaged to execute the work at his regular tariff, particularly as hitherto he has looked upon a few of these gatherings a year as a steady source of income. In such cases not only does the local artist lose directly in pocket, but sometimes he does so in prestige, because, as he has always had the work to do, the idea may prevail in the neighbourhood that it has not been done satisfactorily, or that it could be done better by people from town. This kind of thing also conduces to the impression amongst the public, as photographers are so anxious to take pictures gratuitously, and go to a considerable expense to do so, that their time and ability are of little value.

In his letter, Mr. Grove alluded to the influence of "the mighty army of amateurs." It may, we think, be concluded that, since the introduction of dry plates, amateurs have, directly or indirectly, materially affected the profession. The *bonâ fide* amateur, it is true, may have done but little direct injury to the business; but we are afraid he has unwittingly done so indirectly. In most families now one or more of its members are amateur photographers, and, as a rule, amateurs know the cheapest markets for everything they purchase; hence the lay public generally have become cognisant of the actual lowest cost of everything connected with photography. This, coupled with the free-sittings system and the low price at which some photographs are taken, has induced the idea, and we have often heard it expressed, that fair-price portraits, although they may be of the highest class, are nearly all profit. When the bare cost of the materials is known, artistic ability and skill in the production of the finished result is too frequently entirely ignored by many.

Supposing the lay public did not learn the cost of the materials employed in photography direct from the amateur, is it not given them in all the so-called "stores" price lists of groceries and other household commodities? In one now before us over fifty pages are devoted to photographic goods. Lenses by leading makers are quoted at prices below those in their own catalogues. Standard brands of dry plates are also quoted lower than in the manufacturers' list prices, and so with almost everything else. Prices are also given for developing, retouching, mounting, copying, enlarging, &c., at what most would consider ridiculously low prices. For example, the price for copying 12×10 is five shillings only, while the price for a 23×17 enlargement on bromide paper is a similar sum. With these prices before them, it is scarcely to be wondered at that the outside public sometimes think those charged for the high-class work issued by most good houses are exorbitant. But for amateurs, this state of things would not have existed. The question is, how is it to be remedied?

THE TREATMENT OF GELATINO-CHLORIDE PAPER.

The growing popularity of the various kinds of gelatine printing-out paper would seem to indicate that albumen, after many years of good service, has at last a good chance of being superseded; but, although it has had its undeniable faults and drawbacks, it is very certain that the change will be made by most of the older hands with much regret; for the gelatine papers, despite the beauty of the results attainable, and, perhaps also the additional chances of permanency, are undoubtedly surrounded by many little difficulties and objectionable features that were entirely absent with albumen.

These arise solely from the physical character of the gelatine film itself, not from the sensitive material; and long familiarity with the behaviour of chloride of silver in albumen perhaps renders it somewhat difficult to realise that the mere change of one organic vehicle for another can produce modifications that seem sometimes almost to arise from chemical causes. If, however, the beginner with gelatine paper will recognise at the outset how important is the difference in physical properties of the

new films, he will free himself at once from the chief portion of his troubles.

The differences between gelatine and albumen commence with the papers themselves before the printing operations are entered upon, inasmuch as gelatine, from its more marked hygroscopic nature, necessitates a greater degree of care than is required in the case of ready-sensitised albumen paper. This is not so much, perhaps, due to want of keeping properties, in a chemical sense, for the newer paper keeps far better under ordinary conditions than does the best ready-sensitised under the most favourable circumstances; but, in order to avoid actual physical damage to the paper, and also to ensure evenness of action in printing and toning, it is absolutely requisite to guard against the effects of damp.

In addition to the hygroscopic nature of the gelatine, it should also be borne in mind that the emulsion papers contain deliquescent salts, the result of the decompositions that occur in sensitising; and although these, together with free silver nitrate, are also present in albumen paper, their action is held in check by a considerable proportion of free acid. In the modern commercial gelatine papers the proportion of free silver is very considerably less than in the case of albumen, which reduces the necessity for the acid, and in some, at least, of the samples now on the market it is entirely absent. In fact, it is quite possible to make a keeping emulsion paper for printing-out purposes without either free silver or free acid, but rather with an alkaline reaction.

The first uncertainty that arises after precautions against damp have been duly seen to lies in the washing, before toning. With some of the papers, under certain circumstances, the preliminary washing may be dispensed with, or it may be resorted to as choice may decide. This appears to have given rise to an idea that the question of washing is of no importance, and that, if resorted to at all, the most perfunctory performance of the task will suffice. Nothing is further from the truth, for, though the operation may be dispensed with altogether, if it is performed it must be done thoroughly, or else nothing but irregularity will result. It should be borne in mind that, in the unwashed film, the soluble matters are evenly diffused throughout the whole of both emulsion and paper, and the dry print enters the bath in a condition to be uniformly acted upon over its whole surface. But if it be first of all soaked for a few seconds, or a minute or two, in water, especially if, as is likely to be the case, a number of prints are crowded together into the same dish, the only result can be that the soluble salts are partially and unevenly removed from the print, which is, accordingly, acted upon by the toning solution in an irregular and patchy manner.

But, even when the theoretical necessity for perfect washing, or none at all, is recognised, the tendency, with old albumen workers especially, is to shirk the task, or, at any rate, to under-do it, trusting to the same amount of washing as would suffice for albumen paper answering equally well with gelatine. But the gelatine film parts with its soluble constituents far more slowly, and consequently requires a proportionately longer washing. It is, indeed, remarkable how protracted a washing may be given without thoroughly eliminating the soluble salts, for the tendency is, unfortunately, almost invariably to crowd too many prints into the same dish. When the printed instructions to wash "in two or three changes of water" are followed, the quantity of water should be liberal, and the time of soaking in each fairly lengthy. Moreover—and this is perhaps the most important condition of all—the prints should be turned over singly at least once in each water, and the surface gently rubbed, to remove any film of chloride or carbonate that may be formed by the action of the hard water upon the soluble silver salts. Uniformity of tone in gelatine, as in albumen, paper is best promoted by a complete removal of all the free silver.

Many operators prefer—and it is specially recommended in some cases—to treat the prints with alum before toning. This, of course, adds one more complication; but, where it is resorted to, every precaution should be taken to prevent its leading to inferiority of result. The necessity for thorough washing is equally as great before using the alum as before toning; but it is even more important after removal from the alum. The latter is an acid salt, and nothing so quickly modifies or destroys the action of the toning bath as a trace of acidity. What, then, is more likely to conduce to irregularity of tone, or to destroy the toning power of the solution, than to remove the prints into the gold solution while they are partially and unevenly impregnated with alum?

Besides this, it is also to be kept in view that alum and hypo mutually decompose one another, and that therefore the introduction of a print impregnated with alum into the mixed toning and fixing bath is in the highest sense dangerous. It is true that in some of the formulæ for the mixed bath both alum and hypo play a part; but in that case their mutual reactions are complete, and have ceased before the process of toning commences, whereas with an imperfectly washed print the decomposition is set up the moment the print goes into the bath, and most probably precedes or takes the place of toning proper.

The importance of thorough washing cannot, in fact, be too strongly impressed upon those commencing to use emulsion papers, and therefore, in order to lessen as much as possible the trouble, we should not counsel the use of alum before toning unless it is absolutely necessary. If proper care be observed in regard to the temperature of the washing waters and of the toning bath, we have never found it difficult with any of the papers we have tried—and these include all or most of the commercial makes as well as numerous samples of private manufacture—to dispense with the preliminary alum bath; but, when the weather is warm, or the gelatine surface from any reason is inclined to be soft or "slimy," the alum solution is undoubtedly a very great boon, but, if adopted, it must be with the full knowledge of the necessity for thorough and complete washing and with the intention of carrying it out.

The utility of the alum bath is not only confined to such severe cases of softening as those that verge on the solution of the film; then it becomes an absolute necessity, practically. But, if a large batch of prints be examined carefully, they will seldom be found free from minute specks, which represent so many little flaws in the gelatine film. Even with the utmost care such will make their appearance, and with the least roughness or carelessness will develop into serious defects. Even in their mildest form they detract from the beauty of an otherwise perfect print, and are therefore to be avoided if possible. Here, again, the value of the alum bath is exemplified, for, when this is used, these little flaws, arising from the friction of minute dust specks in the various solutions, are less troublesome, if not altogether absent, owing to the less tender nature of the film.

It will be seen, then, that in the matter of the use of the preliminary alum bath it is a question of compromise, trouble on the one side being weighed against quality of result.

Action of Light upon Iodine Compounds.—Professor Meyer has definitely decided the question of the action of light upon pure hydriodic acid gas. Bulbs exposed during the summer months in the laboratory were filled in a few days with brilliant crystals of iodine. After ten days more than half the gas was decomposed, and at the end of summer practically the whole of the gas was dissociated.

Relative Strengths or Acidities of some Weak Acids.—Before the Chemical Society Dr. John Shields read a paper on this subject which throws some instructive light on such problems as often occur in photographic practice as to the amount of relative decomposition that takes place when certain substances are mixed in solution. He found hydrochloric acid to be the strongest; taking it as 100, acetic acid was only ·35; biboric acid, ·0057; carbonic acid, ·00001.

Photography of the Human Eye.—M. Albert Londe has recently published a very complete and highly interesting paper upon the photography of the eye of living subjects. It is well known that for many years past experiments in this direction have been made, but it remained for Herr Gerloff in 1891 to make a practical success. He has lately still further improved his methods. Before describing them, we may briefly allude to the investigations of earlier experimenters. For instance, in 1862, M. Noyes of New York, and Sinclair of Toronto, were the earliest to work in this path, but they found the insensitiveness of the plates of the period to be a bar to success. Then, in 1864, a method, which has since been rediscovered, was invented by Mr. Rosenburgh. He placed a thin piece of glass at the intersection of two tubes, one pointed at the eye and the other view by the operator. The solar light was directed down the first into the eye, a portion being wasted by the piece of glass and the rest entering the pupil. The image was then reflected by the glass plate, similarly diminished in brightness by the partial reflection, and then photographed at the end of the cross tube. Other inventors used a concave mirror like those employed by artists at the present day, the image being viewed from the central aperture of the mirror. In 1884 Mr. Rosenburgh's plan was modified by M. Dor, of Lyons, who experimented with the eyes of a chloroformed cat and a rabbit, and using the electric light with Trouvé's photophore. Cohn, in 1888, devised a plan for reducing the time wasted in focussing. Two identical rhomboidal prisms were placed in the path of the luminous rays, and so obtained two images, one for focussing, and the other being directed on the sensitive plate, screened by a special shutter. Later, Hope, in St. Petersburg, and Galezowski, in France, tried to solve the problem, but found the greatest difficulty in suppressing the reflections from the cornea. M. Bagnéris used an equilateral prism covering a portion only of the pupil, then with a short-focus lens, placed about two-and-thirty inches from the eye, directed a ray of light upon the prism. The rays refracted by the first face and reflected by the second left the third at a right angle and converged towards the corner, thus lighting the eye. The objective was then placed in front, and took an image through the uncovered part of the pupil. Using Perrin's artificial eye, he obtained images two inches in diameter. We now come to M. Gerloff's plan. To avoid reflections, he placed before the eye, previously treated with cocaine and atropine to destroy sensitiveness of the conjunction and to enlarge the pupil, a reservoir whose anterior face was formed of a plate of glass with parallel sides, the whole being filled with a physiological solution of chloride of sodium. The corneal reflections were thus eliminated. He used a zirconium or magnesium lamp, or the magnesium light. The reflector was a laryngoscopic mirror like that worn by the surgeon over his face, and the camera was placed behind the opening. His results were the best yet obtained, but it was a very delicate piece of work to employ it, and the images were faint. In his final efforts he resolved to eliminate certain objections. He would take the largest possible field of view, would not require the patient to keep his eye rigorously in one direction (which was found to be almost impossible), nor employ troublesome apparatus for eye or hand, would take the photograph very rapidly, and use no light likely to be injurious. He places the subject before a table or other support carrying the lamp. The light is thrown into the eye through a tube with a cross piece with mirror placed at the intersections. The mirror throws the image out of the right line into the cross tubes, in which the focussing is done on a piece of ground glass. To expose, the mirror is twisted, which then allows the light to pass into the main tube and on to the sensitive plate. He uses burning magnesium, and it is found to be not at all injurious to the eye, on account, it may be surmised, of the brilliance being spread over a large area, and so less intense on any particular spot than when the eye focusses it in the ordinary manner. It is not possible to enter into further details without a diagram, but we may be sure the new plan will excite a great amount of popular interest. It has been suggested to us that a modification of the microscopic immersion lens might be made for the purpose of avoiding reflections of the cornea, a piece of glass of about an average corneal curve on one side and plain or concave on the other might be placed in contact with the eye, rendered insensitive by cocaine, optical contact being ensured by some gelatinous non-irritating lubricant between eye and glass.

PHOTOGRAPHIC PROPERTIES OF THE SALTS OF CERIUM.

We referred some time since to the fact that Messrs. A. & L. Lumière had been experimenting with the salts of cerium for producing photographic images. In a note presented to the Académie des Sciences, and since published, they observe: It is well known that cerium yields two principal series of salts, the cerous and the ceric. The first are very stable, whilst the ceric compounds are reduced by feeble reducing agents; some intermediate compounds, and more especially organic salts, are even spontaneously reduced so soon as they are formed, so that so far it has been found impossible to isolate them. The easy reducibility of the ceric salts has led us to a study of the action of light upon them, and we have remarked that this action, followed by readiness of reduction, appears to us to form a basis for perfecting an interesting photographic process.

Among the mineral salts which have given us the best results we may mention ceric nitrate and sulphate, formed by dissolving ceric hydrate in nitric and sulphuric acids. Aqueous solutions of these salts were used to impregnate paper sized in the ordinary way or treated with gelatine, the ceric salt colouring it a deep yellow. After being dried in the dark, the paper was exposed to sunlight under a positive. In the transparent parts of the *cliché* the luminous rays reduced the ceric salt to the cerous state, and the paper is decolourised on those parts. This decolourisation enables one to watch the action of light, and to stop printing when necessary. The print should be treated with a suitable reagent that will differentiate the cerous salt from the unaltered ceric salt, and will thus fix the image. The process, it will be observed, is one for making positives from positives.

In an analogous process with manganic salts that we have already published, say Messrs. Lumière, we have utilised the oxidisable properties of the manganic salts to form with a great many bodies of the aromatic series insoluble colouring matters. In the same manner, if we treat cerium prints with these reagents, there is formed by oxidation, and fixed, coloured substances in those parts where the ceric salt has not been reduced by light. All that is then necessary is to eliminate by washing the excess of the reagent as well as the cerous salt to obtain definitely fixed prints.

It is important that the colouring matter should be insoluble, in order that it should not be removed in the washing.

We have discovered, in the course of our investigation of their photographic uses, and in making a comparative study of the action of the ferric, cobaltic, manganic, and ceric salts on a great number of bodies of the aromatic series, that the last-named are capable of setting up colour reactions much more numerous than the others. Among the more characteristic of these reactions, the following may be mentioned:—

In acid solution, the prints are coloured grey with phenol, green with salts of aniline, blue with naphthylamine, brown with amidobenzoic acid, red with parasulphanalic acid, &c. Treated with ammonia, the colouration changes, becoming, for example, violet with aniline, red with naphthylamine, &c.

Paper sensitised with the ceric salts is more sensitive to light than either ferric or manganic paper.

Messrs. Lumière conclude by saying that they are still pursuing the study of the photographic applications of cerium salts.

ON THINGS IN GENERAL.

Mr. Lewis Wright has done good service to lanternists in his article in the "Lantern Supplement" regarding the use of compressed coal gas for lantern use, and the possible presence of iron carbonyl. He has hit upon a very probable solution of some of the difficulties attendant upon the use of household gas in a compressed form. That this carbonyl is present is highly probable, but to assume that any liquid found in a compressed gas cylinder is necessarily to be put down to its existence would be a mistake. It would be very difficult to say what it could not be, in fact, for coal gas is a substance of almost infinite complexity. It contains, in addition to what are more generally understood as gaseous compounds, of greater or less illuminating value, a number of vapours of chemicals, liquid or solid, at ordinary temperature, as, for example, water, benzine, naphthaline, &c. When the whole body of gas is subjected to pressure, and cooled, a considerable amount of these bodies must be deposited. Further, when the gas passes out of the cylinder at all rapidly, deposition will occur through the cold produced. Hence, though Mr. Wright's suggestion is a very happy one, it cannot cover all probable causes, at any rate, of deposited liquid in the cylinder. But, regarding for a moment only the injury liable to be caused by the production of the carbonyl, it is evident that his proposal to coat the cylinder internally with something of the nature of a varnish, to prevent the action of the gas upon the steel, would, if effectually carried out, answer admirably; but better than varnish would be a metallic coating. The cylinder could be internally electro-plated with silver copper, or any suitable metal, or, if zinc or tin was thought better. they could be easily applied. Finally, however, I would say, seeing the absolute certainty of precipitation in the cylinders, and the possibility of further injury from some of the gases when coal gas is used, why use it all? Let hydrogen, clean, pure, and dry, be used; it can be made at a very low rate, and would carry none of the above-mentioned disadvantages.

We have, in the same journal, some of the usually interesting and practical mems from Mr. Baker, but he seems to have mixed things through not seeing a proof of his paper. In The British Journal of Photography he makes a correction which, being a purely clerical one, the Editor has already put right. But he is confusing to outsiders in his remarks about sulphuric ether. The density of ether has nothing whatever to do with any smell it may or may not possess, and, when he says ·720 s.g. is about the densest that should be used, I can only say that ·720 is the density at 15° C. of absolutely pure ether according to the best authorities, and so is the least dense obtainable.

The question of plate speeds has been occupying a good deal of attention of late, and much talk foreign to the matter in question has been indulged in. I can only say that those acquainted with Mr. Williams's work and abilities are aware that whatever thesis, derived from experiments, he advances may be looked upon as the carefully thought-out results of the work of an eminently skilful worker. Then, again, we all know Mr. Cowan's ability; but, when he says that, if Messrs. Hurter & Driffield's "original paper is carefully read, it will be found that they have been very careful to express what they really did mean." I must say that such, also, was my own belief; but it was very quickly settled by a letter in this Journal from the experimenters in question, in which they stated that they had not made certain assertions which ordinary minds thought they saw in the original paper. But we all have heard of the celebrated cynic's saying that "language was given to conceal thought." Professor W. K. Burton will have to take the same lesson to heart; he has recently shown that it is possible to vary the density ratios by development. Messrs. Hurter & Driffield's letter is in print, saying they never said the contrary. Like others who had read their original paper, I thought they had denied this possibility, but "language was given," &c.

It was very pleasing a week or two ago to meet an old friend again. True, it was about the period for a recurrence of his visit. I allude to our very old friend, Photography in Colours. He has been dressed up again, and the papers have gone into the usual, though milder, hysterics over the grand discovery. It is a little singular that, just at the time when his form is decidedly less shadowy, the excitement is less severe than when he might be said to be *vox et præterea nihil*.

With regard to the reduction of over-printed proofs on gelatine paper, Mr. Lindsay has, in a recent number, some interesting remarks. So far as albumen prints are concerned, there is no doubt the best and only suitable reducer is a five per cent. solution of cyanide of potassium. As to gelatine. I am less able to speak positively; I must try Mr. Lindsay's plan. But I shall not find it necessary to go to the trouble of dissolving common salt in hot water, and waiting for it to cool, for the simple reason that hot water will not dissolve chloride of sodium any more quickly, or in any larger quantity, than cold water. According to some authorities there is a slight difference, but it is fractional only.

Poor "Cypher!" who writes to know what he must do, for the rain has got to his negatives and stuck them to the paper—the Editor very properly tells him there is no remedy but to retake the views. I would add to that advice, say, when you get your views again, do not print from them till they are varnished. You will then be free from stains on your negatives from your paper at any time, and, if the rain does again attack them, you may, by dissolving off the varnish in spirit, have them as good as ever they were, unless the rain beats for a considerable time in this unwelcome proximity.

Free Lance.

ANGLE OF VIEW.

[London and Provincial Photographic Association.]

If we examine the picture formed by a photographic lens upon a screen of sufficient size, we shall find it is circular. This circle is the base of a cone of rays transmitted by the lens. Divide this cone in the direction of its axis. The section is triangular, and the angle at the apex is called the angle of view. Let us suppose the focussing screen is square, and that the circle of illumination touches each side. A plate under such conditions would be unexposed at the corners. Yet, to calculate the angle enclosed by such a plate, we have been directed by the rules hitherto accepted to take the diameter of this circle as a factor. It is an astonishing fact that these rules have the sanction of a number of writers, amongst whom may be mentioned Shadbolt, Grubb, J. H. Dallmeyer, Traill Taylor, Woodman, Emerson, and still more recently A. Haddon, the respected curator of this Society.

To cover a plate such as has been described, it is evident the circle of illumination must enclose the plate, and not the plate the circle of illumination. We must therefore measure the diameter of the circle by the diagonal instead of the side of the plate. The perpetuation of the mistake is probably due to the habit, common amongst writers, to take data at second-hand rather than think them out for themselves. There are, however, two noteworthy exceptions. Dr. Eder, in his *Ausführliches Handbuch der Photographie*, gives rules and tables for calculating the angle of view included by a lens, and for that included on a plate. For the latter he takes the diagonal as the basis. Professor W. K. Burton also estimates the angle of view by the diagonal of the plate, according to an article on the Concentric lens in *Photographic Work*, February 24, 1893.

Recently I criticised, before this Society, the rules laid down by Mr. Haddon for calculating the angle of view included on a plate. They were published in The British Journal Photographic Almanac for the current year, and may be taken as correctly representing the rules of the writers first mentioned. These rules take the longer side of the picture as the base of the triangle enclosing the angle of view. You may follow the rules and work the problem correctly, but the answer will always be at variance with the facts. Either the angle will be too wide or the focus of the lens too short, when you take the photograph. We may also have a series of plates such as 15×9, 15×10, 15×11, 15×12, yet, by these rules, all will include the same angle, with the same lens, under similar conditions; or, if we wish to include a given angle from the same station-point, we must use a lens in each case of identically the same focus. Further, no matter what position the lens may occupy on the front of the camera, the angle will remain the same. Rules giving such results are evidently wrong, and, as a more rational system, I would suggest the adoption of the method used in perspective.

The circle of illumination of a lens corresponds with the base of

the cone of visual rays. The lens is the eye and the picture plane is the photographic plate. These are corresponding terms in photography and perspective. The picture plane is vertical, and must not extend beyond the base of the cone of rays.

The angle of view in perspective is limited to sixty degrees to avoid that exaggerated appearance with which we are familiar in pictures taken with wide-angle lenses. But, for the purpose before us, this may be disregarded, since what is true of an angle of sixty degrees is also true of any other angle. In perspective, if the picture plane touches the edge of the base of the cone of rays at any point, it is said to include an angle of sixty degrees, and, similarly, we may speak of pictures including any other given angle.

On the picture plane there are two important lines, the base line and the horizontal line; the base line is that upon which the picture rests, and the horizontal line extends from right to left at the height of the eye. Upon this line is the centre of vision, or centre of the circle forming the base of the cone of rays. The axis of this cone is called the principal visual ray, and corresponds with the focus of the lens.

The artist may select any portion of the base of the cone of rays for his picture, and the photographer does a similar thing when he moves the cross fronts of the camera in arranging the subject on the focussing screen. What, then, are the conditions which determine the angle of view for any given picture? First, the distance of the spectator from the picture plane, which, in photography, we may call the focus of the lens. Second, the position of the centre of vision, which, as I have shown, will vary according to the position of the lens on the front of the camera. To ascertain the position of the centre of vision, we must draw a line perpendicular to the plate from the apex of the cone of rays. Where the line touches the plate is the centre of vision, and we must measure the distance thence to the farthest corner of the plate. We can now measure the angle of view by means of the table of natural tangents given by Mr. Haddon, the rule for which should be stated thus:—

To find the angle, divide the distance from the centre of vision to the farthest corner of plate by the focus of the lens. Find the nearest number to this in the table of tangents, and twice the arc opposite it is the angle required; or, if we know the angle of view, and wish to find the focus, find the tangent opposite the arc, which is half the angle of view. Divide the distance from the centre of vision to the farthest corner of plate by the tangent. The answer is the focus of the lens required.

Mr. Haddon was unfortunate in the selection of the title of his article, "Angle of View included on a given Plate by a given Lens." If the lens is not opposite the centre of the plate, the whole angle of view is not included. But the expression is permissible if we understand by it the angle under which the picture is taken. I mention this merely to draw attention to the fact which some may overlook, that the angle is different if the lens is moved by using either of the cross fronts. It must also be remembered that a lens can be used to cover a larger angle if the axial ray is not perpendicular to the plate, as pointed out by Mr. W. E. Debenham when this subject was last under discussion. But, as I have used the term angle of view in relation to the picture, and not to the lens, the rules I have given apply to the picture only. If it is required to calculate the angle covered by a lens under the abnormal conditions mentioned, the necessary modification must be made in the formula. P. Everitt.

NOTES ON STUDIO-BUILDING.*

This being the time of year when studio building is usually undertaken, and the matter having recently been discussed in the columns of this Journal, it occurred to me that, having worked in several different studios, and built two which answered their purpose fairly well, but which were capable of improvement, a few notes on their good and bad points might be useful as showing what to avoid, if not what to adopt. The chief matters to be taken account of are: *Size*, as regards length and width; *height* and pitch of roof; *aspect*, north, north-west, north-east; *amount of space glazed; kind of glass; nearness* or otherwise of neighbouring buildings, or possibility of their subsequent erection; *supports for glass; roof on shadow side; blinds and method of fixing; tie rods; ventilation.*

The first studio I worked in had clear glass in roof, and I fancy north-east aspect. We used to get the sun in, and I remember once placing a thermometer on top of camera and finding it registered 120° Fahr. The next had either Hartley's rolled or else plain glass in roof, with plain glass at side. Aspect, north by northwest. In the middle of summer the sun used to shine in during afternoon, restricting us to the use of one end of the room for the time being. The framework of roof was of T iron, and inside walls painted pale blue. Light was quick, and lighting good. Dimensions about 27 × 12 or thirteen feet, with room to back out at one end when taking large groups. The side light came down rather low, about two feet or two feet six inches from floor, with short curtains along the bottom portion. Ridge roof, light only from one side.

Another studio, dimensions about 30 × 15, also with ridge roof, had a narrow top light, with long sloping side; glass all "white cathedral," or similar sort. This is a good kind to use where the studio is overlooked, as it prevents sitters seeing outside objects clearly, and gives a feeling of seclusion and privacy—more apparent than real, however, as from a little distance off any one outside can distinguish objects inside, though not sufficiently to recognise individuals. To entirely prevent outsiders seeing what is taking place inside, ground glass is necessary.

This studio ran out end ways from the house on ground floor, and at opposite end were some fairly highly trees, so that, whichever end the sitter was placed at, the front top light was seriously cut off. Walls and roof on shadow side painted chocolate, lighting being slow, except when very bright clouds were about, and always hard. There were no cross ties, and I was able to use a head screen for bust portraits. The next studio was in London, glazed at top on both sides of ridge with Hartley's rolled glass. One side of roof generally kept covered by opaque blinds. No side light, but a window at one end, which could be uncovered if desired. With the exception of this window, there was no glass lower than about eight feet, and wall of next house ran up higher than studio. Lighting too much from top, and consequently hard; and, unless both sides of roof were uncovered (which gave flatness), light was very slow.

The next studio was at the seaside. Aspect something like north-west, sloping light, starting at about three feet nine inches from floor, and running right away above wall on shadow side, a small portion near the wall being ceiled. On the south side were other rooms, with their roof running up above to meet the studio roof. There was thus a considerable air space up under the ridge. The studio was cool, except in middle of summer, when the sun used to peep in. Glass was plain, and to keep out sun tissue paper was pasted over it, which, owing to the sitters having to be placed close to the window on account of narrowness of room, gave considerable glare, and caused very large high lights in the eyes. I found four large opaque blinds in use, running on wires horizontally, each one covering one quarter of the glass. As the room was only about 20 × 10 ft. on the floor, and narrower still five or six feet above, the sort of lighting it was possible to get with sun shining in may be readily imagined. Several smaller black muslin blinds were substituted for the four large thick blue ones (also running horizontally), which subdued the glare and enabled me to modify the lighting according to requirements. In winter time the tissue paper cut off too much light, so it was dispensed with, and when summer came round again mineral paper was used instead, with good results. The supports for the sloping light were of wood, and occasionally the wet found its way through. Ventilation was effected by lifting up hinged portions of the framework, with the disadvantage that in wet weather the rain drove in.

With reference to dimensions, 30 × 15 feet is a useful size, and, if there is a room opening out of studio in which accessories not in every-day use can be kept, the width will be enough for most purposes; eighteen feet would, however, be better. The tendency nowadays is towards large work, necessitating large cameras and stands, which require to be kept handy and yet out of the way when not in actual use. I should have made my present studio eighteen feet, but was limited by width of ground. Thirty feet is long enough for most work; but, if background carriers with projecting feet are employed, and some at each end of room, thirty-five feet would be more convenient.

Height.

Up to eaves mine is eight feet, but nine feet would have been better, and, if studio is to be eighteen feet wide, height to eaves should certainly not be less than nine feet, assuming a ridge roof to be chosen. Height of ridge from floor is about fourteen feet, but rather more would have been an improvement, with the eaves at eight feet, and, with the eaves at nine feet and the width at eighteen feet, the height to ridge should be as much as eighteen feet. The steeper the roof the more easily will the snow slip off, and the cooler will the place be in summer.

Support for Glass.

I can speak strongly in favour of T iron. I have had it in use for seven years, and have never had any wet come in. Glass was painted over at edges before puttying in, and I believe the rabbet of iron also. The first two summers were very hot ones, and after the second

* Mr. Cole's article has been in type for a considerable time, but had to be held over through pressure of other matter.

it was found that a little of the paint and putty was the worse for wear. It was repainted and puttied where necessary, and went for five summers without anything being done to it, then had another puttying and painting, being apparently as good as when first put up. The framework for side light is of wood, with a wooden plate. If building again, I should have this also of iron, with an iron plate, which would obstruct less light at the eaves, and be less inclined to twist or warp. For another studio I built, which there was a possibility of wanting to remove, wooden rafters were used with patent zinc tubing to avoid fixing glass in with putty. The zincs were supposed not to require any other rafters, and were supplied extra strong for the purpose, but they were of no use as supports. By fixing them on wooden rafters they answered all right, except for the bottom panes next to gutter, which were always slipping and breaking till I had some iron stops made and screwed on to plate. T iron has this disadvantage over wood, that, when it is required to attach anything in the way of supports for blinds and curtains, there is nothing to fix them on to; therefore, at intervals along the framework, before the glass is put in, the iron should be drilled, and a few small pieces of iron screwed on inside, to which wooden rails can be fixed. On these rails any fittings can be easily attached. If an iron plate instead of a wooden one at the eaves is adopted, this should also be drilled, and a strip of wood bolted to it for fixing side blinds or cords to. It must be remembered that in frosty weather the roof gets very cold during the night, and condenses any moisture there may be in the studio. This moisture runs down towards eaves, and any projections, such as tie-rod connections, are liable to arrest the water and cause it to drip off on to the floor or furniture. All such projections should, therefore, be bevelled off on under side, so as to lead the wet *on* to the roof instead of away from it.

I saw in London not long ago a studio in which the roof and sides were in one continuous curve, bent glass and curved T-iron frame, work being employed. This gave a free, unobstructed light, and the moisture was led right away to bottom of the side light. The proprietor spoke highly of it.

Aspect.

North-west is undesirable unless high buildings happen to trap the afternoon sunshine. North by north-east is more suitable than due north, as tendency now is for people to come later in the day than formerly. As there is always the possibility of early sitters, it is advisable to have the means of screening the morning sun as well as that of the afternoon. I have zinc screens, about two feet wide, attached by brackets to the roof, running up each end and along the ridge. These are screwed up in the spring and taken down in the autumn. Zinc is better than wood. I was once nearly killed by a wooden screen being blown down piecemeal through the glass roof. About ten large panes were smashed. One board came through just where the operator had been varnishing some negatives.

Amount of Space to be Glazed.

Best to have enough, it can always be screened off when not wanted, and there are occasions when all possible light is required.

The distance from floor at which side lights should start is a matter for consideration. My own begins at about three feet six inches from floor, and in a wide room this might do, but in a narrow one the glass might come down lower. Talking to a photographer the other day whose side light begins at about the same height as mine, we both agreed that, if building again, we would make it lower. Short curtains running on wire can be used to screen the bottom portion. When young children are taken standing on the floor, it is difficult to get sufficient light on the legs unless the side light is low.

Kind of Glass to Use.

In the roof I have used Hartley's rolled, and like it very well. It certainly cuts off more light than clear glass, but it diffuses what passes through, which compensates for any cut off. There is a good deal of colour in some samples, which are therefore to be avoided. If building again, however, I should be inclined to try ground glass. Hartley's is pretty strong, and although the street urchins are fond of making a target of the roof, and several panes have been cracked in the course of a few years, it has not been found necessary to replace any.

In the side I have "white cathedral," which gives a pleasant illumination, but does not diffuse the light so well as "ground." Working in a studio on ground floor, having clear glass in side, the window looking out on to a grass plot, with a one-storied building about twenty feet away, the lighting was found to be hard, and was much improved by fixing up ground glass inside the clear for about two-thirds of the distance up the sides towards eaves. If the side light is quite unobstructed and likely to remain permanently so, and studio not overlooked, then, provided the outlook is pleasing or interesting, a certain amount of glass in the side might be left clear—it affords occupation to sitters or their friends to look at while waiting, and where several negatives have to be taken this is an advantage. For lighting, however, I prefer *ground* or *figured glass* up to level of head of standing figure, and above that *clear* or "white cathedral." As figured glass is expensive and not strong enough for outside use, I should be inclined to glaze the whole of side with "white cathedral" or similar kind, and then have an inside casing of figured about two-thirds the way up to eaves, this to be so fixed that it could be removed or slid along for occasional cleaning. Clear glass could be left at intervals for outlook if preferred.

Blinds.

Whether these should run vertically on spring rollers or horizontally on strained wires depends on individual fancy, and on the way the tie rods are fixed. I have some of each kind. The chief, in fact only, objection to those running on wires is that they have to be moved with a long stick, which invariably causes sitters to look up at the skylight, and they then begin to realise that the light is strong, and perhaps find their eyes dazzled. Those running vertically, moved by a string, do not seem to have this drawback. With those running horizontally more graduated lighting can be obtained.

Tie Rods.

These are generally necessary evils. They are apt to be in the way of blinds, &c., and, unless eaves are high and the ties arched upwards, they prevent anything in the way of head screens being conveniently used. Screens such as recommended by Mr. Whaley in a recent "Annual" cannot be used if the tie rods are low. The places for these should be well thought out beforehand, so that, instead of being in the way, they may be made use of for hanging a swing or hammock from at a suitable distance from background.

When I built one of my studios, not having had much to do with actual building operations, I wanted, as far as possible, to dispense with ties. Builder thought he could manage with two up in the roof only, not braced to the sides, with the result that, as soon as men began putting the slates on, the walls began to spread out, and we had a narrow shave of having to build twice instead of once. They were got back nearly into the original position, but not quite, and the wooden framework of side light remained somewhat twisted. Fortunately there was no glass in, or it would have been smashed. We then had to put ties in where we could, with the result that those attached to the sides did not correspond for position with those in the roof, and rather interfered with the working of blinds.

In the matter of choosing a builder, it will be found cheapest in the end to go to the best, preferably a local one, who can be fetched back to make good anything that may not have been done just as it should have been. Coming as a stranger into the town, I thought it would be better to employ a man I had some acquaintance with (a non-resident) rather than take my chance of getting hold of a good one amongst strangers. I made a bad spec. My friend (?) used poor mortar, did not put any damp courses to the new work, put up a gutter to small too carry off the water properly, and fixed it up badly. This side being close to neighbouring property, the gutter had to be kept back flush with wall, so he just bedded it on top of wall with ordinary mortar, consequently it overflowed inside as well as out.

I had to call in another builder, who raised the wall to form a parapet, and put down a proper lead gutter. The parapet is a great convenience, as, when we want to get on roof to fix stove-pipe, put on a new slate, fix up the zinc sun screens, or mop the glass, we can walk along without having to ask permission to take a ladder on to adjoining property.

Materials for Walls.

If on own property, or such as there is a long lease on, it is best to have brick—at any rate, if building is at all exposed to the sun's rays—and, if one cares to afford the luxury of a tiled roof, the room will be all the cooler for it in summer. If sheltered from the sun, wood and iron will do, provided there is good convenience for keeping it warm and dry in winter; if exposed to sun, an iron building is decidedly hot in summer.

Ventilation.

I had arranged with the builder just mentioned to have good-sized ventilators in the gable ends, but he forgot, and persuaded me to rest content with a couple of air bricks. Result: operator and sitters baked.

Next spring air bricks were replaced by a good swinging ventilator at each end, and the studio has since been no hotter than the generality of such buildings.

Warming.

Hot water from a Loughborough boiler heats all the rooms on ground floor, studio itself being warmed by a tortoise stove. Hot water saves a vast amount of mess and dirt, besides being more economical, and, provided the stoker is intelligent, leaves little to be desired. If, however, the stoker has a fancy for getting the pipes nice and hot on a mild day, and letting the fire out when the weather is chilly, the surplus heat cannot so quickly be got rid of by opening windows and doors, nor the room quickly warmed, if cold, as when a stove in the studio is the source of heat. If a stove is used, the fewer bends in the pipe the better. I used formerly to have the pipe go straight up through the roof, and the stove always drew well, never requiring sweeping all the winter through, a slight tapping on the pipe being sufficient to shake the soot down. Having moved it to a fresh place, necessitating a bend or two in the pipe, the moisture, which gets into it during the night in damp, foggy weather, cakes the soot, and necessitates frequent sweeping.

Thanks to the ventilators at each end near the top, any smoke that may be puffed out when fire is first lit can be readily got rid of. However full of smoke the room may be, by opening the various doors and ventilators it can be all blown out in about five minutes, and a clear negative taken. It is a great convenience to have a good supply of gas near the stove from which a Bunsen can be supplied to light up fire quickly when required. For small rooms, or branch places not open perhaps every day in the week, the new hot-water apparatus heated by paraffin should answer well if means are adopted to lead away the products of combustion into the outside air.

Under any circumstances it is advisable to have stoves shut off from the printing department. Unfortunately, in my case, the only access to the Loughborough boiler is through the printing room, and the number of black spots due to coke dust that we get on our vignettes during the winter months is somewhat alarming. Doubtless, where it is necessary to heat rooms on different floors, a high-pressure boiler will do it most satisfactorily, but of this I have no experience. Some insurance companies, I believe, decline to insure studios heated with water at high pressure.

W. Coles.

PRACTICAL REMARKS ON PHOTOGRAPHING DIFFICULT INTERIORS.

II.

In a previous article I referred to a few of the different kinds of interiors an operator is sometimes called upon to deal with, and instanced a few of the chief points necessary in dealing with well-lighted subjects, where it was possible to bring into one's aid diffused light.

There are very many other cases, however, where the light is so poor as to require extremely long exposures—ranging from hours to days, even when using plates of the most exalted sensitiveness, instances of which will be found in warehouses under dark arches, such as are only lighted by large windows or doors at one end, and where the interior runs a long way back from the light. This class of subject is generally to be met with in large cities, where the arches under the railway lines are utilised for warehouse purposes, such as bonded stores, and many other similar businesses. I have known cases where, an exposure of twenty-four hours proving insufficient, a further exposure of from two p.m. on Saturday until ten a.m. Monday yielded a satisfactory negative, using a stop equal to *f*-22. One item of paramount importance, when giving such long exposures, is the utmost certainty of the camera and all its fittings being absolutely light-tight; and a further cause of failure, which I have never seen pointed out or referred to by writers, is the necessity for the plates being the full size of the cells. I have known cases where plates, being cut too small in their breadth, although right as to their length, gave no end of bother even to find the cause of failure; when such happens, the light plays round the back of the plate, and proves disastrous, the appearance of the plate being as if badly fogged. Another frequent cause of failure is using a lens too wide of angle for the camera, or dimensions of plate being used, whereby the sides of the camera reflect light on to the front of the sensitive plate. Wide-angle lenses, however, are a necessity for this kind of work, but they should be carefully selected, to suit the size of plate being used.

I sometimes feel platemakers have a deal to answer for in the careless manner they cut their plates to sizes, and when any one experiences, as I have done, the annoyance of a plate being just so small as to allow of one side of it being pushed forward of the rebate in the slide by the pressure springs, he will know to his cost how necessary it is to examine carefully every cell before leaving the dark room. This is especially the case when using large-sized plates, such as 12 × 10 and upwards. When a plate is cut too small, it is just about a hundred to one the withdrawal of the shutter of the slide will cause a scratch line straight across the face of the plate, and, worst of all, when the shutter of the slide is fully drawn, the pressure springs of the slide will push forward the plate, and prevent the door of the cell being reclosed. A more exasperating trouble cannot fall to the lot of any one. But these troubles are not only confined to interior work, they happen at all times; still, after having exposed a plate upon a difficult subject for, say, forty-eight hours, it is doubly annoying to have to go all over the routine again.

It is highly important that the plates fit the cells thoroughly. With camera and slides all being in perfect order, an operator has the utmost confidence that, even with the most prolonged exposure, his plate will develop up free from veil or fog. A very necessary precaution, however, is the backing of every plate with a coating of asphalt dissolved in benzole, as described by me in a former article on photographing stained-glass windows. This should never be omitted where very long exposures are being made, and any extra trouble expended in preparing the plates is more than compensated for by the results attained.

Later on I hope to refer to the development of such long exposures. In very dark interiors, such as I have just referred to, it is almost impossible to over-expose a plate when properly backed with a preventive against halation.

I am a firm believer in utilising daylight for all exposures when at all practicable. There are many instances, however, where artificial lighting may be employed in combination with daylight. This I hope to refer to later on. Daylight, with plenty of time, however, will be sure to make its presence felt on the sensitive plate, and, as a rule, yield the most truthful representations.

In some cases isochromatic plates are a distinct advantage, but they should be used with considerable forethought, according to the nature of the subject.

In dealing with large engine shops, where the entire structure has to be included, prolonged exposures will generally be found necessary, and a time selected when the works are quite free of smoke and dust. I have known cases where some parts of the machinery required, under similar conditions of plates, stops, &c., an exposure of only twelve minutes, whilst the entire workshop was not overdone when exposed from early morn till dark, the cause being that the portion of machinery was situated somewhat near to a large window. When operating on machinery a considerable amount of preparation is necessary. This includes the colouring of the various parts, and toning down unduly bright portions. As a rule, however, in every well-appointed engine shop the makers and workmen are quite alive to the necessity of such, and generally arrange for this being done before sending for the photographer. Badly situated windows must also be dealt with, and one of the best means of doing so is by hanging outside the windows large tarpaulins; this should never be neglected, and, although to any one unaccustomed to this kind of photography it may appear a lot of heavy work to arrange for such, still, in engine shops and other similar cases, the workmen are quite accustomed to face far heavier preparations than the mere handling of a few waggon covers, or the placing of such in suitable positions. I never yet met a case where the utmost willingness was not shown to assist in and carry out every necessary preparation. Engine work, as I have said, differs very much from all other branches of photography, and, before a young operator undertakes the responsibility of such, he would do well to put in some experience with one accustomed to this special class of work. On doing this he will at the outset feel that he is, as the Yankee says, dealing with the "big in everything;" he will soon, however, come to learn that what previously appeared an almost insurmountable obstacle was easily removed by a few willing hands, which are always to be found ever ready to help, and this will soon engender confidence. It is seldom, however, especially in the case of photographing machinery, that negatives can be obtained sufficiently clean or free from adverse surroundings as will permit of their being printed from without a considerable amount of preparation. This to a very great extent means the necessity of blocking out such parts as could not be dealt with in the preliminary arrangement before taking the negative.

In striking contrast to large engine works will be found such subjects as interiors on board ship. Of course there are large and small ships; but, even in the case of the new Cunarder *Campania*, there are very many interesting parts so cribbed and cramped up for space as makes it a matter of extreme difficulty to overtake. Of course, the magnificent dining saloon, capable of seating about 450 passengers, is one of the big things, and so are many of the other points of interest on board, including the funnels, which are over twenty-one feet in diameter, and large enough to permit an express train to pass through as it were a

tunnel, are things that require a pretty big plate and wide-angle lens to do them justice, but the cramped and cribbed subjects on board are the alley ways, state rooms, pantries, &c. To photograph such was a matter of no little difficulty. So, also, was the library; although one of the features of the ship, and a magnificent room it truly is, still it gave me no end of bother to get a good result. This delicious retreat is built somewhat in the shape of a horseshoe, and the semicircular bookcase, entirely filled with a most careful selection of books, corresponds in shape exactly to the curve of the structure, every portion of which, at short distances apart, has little windows entirely round its sides. These windows throw a beautifully soft light into the room, but for photographic purposes—oh, what a horror!—every light is reflected back from the glass window in the bookcase. Screen off the windows, away goes the light. After much thought, however, I hit upon a plan which worked admirably, and, although I did not succeed in getting all the bookcase into the view, still, by cutting off the light all round one half the circle of the structure, and by blocking out the windows, I was able to get rid, to a very great extent, of the objectionable flaws in the bookcase. An exposure of exactly one and a half hours yielded a good negative. The magnificent dining-room gave little or no trouble, and makes a very fine interior, and doubtless, before long, the market will be flooded with all sizes of pictures of this enormous saloon. I obtained a fine negative in one hour and a quarter's exposure.

As I have said, it is the confined places, such as the pantries, bathrooms, and "a warm corner for two" that taxes to the utmost the energies of an operator. The plan I found best was to invariably use a fast plate, well backed with tar, and to expose, say, on such small, confined situations a plate of large size, with a small lens in the camera of good covering power, well stopped down, of course giving very long exposures. By this means I got a good range of view of the pantries, and many others of the confined places on board. At no time did I resort to the use of the magnificent installation of electric lighting, of which there are nearly fourteen hundred lamps on board. I found daylight quite sufficient. Of course there are very many interesting places on board that are not possible of being photographed; but, for the coming season, the rage will be *Campania*, and I dread to think how often that kind-hearted genial gentleman, the steward, and that hard-headed level Scotchman, Mr. Paton, the head engineer, will have to suffer the infliction of having their pictures drawn. Were the Company to tax hand cameras, and hand the proceeds to the Photographers' Benevolent Association, I think, before the close of the Chicago Exhibition, they would have a real good thing.

T. N. Armstrong.

"PREVENTIVES OF HALATION."

A few remarks on the above subject will not, I hope, be considered untimely, bearing in mind a statement that Professor Burton and another gentleman in Japan had found in picrate of ammonium a sure preventive of halation. I have not been able to find much detail, but presumably picric acid was dissolved in water (its solubility is barely one in ninety), the solution carefully neutralised with ammonia, a plate immersed therein, dried, and exposed, with, as stated, the best results. I confess to failure so far; working as above, there is a total absence of halation, simply because the plate, no matter how much alkali be used, is quite insensitive, and this even when using a solution so weak as 1 in 2400; however, a trial was made of other dyes for the same purpose (also of the picrate salt used differently) with better results. The idea was, of course, to interpose between subject and plate a tinted film, which would prevent excessive action in the high-lighted portions of the plate, while allowing full exposures for the shadows. The most convenient method of following out this idea was to make the solution in spirits of wine, and then mix with enamel collodion, coating a plate with this, and drying (which it does quickly) prior to exposure; *e.g.*, dissolve a grain of picric acid in fifteen minims or so of rectified spirits of wine, neutralise with ammonia—though I don't think this is essential—add two or three parts, say, thirty to forty-five minims, of ether, and then make up to half an ounce with enamel collodion.

In the case of any other dye, as green, rose aniline, or rosine, the solution would be simply made in spirits of wine, and then diluted or mixed with collodion as stated above. Four plates were coated with collodion thus prepared, and received comparatively brief exposures upon a subject suitable for the purpose. It was found possible to develop the eosine-coated plate with an ordinary pyro and sulphite developer; also, with rather more alkali, the *green*-tinted plate. The rose and yellow-tinted plates remained quite insensible to the blandishments of the pyro, &c., and an immersion of nearly half an hour failed to produce appreciable effect; they were therefore removed, rinsed in water, placed in a bath of methylated spirit, and, after wiping off the superfluous spirit, were once more submitted to the action of the developer, with the result that the pictures developed up quickly, these two being the most satisfactory as regards colour and density, while, with reference to *halation*, the *yellow*-tinted plate was first, closely followed by that tinted with rose aniline. I am inclined to think that, combined with a good "backing," the use of a canary-tinted collodion applied to the sensitive surface of a plate will be found an advantage, not very great perhaps, but every little helps. The trouble of coating is very slight; the plates are dry very quickly, and a preliminary bath of methylated spirit is not a serious business.

I imagine the selection of picrate of ammonia to be merely an incident, probably a convenient solution to use—I handle it every day for the treatment of malarial fevers, &c.—and that picric acid, well diluted, answers the purpose just as well. With eosine, a drop or two of ammonia solution is an improvement. Finally, the degrees and attenuation of the solutions used may be mentioned:—

Picric acid	1	part in	4,000
Green dye	1	„	1,000
Eosine	1	„	200
Rose aniline	1	„	10,000

the collodion being prepared by dissolving one part of pyroxyline in a mixture of eight parts of spirits of wine and twenty-four parts of ether.

J. Pike.

PHOTOGRAPHY AT GREENWICH OBSERVATORY.

The annual visitation of the Board of Visitors of the Royal Observatory at Greenwich was made on Saturday last, June 3. The Board consists of the President of the Royal Society (Lord Kelvin), the President of the Royal Astronomical Society (Captain Abney), six Fellows of each Society, the Savilian and Plumian Professors of Astronomy at Oxford and Cambridge, and the Hydrographer of the Navy. In addition to the Board a large number of other visitors were present. On this day—and it is the only day in the year when such is the case—work at Greenwich is entirely suspended, so that visitors have then an opportunity of examining the various instruments, which it would be impossible at other periods of the year to obtain. The annual report of the Astronomer Royal to the Board of Visitors is also presented this day, and from it we here give one or two short extracts:—

Catalogue and Chart.

"With the Astrographic equatorial 722 plates, with a total of 1812 exposures, have been taken on 161 nights in the year ending May 10, and of these 116 have been rejected, viz., 57 from photographic defects, 6 from mechanical injury, 12 from mistakes in setting, 6 from the plate being wrongly placed in the carrier, 7 from failure in clock driving, and 28 from interference by cloud. The following statement shows the progress made with the photographic mapping of the heavens in the year 1892, May 11, to 1893, May 10:—

	No. of Photos. taken.	Successful Plates.
Astrographic Chart (exposure 40m)	200	183
Plates for Catalogue (exposures 6m, 3m, and 20s)	367	288
Number of fields photographed for the chart		172
Number of fields photographed for the catalogue		271
Total number of fields photographed since the commencement of the work for the chart		176
Total number of fields photographed since the commencement of the work for the catalogue		299

It has been made a practice to take a trail on each night on a catalogue plate as a check on orientation, and during the past year 127 plates with trails have been thus secured."

Among the negatives shown were several illustrative of the effect of prolonged exposures, the latter as compared with comparatively short exposures enormously multiplying the number of stars photographed.

Miscellaneous Photographs.

The following miscellaneous photographs (included in the total number of 722 given above) have also been taken:—

Nova Aurigæ, 49; for zero of scales and orientation, 36; North Pole (for adjustments of equatorial), 11; Pleiades, with various exposures, 19; Victoria comparison stars (for determination of scale value), 12; lunar

eclipse, 1892, May 11, 4; comet Holmes, 2; moon, 3; Saturn, 5; conjunction of Saturn and γ Virginis, 16; trails of equatorial stars, 3.

Four of the plates of the Pleiades have been taken with the group in four different positions on the plate for determination of the optical distortion of the telescope.

Some experimental plates of Jupiter, Saturn, double stars and lunar craters have also been taken with the image enlarged about fourteen times by a secondary magnifier, consisting of a triple commented concave lens of one and three-eighths of an inch in diameter and three inches focus, supplied by Mr. T. R. Dallmeyer. The results are very promising.

The Photo-heliograph.

The telescope and camera of the Dallmeyer photo-heliograph were again removed on September 9, 1892, from the wooden dome, where the new buildings obscured the horizon, to the first floor of the new museum, where they were remounted on stand No. 3, which was simply placed on the floor and found sufficiently steady. From this position it was possible to photograph the sun during about two hours each day. The instrument and stand No. 3 (the proper stand No. 4 having been lent for use in the eclipse expeditions) were taken back to the wooden dome on April 7, 1893, the sun being then visible over the roof of the intervening building.

In the year ending May 10, 1893, photographs of the sun have been taken with this instrument on 180 days, and of these 410 have been selected for preservation, besides twenty-two photographs with double images of the sun for determination of zero of position.

The photographic telescope presented by Sir Henry Thompson, which has been mounted on the Lassell equatorial, has been in regular use as a photo-heliograph since January, 1893, and photographs of the sun have been obtained with it on eighty-nine days, of which 158 have been selected for preservation. In all, with one photo-heliograph or the other, a record of the state of the solar surface has been secured on 220 days during the year. A new enlarging lens by Messrs. Ross & Co., which appears to be very free from distortion, was fitted to the Thompson photo-heliograph on December 13, and has been used regularly since for the eight-inch photographs of the sun.

For the year 1892 Greenwich photographs have been selected for measurement on 197 days, and photographs from India and Mauritius (filling up the gaps in the series) on 165 days, making a total of 362 days out of 366 on which photographs are available."

For photographs of sun spots an exposure of $\frac{1}{5000}$ of a second is given.

Magnetic Observations.

The following remarks as the value of photography in magnetic observations will be read with interest.

"The photographic registration of the variations of magnetic declination, horizontal force and vertical force, and of earth currents, with the accompanying eye observations of absolute declination, horizontal force and dip, are maintained as in former years. The period has been one of great magnetic activity, and at such times we can appreciate the advantage of the newer photographic processes, as compared with those of earlier days, in the clearness and delicacy of the registration of the many rapid magnetic movements that occur during magnetic storms. There is also greater general certainty in the photographic work, the loss of register due to photographic failure being now a very rare circumstance."

Recent Sunshine.

Photographers may like to know what the Greenwich authorities have to say over the recent remarkable summer weather:

"The sunshine registered in the months of March and April has been phenomenal. For March it was 155·1 hours, and for April 231·0 hours; the greatest numbers for these months in the sixteen years 1877–1892 being 141h·0 (1880, March) and 196h·3 (1892, April). The greatest values for *any* month in the sixteen years preceding are 277h·1 (1887, July), 267h 1 (1877, June), and 237h·8 (1882, May); and, if we consider the *ratios* of sunshine to the total time the sun was above horizon, or to the total time, less one and a half hours each day, during which the sun is too low to give a record on the paper, we find that April, 1893, was the sunniest month yet recorded."

	Ratio to Total No. of Hours.	Ratio to Total, less 1½ hours daily.
1877, June	0·540	0·594
1882, May	0·493	0·546
1887, July	0·558	0·615
1893, April	0·557	0·624

A NEW SOCIETY—THE NORTHERN PHOTOGRAPHIC AND SCIENTIFIC ASSOCIATION.

When a number of amateur photographers and scientists residing in the more northern suburbs of London decided upon the formation of a society which should prove of greater scope than photography alone could provide, the pleasant and now largely populated village of Wood Green was universally selected as the site of its headquarters. Wood Green in itself has many amateur photographers and others devoted to scientific pursuits, and these have during the past few weeks being doing advance work in the formation of a society which should embrace not alone photography but other sciences more or less cognate to it. Wood Green, from having a short time ago been an outlying and very small suburb of London, has now become a species of centre, having suburbs of its own, the preponderance of its male inhabitants being engaged in London in business during the day. It is in contiguity with Noel Park, Hornsey West Green, New Southgate, and similar populous districts.

The inaugural meeting, which assumed the form of a *conversazione*, took place in the Public Hall, Canning-crescent, Wood Green, on Wednesday evening last week. The Hall was crowded, many ladies being present. On the tables around the Hall numerous microscopes, showing objects with plain and polarised light, were arranged, together with curios from China, Japan, India, Africa, and the South Sea Islands, lent by medical men and others of the neighbourhood. The walls were decorated with photographs, both of a pictorial and a scientific character. A twelve-foot screen at one end, and a lantern in the middle of the Hall, left no room for doubt as to what one part of the entertainment was to consist of, and which eventually was found to be a display of a selection from Mr. F. P. Cembrano's choicest slides.

Mr. J. G. Robins, the President of the Association, occupied the chair, and in course of his remarks spoke of the future of the Society that had just come into existence. Two preliminary meetings had been already held, and that night it was to be launched out to take its chance among the many others of different kinds that already existed. This Society was a scientific as well as a photographic one, and the person who took a practical interest in it found himself perforce dabbling in chemistry, and several other sciences. The promoters of this Society were a few gentlemen who were scientists, and who thought that a very good society could be formed in the district. The audience could judge for themselves as to the success of the inaugural meeting. The aim of the Society was to unite photography and other sciences together, which was plainly demonstrated that evening by a glance round the hall. The speaker then went on to enumerate the various collections they had lent them that evening, speaking in very kind terms of the gentlemen who had so befriended them, and expressing the gratitude the Society felt towards them for their kindness. He also spoke in eulogistic terms of the Secretary, Mr. A. S. Murrow, of the hard work that had devolved upon him in that capacity, and of the efficient manner that he had performed his various duties. The Society was indebted to Mr. Murrow for the handsome screen they saw before them, which was in every respect one of the best that it was possible to get. Mr. Murrow had made them a present of it, and his kindness had been greatly esteemed. With regard to the lantern and photographic slides that would be exhibited by Mr. P. D. Coghill a little later on, the Society owed its thanks to Mr. Cembrano, of Richmond, who had sent, for this occasion, the finest photographic slides it was possible to obtain. Those present would soon have an opportunity of judging for themselves as to the accuracy of his remarks when the slides were projected on the screen. The speaker then went on to announce that the next meeting of the Society would take place that night three weeks, on which occasion a lecture would be given by Mr. C. Coulter on *Chemistry on Dry Plates*. After supplementing several additional fixtures, the speaker concluded his remarks by urging all his hearers who took an interest in any scientific pursuit of any description, to give in their names to the Secretary, who would cordially welcome them on behalf of the Society.

The Treasurer, Mr. F. K. Beagley, said that the Association was not being run as a paying concern, and all that was required of it was that it should pay its own way. In view of this the subscription was not a heavy one, namely, ten shillings a year; and this was very reasonable considering the programme that was in store for them.

The exhibition of Mr. Cembrano's slides, each of which was greeted with encomiums, was followed by a similar exhibition of microscopic projections on the screen. Music, including madrigals, formed an attractive feature in the proceedings, and as some of the members and their lady friends are professional musicians, this element was ably conducted.

The committee of management deserve unqualified thanks for the able manner in which everything was carried through.

The membership is very numerous, and the Association has our best wishes for its success.

PHOTOGRAPHIC SALON, 1893.

The following are the particulars of the Exhibition of Pictorial Photography, to be held at the Dudley Gallery, Piccadily, from October 9 to November 11, 1893.

1. An Exhibition of photographic pictures, to be called the Photographic Salon, will be held at the Dudley Gallery, Piccadilly, London, W., from October 9 to November 11, 1893.

2. Careful consideration will be given to all pictures entered for exhibition, and a selection of works of pictorial merit only made by a Committee.

3. Foreign as well as English photography will be represented.

4. The aim of the organizers of this, the first Photographic Salon, is to inaugurate a series of Exhibitions (which it is hoped may be annual ones) bringing before the public the best productions of photography solely from the pictorial point of view.

5. No awards are offered, and no charges made to exhibitors.

6. The usual charge of 1*s.* will be made to the public for admission. Exhibitors will be entitled to a season ticket

7. Arrangements will be made for the sale of pictures, if desired, and a commission of fifteen per cent. will be charged on sales effected. Particulars as to price and sale will be printed in the catalogue.

8. Each picture must be separately framed, and each frame must bear on the back name of exhibitor, number and title of picture, and price if offered for sale, corresponding to the particulars on the entry form. This information must also, for catalogue purposes, be repeated on a label attached by a string, and made to hang over the front of the frame.

9. The form announcing intention to send picture should be forwarded as soon as possible, and not later than Friday, September 1. The entry form must be sent with, or previous to, exhibits, and received not later than Wednesday, September 27th, addressed to the Secretary, Photographic Salon, 215, Shaftesbury-avenue, W.C.

10. Pictures sent in packing cases, &c., must be delivered, carriage paid, at 215, Shaftesbury Avenue, W.C., not later than Wednesday, September 27. Frames delivered by hand must be left at the Dudley Gallery, Piccadilly, on Saturday, September 30, and removed, after the Exhibition, from the same place on Monday, November 13.

11. The Committee will unpack, repack, and deliver to carriers all exhibits sent in cases, but will not be responsible for damage. Every care will be taken of exhibits. To avoid damage, frames should have no projecting nails.

12. Intending exhibitors are desired to fill up the forms of advice and entry, and to forward the same to the "Secretary of the Organizing Committee, Photographic Salon, 1893," 215, Shaftesbury Avenue, London, W.C., in accordance with the instructions noted thereon.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

May 26,—Council Meeting—the President, Mr. Thomas Fall (London), in the chair.

Present: Messrs. Birtles (Warrington), Warwick Brooks, Hon. Secretary (Manchester), Crosby, Hon. Treasurer (Rotherham), Eddison (Barnsley), Higginson (Bowdon), Whitlock (Birmingham), Yates (Sheffield); also as a member of N.A.P.P., T. N. Longton (Sheffield), and D. J. O'Neill, Secretary.

Telegrams and letters of apology were received from Messrs. Bromwich (Bridgnorth), Gill (Colchester), McIver (Leeds), Slingsby (Lincoln), Whaley (Doncaster).

Secretary's report was read, and the business transacted may be summarised as follows:—Annual report and statement of accounts, also list of the new Council elected at the annual meeting had been forwarded to the (146) members.

Next annual meeting will be held February, 1894, Birmingham. A dinner to be arranged for the members and friends on that occasion, details of which will be duly announced.

Members of Council and members of the Association had paid over to Guarantee Fund for working the Association, 35*l.*

New members elected by vote of Council, Mr. Lyd. Sawyer (Newcastle-on-Tyne), Mr. A. Hollis (Barrow-in-Furness).

Several members not having yet paid their 1893 subscriptions (10*s.* 6*d.*), Council requested that same may be forwarded to Secretary, D. J. O'Neill, 47, Charlotte-road, Birmingham, as speedily as possible.

Secretary continues to receive communications of various kinds from all parts of the world, evidencing the fact that the N.A.P.P. was now fully recognised as the official representative of the profession.

The Photographic Convention of the United Kingdom will be held at Plymouth, July 3, 1893.

Mr. Coles (Watford) had kindly sent a list of proposed members to Secretary.

The various uses to which the Association might be applied for the benefit of the profession had been frequently referred to in the photographic press.

The establishment of a Photographic Club and Institute was heartily approved by the Council, and it was noted that the President, Mr. T. Fall, had been requested to act as a member of the Provisional Committee of the Club.

Respecting the very important case of the most unjust prosecution of Mr. Cowley, the Secretary gave full particulars of the correspondence on the subject between influential members of the N.A.P.P. It was felt that, while every member of the Association heartily sympathised with Mr. Cowley, the Association was not in a financial position to take up his case and to institute legal proceedings on his account, especially as he *was not a member of the Association*. Council recognised gratefully the active part taken by the President, Mr. T. Fall, in this matter, and he detailed the action which he (Mr. Fall) was taking for the benefit of Mr. Cowley on his own responsibility, and without in any way compromising the Association or its friends.

A desire was expressed that the members should send in to Secretary suggestions and designs for the proposed "Certificate of Membership," which it was agreed at the annual meeting should be issued to members.

Referring to suggestion from Mr. W. P. Marsh (Bognor, Sussex) as to traders and manufacturers supplying members on special advantageous terms, Council was of opinion that the present members (146) of the Association now warranted their demanding such advantageous terms for the Association. The President kindly undertook to procure data as to the terms on which makers and traders would be willing to comply with this very reasonable request of the Council.

Mr. R. Slingsby (Lincoln) having brought forward the subject of *certificates* of skill and capacity to be issued to assistants, the President dwelt at length on the very unpractical character of the certificates now issued by the London Polytechnic Institution, which were merely good for a limited *chemical* knowledge.

Council expressed strong wishes that some system should be adopted to bring really capable and duly qualified assistants within reach of the professional photographer.

Secretary was instructed to communicate with Secretary of Polytechnic Institution, with a view to some arrangement that before such certificates were issued, students should be examined by some representative, capable, and experienced photographer.

In reference to the comments of Mr. Battersby (Manchester) on the sale of methylated spirit, Council considered that there was now no practical difficulty in the way of photographers procuring same. The President stated he should be happy to assist all members in this matter, and to give them the advantage of his knowledge and experience on the subject.

The President reported his intention to visit the Chicago Exhibition Photographic Conference as requested by the Council.

Mr. Eddison (Barnsley) brought forward the subject of the present unjust mode of dealing with photographers by the fire insurance companies, as regards compensation for loss of negatives. He spoke from painful and personal experience in the matter, and stated that instead of the person insured recovering the amount which he was insured for, the insurance company only paid on a "proved average of the actual sales from negatives in stock over a given period," making the amount refunded about one-fourth of that on which the insurer had been paying all along. The Secretary was instructed to communicate with Mr. Eddison and his assessors, Messrs. East & Haslam, Leeds, with a view to procure some alteration in this most unjust mode of procedure.

The next Council meeting will be held at Anderton's Hotel, Fleet-street, at the time of the opening of the Pall Mall Photographic Exhibition, London. All professional photographers will be gladly welcomed by the Council.

Our Editorial Table.

GLYCIN-HAUFF.

Fuerst Bros., 17, Philpot-lane.

Last week we acknowledged receipt of a sample of the newest developing agent, and since then we have had an opportunity of putting it to a trial. Its salient qualities are thus indicated in the makers' instructions. "Glycin-Hauff, with potash, forms a developer giving, without the addition of bromide, absolutely clear and transparent negatives of an agreeably grey colour. It is not a rapid developer, but works slowly, with great harmony and softness. An advantage not to be under-estimated of this developer also consists in its great keeping quality, which will not alter if the solution is sufficiently concentrated and in well-closed bottles. The concentrated developer is made up as follows:—350 grains of sodium sulphite crystal are dissolved in one ounce of water, 150 grains of glycin are then added and heated to boiling point, and one and a half ounces of potash carbonate are added (begin adding the potash in small quanti-

ties, on account of the carbonic acid gas). When cold, this concentrated developer—forming a thin, pasty solution—may be kept as stock. For use, shake the solution first, and dilute the required quantity twelve times for ordinary purposes. For use when development is to be left to itself, the stock solution is diluted fifty times."

In our own experiments, we made up for use the following solution:—

Sodium sulphite	40 grains.
Glycin	20 „
Potassium carbonate	80 „
Water	4 ounces.

Using this solution as the working developer, we found that, although its action was comparatively slow, with rightly exposed plates it yielded a charming quality of image, having perfect softness and harmony, with a richness of colour of the deposit which should make glycin eminently useful for transparency work. It works very cleanly, and has great power over detail, so that, with those who incline to slow development, it should be a favourite.

The A B C Toning Powder.

Aston & Sons, 95, Spencer-street, Birmingham.

To the drachm of hypo dissolved in two and a half ounces of water, twelve grains of the toning powder are added to make a combined toning and fixing bath. The combination yields excellent tones on gelatine paper. It will, doubtless, be a convenience to many to have the toning powder in this handy form.

A New Hand Camera—the "Queen."

The "Queen" is well worthy of notice, for two reasons: first, it is the invention of a lady photographer who has shown that she possesses an inventive faculty hitherto believed, in this direction, to have been confined to the sterner sex; and, secondly, and more particularly, that her "Queen," although selling retail at only 15*s.* 6*d.*, is a really effective magazine camera, containing one dozen of plates in its interior, each in a sheath. It has an achromatic lens, which covers a quarter-plate sharply. It is light (small doubt of that when a lady is the inventor), weighing only three pounds when charged. The general principle is this: The plates are stacked behind, and pressed forward by a spiral spring to the checks at the focal plane, like those in the well-known Swinden & Earp camera. Upon pressing a button concealed under the carrying handle, a part of the stage containing one sheath only is depressed, which causes the sheath and plate to fall forward on to a spring-board, from which it slides into a receptacle at the back, into which the plates store themselves very neatly one on the other. The instantaneous shutter, which is always set, is simple in the extreme, but it answers the purpose, and, like the other acting parts of the camera, cannot get out of order. It is made by N. Crouch & Co., 122, Newington-butts, S.E.

Brilliantine.

S. Sidey, Richmond-road, Dalston, N.E.

Brilliantine is a solution which, when diluted with water, is intended for removing pyro and other stains from negatives, and clearing up their shadows. This, from a single trial, we have found it to accomplish.

Wynnes' Exposure Meter.

An exposure meter, differing from those already known, is brought under our notice by Mr. G. F. Wynne, of Wrexham, who has organized a "company" in order to its being brought efficiently before the world, and who, claiming the infallibility of its indications, has adopted this qualifying term as the name of the meter.

The Infallible Exposure Meter is a miniature slide rule which, being only a little over three inches in length, can easily be stowed away in the vest pocket. In the right-hand column are the stops, ranging from *f*-4 to *f*-256. The third column, which, like the first, is on the solid rule, represents the speed of plates, graduated from a very low degree of slowness to an almost inconceivable rapidity. The centre column is engraved on the brass slide, and ranges from 64 seconds downwards to the 128th of a second. The meter is accompanied by full directions for use. We believe that this little instrument will prove very useful, especially when used with an actinometer, the use of which is described, but which has not yet come to hand. Mr. Wynne truly says that the greatest difficulty a beginner in photography experiences is in rightly estimating the correct exposure to be given under the varying conditions of subject, stop, speed of plate, and light value, and he believes that this exposure meter will prove an "infallible" guide to such. It sells at a very low price. We may return to this subject after receiving the actinometer referred to.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,146.—"Improvements in Dark Slides for Photographic Purposes." W. H. Prestwich.—*Dated May* 23, 1893.

No. 10,166.—"Improvements in Photographic Cameras, and a Fastener to be used therein." C. Shaw.—*Dated May* 23, 1893.

No. 10,184.—"Improvements in Magazine Photographic Cameras." M. Cobé.—*Dated May* 23, 1893.

No. 10,194.—"Improved Means for the Development of Photographic Plates." J. R. C. Gale.—*Dated May* 23, 1893.

No. 10,196.—"Improvements in Phototype Machines." Communicated by A. P. Stanford. Complete specification. A. J. Boult.—*Dated May* 23, 1893.

No. 10,238.—"Improvements in Optical Lanterns." L. Matthews.—*Dated May* 23, 1893.

No. 10,319.—"Improvement in Photographic Printing Frames." G. R. Heaviside and J. H. Scampton.—*Dated May* 25, 1893.

No. 10,397.—"Improvements in Photographic Cameras." T. F. S. Tinne.—*Dated May* 26, 1893.

No. 10,524.—"The Employment of Cobaltic Salts to Obtain Photographic Images." Communicated by A. Lumière and L. Lumière. B. J. B. Mills.—*Dated May* 29, 1893.

No. 10,617.—"Improvements in Apparatus for Calculating Photographic Exposures." G. F. Wynne.—*Dated May* 30, 1893.

No. 10,685.—"Improvements in or connected with the Production of Photographs on Slate." W. Jones and H. Jones.—*Dated May* 31, 1893.

No. 10,694.—"A new Cross Motion for the Fronts of Field Cameras." W. Dawkins & Sons.—*Dated May* 31, 1893.

SPECIFICATIONS PUBLISHED.

1892.

No. 10,796.—"Photographic Apparatus." Mackenstein.
No. 11,175.—"Photography." Van der Weyde.

1893.

No. 4377.—"Photographic Objectives." Parvin.
No. 7343.—"Colouring Photographic Prints, &c. Klary.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 12	Darlington	Trevelyan Hotel, Darlington.
„ 12	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
„ 12	North Middlesex	Jubilee House, Hornsey-road, N.
„ 12	Richmond	Greyhound Hotel, Richmond.
„ 13	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 13	Derby	Smith's Restaurant, Victoria-st.
„ 13	Great Britain	50, Great Russell-st. Bloomsbury.
„ 13	Hackney	206, Mare-street, Hackney.
„ 13	Manchester Amateur	Lecture Hall, Athenæum.
„ 13	Paisley	9, Gauze-street, Paisley.
„ 13	Stockton	Mason's Court, High-street.
„ 14	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
„ 14	Leytonstone	The Assembly Rooms, High-road.
„ 14	Munster	School of Art, Nelson-place, Cork.
„ 14	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 14	Southport	The Studio, 15, Cambridge-arcade.
„ 14	Stockport	Mechanics' Institute, Stockport.
„ 15	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 15	Glossop Dale	
„ 15	Hull	71, Prospect-street, Hull.
„ 15	London and Provincial	Champion Hotel, 15, Aldersgate-st.
„ 15	Oldham	The Lyceum, Union-street, Oldham.
„ 15	Oxford Photo. Society	Society's Rooms, 136, High-street.
„ 16	Cardiff	
„ 16	Croydon Microscopical	Public Hall, George-street, Croydon.
„ 16	Holborn	
„ 16	Leamington	Trinity Church Room, Morton-st
„ 16	Maidstone	"The Palace," Maidstone.
„ 17	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 1,—Mr. W. D. Welford in the chair.

The CHAIRMAN exhibited an album of gelatine-chloride prints, toned with his bicarbonate of soda toning bath, mentioned at a previous meeting of the Association. He also said that, during a recent trip to Belgium, he had exposed sixty plates in a hand camera, and had only lost four of them.

Some discussion arose over a statement in one of the photographic journals that ninety per cent. of the light was stopped by the glass roof of a studio.

Mr. W. F. DEBENHAM thought twenty per cent. a better proportion.

Mr. P. EVERITT observed that as much as fifty per cent. might be obstructed when the glass was not apparently in a dirty condition.

Mr. R. BECKETT exhibited a negative plate, having a positive partly formed upon it, which he thought might be caused by repeatedly looking at the image during development. He promised to confirm the observation by developing an unexposed plate, and allowing the light to show on it, and continuing development.

It was suggested that he should cover up one half of an exposed plate during development, a suggestion which Mr. Beckett said he would adopt.

Mr. P. EVERITT read a paper on *Angle of View* [see page 357]. A discussion followed.

Hackney Photographic Society.—May 30, Mr. E. J. Wall presiding.—Referring to amidol, Mr. VINING said, although the negatives were pretty-looking, they were not good printers; they suited landscape work better than portraiture. Mr. R. BECKETT suggested that he should reduce the exposure and extend the development. He used it every day: that day he had developed twenty-five negatives in thirty minutes; could get any amount of density and excellent gradation. Mr. Wire showed prints from an amidol-developed negative taken by flashlight; they had sufficient contrast. The CHAIRMAN said it was always best to add amidol *dry*, otherwise the density-given power is soon lost. Two grains of amidol and a quarter of a grain of bromide to the ounce works well. It is specially good for old plates, but he did not believe in the latitude in exposure generally claimed for it. The negatives are not so non-actinic as pyro. Metol is nearer pyro. More control can be had over metol than any other developer excepting pyro. It must be dissolved in the order given in the printed formula. There are two kinds of metol—one an oxalate, the other a sulphate; the latter gives most density. A discussion then took place on cloud negatives. Mr. G. Hankins uses a hand camera, small stop, and rapid exposure. A black glass mirror with an isochromatic plate *f*-32, one-twentieth to one-quarter of a second, cuts off much of the too energetic blue rays by polarisation. If the sky is a brilliant blue, the light yellow screen is an advantage. Mr. E. J. Wall generally takes a silver print and cuts out at the sky line as a mask. Mr. S. J. BECKETT said clouds reflected in still water gave better results than the originals. Mr. W. L. Barker smoked the plain side of the negative with a wax taper. Mr. W. A. Hensler fully exposes and under-develops. Mr. E. J. Wall spoke highly of Place's shutter, a roller shutter giving less exposure to the sky. In a batch of views recently taken only three per cent. were without clouds. To develop, he uses one-eighth of a grain of pyro to normal of ammonia and bromide. Mr. W. F. Gosling suns down his skies, when dead white, darker at top than at horizon. Dr. Roland Smith always reduces the sky with ferrid-cyanide of potassium and hypo; however dense it may be, the clouds can always be got out. Mr. S. J. Beckett retards development by bromide applied locally with a brush. At the close of the meeting the presentation of a silver breakfast service was made to the Hon. Treasurer, Mr. J. O. Grant, in recognition of his valuable services to the Society.

East London Natural History and Microscopical Society.—The members of the above Society, according to their established custom, had their annual outing and "social" on Derby Day, May 31, to Epping Forest. Commencing from Theydon Bois the route selected was through the less frequented northern portion of the Forest near Epping, towards Copped Hall, and then southwards to High Beach. Early in the afternoon the party was increased by a contingent from the Hackney Photographic Society. The weather was all that could be desired, and some very interesting "finds" delighted the naturalists, and by the photographic section a good many exposures were made. The *rendezvous* for the "social" was the "George Hotel," George-lane, Woodford, where at seven p.m. the President of the former Society, Mr. W. Smart, and other members of the Executive and friends, met those who had borne the burden and heat of the day. After ample justice had been done to an excellent and much-appreciated tea, to which about thirty sat down, a most pleasant evening was spent. Mr. A. Dean, the Secretary of the Natural History and Microscopical Society, and who is also Curator and Assistant Secretary of the Photographic Society, performed several *morceaux* on the violin, Mr. Drew presiding at the piano. Messrs. Harding, Sparrow, Carrick, Dr. Gerard Smith, Love, and T. Wishart Philips enlivened the evening with many good songs, Mr. Slight giving an excellent recitation. Mr. Smart took an early opportunity of proposing the health of Mr. Dean, whose inception it is to hold these agreeable gatherings, and whose happy idea it was to combine the Photographic Society in the outing, which tended so much to the pleasure of the day and the success of the evening. In his remarks he referred to the charm of revelling in Nature's beauties, the variety of its teeming life, the necessary, but still mysterious, dying of all, filling the mind with awe, reverence, and humility. The smallest weed, the most insignificant insect, hold a secret no man has yet revealed. Mr. DEAN, in reply, hoped that next year there might be a larger attendance, and that the same good feeling and good comradeship would prevail.

Putney Photographic Society.—May 27, Second Summer Outing.—Although the weather looked very gloomy at starting, a good muster of members assembled, and, under the leadership of Mr. Faulkner, member of Council, proceeded to Hayes, on the South-Eastern Railway, for Hayes and Keston Commons. The weather having brightened, full advantage was taken of the very pretty scenery abounding on these beautiful commons, more particularly round the lakes at Keston. Good accommodation was provided at the "Fox Inn." Next Outing, June 10, to Burnham Beeches. Mr. William Martin, jun., will act as leader.

FORTHCOMING EXHIBITIONS.

1893.	
July 3-8	Photographic Convention of the United Kingdom, Plymouth. Hon. Secretary, F. P. Cembrano, jnn. 10, Cambridge-gardens, Richmond, Surrey, S.W.
August	Welsh National Eisteddfod. The General Secretary Pontypridd.
Sept. 25-Nov. 15 ...	Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1-31	Hamburg. Das Anastellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 9-Nov. ...	Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
December	Madras. The Hon. Secretary Amateur Photographic Society, Madras.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE CONCENTRIC LENS.

To the EDITOR.

SIR,—I have given a direct challenge to Mr. Stillman's main contention in his letters on this lens, and specified an authority who can decide the point at issue fairly between us.

Surely it is plain to Mr. Stillman that his own results are no more conclusive to me than mine would be to him. Of what avail for me to send you a softly defined negative taken with *f*-16 and a sharply defined one with *f*-32? Would it convince any one of anything except my own self-conceit?

I trust Mr. Stillman will agree to send one of his lenses to Kew; but if he declines to do so, I will send mine. I am determined to have a reliable opinion on the point, as it will be instructive as well as conclusive.

I am greatly tempted to make some vigorous comments on Mr. Stillman's last letter, but will defer doing so for the present. What we want now is proof. Mr. Stillman says the Concentric defines as sharply at *f*-16 as it does at *f*-64. I say it does not, and will prove the truth of my contention, or retire with many expressions of regret for having driven Mr. Stillman into poetry to prove that all optical science is sheer nonsense.—I am, yours, &c.,

F. H. BURTON.

Roundhay, near Leeds, June 6, 1893.

LARGE CAMERAS FOR PHOTOGRAPHIC SOCIETIES.

To the EDITOR.

SIR,—The following letter, referring to a remark of mine in last "Jottings" as to the purchase of large cameras by photographic societies for the use of members, has been forwarded to me. In order that many more societies may profit by the admirable example of the South London, I would suggest that Mr. Oakden's interesting letter be published.—I am, yours, &c.,

COSMOS.

June 6, 1893.

"SIR,—Referring to your paragraph in THE BRITISH JOURNAL OF PHOTOGRAPHY relating to the purchase of a 12 × 10 camera by the Manchester Society and which leads to the inference that the idea is a new one, I desire to point out that three years ago such a camera was purchased by the South London Photographic Society in a somewhat similar manner. Since that time a wide-angle lens has been added to the outfit. Small fees for the loan of the apparatus have been charged to members, and these have now nearly repaid the original outlay.

"On the purchase being announced in print, our example was followed at once by two or three other Societies.

"A lantern for loan by our members has also been bought in a similar way.

"Some gentlemen have joined us simply to obtain the use of the camera,' &c.

—Yours faithfully, CHAS. H. OAKDEN, *Hon. Secretary.*

"*South London Photographic Society*, 51, *Melbourne-grove, East Dulwich, S.E., June* 1, 1893."

RAPID PLATES AND HALATION.

To the EDITOR.

SIR,—In the course of his paper, *Selections*, which he read before the Holborn Camera Club, Mr. E. Dunmore made some remarks on the subject of "Halation" that are so strongly at variance with my experience of the subject, and may possibly conflict with that of others, that I should

be obliged if you would allow me to say a few words in reference to it. He says, "With highly sensitive films, no precaution that I know of will altogether prevent, or even mitigate it [halation], if the subject is highly reflective, or possessing strong and abrupt contrasts." It is, as a rule, only in such subjects as these that halation is to be apprehended and provided against. I should have thought—and theory seems to me to indicate that such is the case—that the coarse particles of a very rapid film would, in themselves, interpose a natural barrier to the lateral spreading action, although they might not have the same effect with regard to the back reflections.

But, waiving this point, my experience of very rapid plates, backed with a mixture of caramel, gum, and burnt sienna—possibly as good a backing mixture you can have—is, that even in difficult interiors, requiring long exposure, the halation of the image is virtually inappreciable. Many of the most rapid plates contain iodide, of which fact Mr. Dunmore seems unaware, and which may account for my experience differing from his. Some years ago I ascertained, by experiment, that the iodide contained in some plates of inferior and extreme rapidity did not greatly differ in quantity.

Much, of course, depends on the amount of silver contained in the film of rapid bromide; but, apart from this, I do not think it a safe doctrine to put forth that very rapid plates, with a suitable backing, are unmanageable for strongly contrasted interiors, although slow bromo-iodide plates may be preferable, as being more calculated in themselves to subdue halation.—I am, yours, &c., J. STRINGER.

London, June 2, 1893.

COINS AS WEIGHTS AND MEASURES.

To the EDITOR.

SIR,—I am sure photographers ought to be very thankful to you for telling them, as you did in your last number, how admirably some of the current coins of the realm can be substituted for the usual weights and measures. It is not every one of us who knew that a sovereign could be used for a quarter of an ounce, half-a-crown for the half-ounce, and so on, and now that we have the information I fear that, in the present state of trade, there are very few of us who are able to put it to practical account, I, for one, at any rate, find it impossible to keep sovereigns and half-crowns long enough to use them as weights—even when I get them, which is rare now that, as Mr. W. Grove points out, my brother professionals are giving sittings for nothing. Could you not supplement your interesting paragraph by telling us how the sovereigns, &c., are come by—help us all, in fact, to make a living out of the profession you so worthily support? If you can assist us in doing that, I am sure there isn't a man among us who wouldn't be content with light coins, that wouldn't do for weights at all.—I am, yours, &c., HARD-UP PRO.

June 3, 1893.

CHEAP RAILWAY FARES FOR PHOTOGRAPHERS.

[THE following communication from Mr. James Railton, of Messrs. Swan & Leach, referring to cheap railway fares for photographers, has been forwarded to us as the result of a conversation with that gentleman on the subject. The fact that parties of photographers can obtain reductions on their fares deserves, as Mr. Railton hints, to be more widely known.—ED.]

To the EDITOR.

SIR,—Referring to my call at your office this morning, *re* railway fares, &c., for photographers, with regard to their being placed upon the same footing as members of angling societies, I made it my business to bring the matter before the Superintendent of the Great Northern Railway this morning, and he informed me, in course of conversation, that such a thing could not be; it would open too large a field altogether, and people would avail themselves of such a reduction by at once becoming members of photographic societies (which would greatly interfere with ordinary traffic) who would not become members of angling societies. The next time I have the pleasure of seeing you, I would explain the matter more fully, when I am sure you would agree with me that the idea is not one which can be carried through.

The reduction made for members of photographic societies we feel sure is not *generally* known, that is, of course, when they are travelling together on their field days, and personally I shall be very glad to make any arrangements for proposed parties.

As promised, I enclose a copy of the letter I wrote to all the secretaries of the photographic societies upon the enclosed list [24, Ed.]. We have not even received so much as an acknowledgment.—Yours faithfully,

Swan & Leach, Ltd., JAMES RAILTON.

3, *Charing-cross, London, S.W., June* 2, 1893.

DEAR SIR,—We beg to offer you our services in connexion with the arrangements for any excursions or field days which your Society may have during the ensuing season.

On any of the systems of the Railway Companies (or their connexions) mentioned above, we are able to offer you tickets in advance of the reduced tariffs granted to photographic societies, according to numbers.

We are also able to make arrangements for catering, and consequently could quote you a price per head, including cost of return ticket and meals, so that each individual member of your society could know at once the total expense to which he would be put, and at the same time the trouble of making the arrangements would be taken off your hands, and submitted to you when complete for your acceptance or otherwise.

For your guidance we make no charge whatever to you for our services, as we act in the matter solely as the authorised representatives of the Railway Companies concerned.—Yours faithfully,

SWAN & LEACH, LTD.,
JAMES RAILTON, *Managing Director.*

3, *Charing-cross, London, S.W., January* 25, 1893."

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange 3¼×3¼ camera, four double dark slides complete, for half-plate camera.—Address, H. MOREL, Newcastle-chambers, Market-place, Nottingham.

Wanted, detective lens, hand camera, or offers, for Robinson's patent secret camera and plates complete. Address, F. COUCH, 11, Waterloo-crescent, Dover.

Will exchange Grubb's 3A portrait lens in fine condition (list price 6l.) for 12×10 rapid rectilinear by good maker.—Address, F. WILLIAMS, 25, Winton-street, Millow, Cumberland.

Will give a Marion's whole-plate, short-focus view lens for Kershaw or similar shutter, time and instantaneous, for three-inch hood.—Address, A. J. ROBINSON, 4, Windsor-place, Mumbles, Swansea.

Will exchange six volumes, unbound, of Cassell's *Illustrated History of England*, and about fifty odd numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY for a half-plate camera and lens.—Address, H. TUBE, Byfield-villa, Rothes-road, Dorking.

Will exchange *Amateur Photographer*, July, 1891, to date complete, and *Boys' Own Paper*, vols. xiii. and xiv., for Griffith's guinea hand camera or Optimus rapid rectilinear quarter-plate.—Address, W. DOWNING, 22, Pepys-road, New Cross, S.E.

Will exchange 9×7 solid mahogany-box camera, single slide, rising and cross front, also five-inch gas bar burnisher, for hand camera, 10×8 slides, or quarter-plate camera set.—Address, CHARLES E. HEATH, 4, Cambridge-terrace, Brockley-road, Forest Hill, S.E.

Wanted, half-plate modern camera, and three double slides, in good condition, in exchange for three or four dipping baths (various sizes up to 18×14), and about 300 copies of THE BRITISH JOURNAL OF PHOTOGRAPHY.—Address, A. W. DURRELL, 44, Birkbeck-place, West Dulwich.

Wanted to exchange Marion "Excelsior" whole-plate studio camera, will take also cabinets and *cartes*, in perfect condition, for modern out-door whole-plate camera, with three double slides; difference adjusted in cash.—Address, J. T. SIMONS, 46, Elizabeth-street, off Trafford-road, Salford.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

PHOTOGRAPHS REGISTERED:—

W. Crow Gordon, Nairn.—*Photograph of Rev. Currie Martin, of Nairn.*

James Burgoyne, Birmingham.—*Photograph of the Australian Cricketers.*

William James Wilson Munro, Annan.—*Photograph of otter hunters after kill.*

Guy & Co., Limited, Cork.—*Three Photographs of Blarney Mills, County Cork.*

John Charles Burrow, Camborne.—*Sixteen photographs of miners, and miners at work.*

Sydney W. Anstee, Luton.—*Three photographs of bridge over the River Lea at Luton.*

Sydney Victor White, Reading.—*Photograph of Alderman William White, of Birmingham.*

Philip Newman, Devizes.—*Photographs of H.R.H. the Prince of Wales reviewing his own Yeomanry Regiment upon Roundway Hill, Devizes, and upon the occasion of the Wiltshire Yeomanry Centenary.*

W. GIRLING.—Thanks for yours and enclosure.

BINOCULAR.—Screw the lenses on the front, so as each to be in the centre of its half of the plate.

PRINTER.—By boiling the water, and using when cold, the deposit on the prints will probably not recur.

K.—Any good lens of the euryscope class will serve your purpose. The one you specially mention belongs, we believe, to that class.

ALFRED BOEHM (Burton-crescent).—The agent for Gunther Wagner's transparent colours is Mr. C. A. Rudowsky, 3, Guildhall-chambers, E.C.

G. B.—The lenses of Lerebours et Secretan are generally considered good. We do not know the present commercial value of one suitable for whole-plates.

P. NEWMAN.—Registration enables you to proceed for infringement of copyright. The latter lasts for the owner's lifetime, and seven years after his death.

C. J. EMENY.—In the advertisement pages of the JOURNAL and ALMANAC, you will find every type of camera dealt with, some of which you will no doubt find suited to your purposes.

C. Y. O.—Unless you have a copyright in the picture, you cannot prevent its being sold at any price the pirate chooses. It is certainly annoying, after having paid a high price for the negative.

GRAMME.—Weights and measures on the metric system can be obtained from any of the dealers in chemical appliances; or any of the photographic dealers would supply them to order if they do not stock them.

W. HEMING.—If the prints, after being removed from the toning bath, are first subjected to a good dash of water, and are then transferred to fresh water, the toning action will not be continued. This, at any rate, is our experience.

R. MYERS.—Bichromate of soda is not so good as the bichromate of potash for sensitising carbon tissue. It has been recommended for the purpose, but it is found not to answer so well, as it has a tendency to render the tissue quickly insoluble.

NOVICE.—There is no necessity to boil the starch for mounting purposes. In fact, it is not so good if boiled. The want of adhesion in your case is, that the starch was not rightly mixed. Get a little instruction in the matter from the domestic department.

MADAME TALBOT WILSON writes: "May I ask if you could give me a list of the places in Rome, Florence, Venice, and other towns in Italy and Germany, where an amateur could develop negatives?"—Perhaps some of our readers can supply the information desired.

OXON.—Something must be radically wrong. Five grains of chloride of gold for each sheet of paper is out of all reason. As you are sure that none of the gold is reduced spontaneously, we can only suspect that the salt being employed does not contain the proper proportion of metal.

T. CRAVEN.—In copying oil paintings or water-colour drawings with plates orthochromatised with erythrosine, a yellow screen should be employed to obtain the best effects. Its depth ought to be chosen according to the character of the work. It is well to be provided with two or three screens of different depths. They are not expensive in small sizes.

W. A. C.—It was very unwise to send the money for second-hand goods without knowing something about the advertiser. As more than a week has elapsed and the apparatus has not arrived, and you can get no reply to your letters, the matter certainly looks very suspicious. Therefore lose no time in communicating with the superintendent of police for the district, giving full particulars of the affair.

C. TYLER.—The only way to obtain more detail in the darker parts of the interior of the church is by giving a longer exposure. Although twenty-five minutes may seem a long time to you, an hour and a half would not have been a bit too long, under the same conditions as to stop and plate, to get full detail in the deepest shadows. The light circle in the centre of the picture is a flare-spot as surmised.

T. BENJAMIN.—Unless you can prove that the negatives were badly packed, we think you have no remedy against the enlargers. As a rule, they state on their prospectuses that they do not hold themselves responsible for breakages in transit. The remedy, if any, would be against the carrying agents. But the claim should have been made at the time. After so long a period they will, no doubt, repudiate it altogether.

F. G. HILLHOUSE.—1. While the rates of wages for operators in the United States may be higher than those here, it is the case that competition for the best positions is as keen, if not keener. 2. There is no such journal there. 3. If you decided to start business there, we should suggest your going to a small town, and growing with it; but whether you would do better there than here hinges so largely upon personal qualifications that we cannot hazard any opinion on the question.

A. CAMPBELL says: "I have made up some collodion for enamelling, using equal parts of methylated ether and alcohol; but it does not answer. The film it produces seems all right, but the fault is, it will not strip freely from the glass—it sticks in places and spoils the prints, as those enclosed."—There appears to be nothing the matter with the collodion. The cause of the prints sticking is that the plate was not sufficiently treated with the French chalk—it was not rubbed sufficiently on the glass.

H. A.—We should say that the pawnbroker will have to give up the lens, even if the thief is not caught and convicted. As only twenty-one shillings was asked for on an instrument costing over twenty pounds, and bearing a well-known maker's name, the pawnbroker might well have assumed that it was come by honestly. That, we imagine, would be the view taken by the magistrate before whom he might be summoned. As the lens is a valuable one, it may be well, in the first instance, to consult a solicitor.

PYRO (Leeds).—It is impossible for any one to give the exposure "for an enlargement on bromide paper from a quarter-plate negative with a lens working at *f*·8 with daylight." It will depend upon the sensitiveness of the paper, the density of the negative, the light at the time, and the degree of amplification. The best way to ascertain what is required is, when all is in position, to make trial exposures on two or three small pieces of paper, and then develop them. With a few experiments of this kind, proper exposures can soon be arrived at.

C. FRITH.—Your announcement was only received after the preceding portion of the JOURNAL had been sent to press, but we insert here a synopsis. The Harringay Society will, owing to an increase of members, hereafter meet at 8, Station-road, Finsbury Park. They will open with a *conversazione* at the Public Hall, Finsbury Park (entrance, 14, Stroud Green-road), on Thursday, the 15th inst. Tickets of admission, 6*d.*, to be had of local chemists. Secretaries of Societies would greatly oblige by sending their reports so as to reach us *before* Wednesdays.

P. A. G. asks: "Whose place is it to keep a studio in repair, the tenant or the landlord? The tenant built the studio, removable at any time, some years ago in the garden, and the premises are held on a yearly tenancy. The landlord has always done the repairs to the house, and makes no demur to doing so still, but refuses to repair the studio. Can he be compelled to?"—We should think, certainly not. It is the tenant's property, and put upon the premises by him for his own use, and to be taken away whenever he removes. We consider it is as unreasonable to expect the landlord to keep the studio, under these circumstances, in repair as it would be to expect him to repair the furniture in the house when it requiresit.

H. T. writes: "A short time ago I bought a benzoline cask to store waste silver washings, The cask being full, I tried to precipitate the silver with common salt. Finding that it would not separate, tried sheet copper. That not having the desired effect, I have come to the conclusion that the benzoline retained in the wood of casks stops the precipitation. Could you say if it is so, and suggest a remedy? In both trials the washings have been given a longer time than usual to settle, but it has had no apparent effect, except to slightly coat the copper. Have used paraffin casks before, and have had no trouble with them."—The cask is not the cause of the silver not subsiding. The silver in the washings from some papers, particularly ready-sensitised, is more troublesome to precipitate than from others. In these cases hydrochloric acid is a better precipitant than salt. Try the effect of adding an ounce or two of nitric acid, and then give a vigorous stirring for a few minutes. After this treatment the chloride of silver usually subsides quickly.

PHOTOGRAPHIC CLUB.—June 14, Members' Open Night.

MANCHESTER PHOTOGRAPHIC SOCIETY.—June 10, Alton (ramble).

THE Birmingham Photographic Company, Limited, have removed to Criterion Works, Great Charles-street, Birmingham.

WE thank Mr. James Paton, Greenock, for an interesting photograph of a flash of lightning, obtained on the evening of the 20th ult. It was taken across the Clyde.

CHANGE OF ADDRESS.—The address of Mr. Fred H. Davies, Secretary of the Talbot Photographic Album Club, Birmingham, will in future be 265, Coventry-road, Birmingham.

LEYTONSTONE CAMERA CLUB.—June 10, "Up the River" to Battersea Park; leader, Mr. A. E. Bailey. The Club will proceed by the first boat after forty-five minutes past two p.m., from Old Swan Pier, London Bridge.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—Out-door meeting to Ripon and Fountain's Abbey on Thursday, June 15. Train leaves Newcastle at thirty-five minutes past seven a.m. Mr. H. G. Ridgway, leader.

WE are sorry to see from the daily papers that Messrs. Iliffe & Sturmey, the proprietors of our contemporary *Photography*, have had two cases of libel decided against them last week in respect of another of their publications, the *Bicycling News*. It is evident that some cyclists, to borrow our friend's language, have a less tough epidermis than others, hence these actions, which it is to be hoped will not be imported into photographic journalism, some of which body occasionally sail abnormally close to the wind.

LES PROCÉDÉS MODERNES D'ILLUSTRATION.—Messrs. Thévoz & Co., of Geneva, are issuing a small monthly publication, illustrated, dealing with modern photo-mechanical methods of illustration. The first number contains a brief article on "ancient methods," wood-engraving, lithography, and copper plate.

CROYDON CAMERA CLUB.—Wednesday, June 14, Excursion, conducted by Mr. H. Maurice Page; leaves West Croydon at thirty-two minutes past nine a.m. (*viâ* Clapham) for Weybridge. Saturday, June 24, Excursion, conducted by Mr. Maclean; leaves East Croydon at three minutes past two p.m. for Edenbridge.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—June 10, Saturday Outing, London Colney; first train from St. Pancras after half past two. 22, Demoustration by W. D. Welford, *Welford's Toning Bath for Chloride Paper*. 24, Saturday Outing, Chingford, for the Forest. 29, Annual Meeting; election of officers.

OLDHAM PHOTOGRAPHIC SOCIETY.—June 10, Saturday, Rossett. Depart, Central, fifty-two minutes past eight a.m., for Rossett *viâ* Chester. Return fare, about 4*s.*; leader, Mr. W. Thompson. June 13, Tuesday, Belle Vue. Depart, Clegg-street, twenty-seven minutes past one p.m. Return fare, 1*s.* 2*d.*; leader, Mr. Tom Heywood.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—June 13, Ordinary Meeting, to be held at 50, Great Russell-street, at 8 p.m. A paper will be read by Mr. William Taylor (of Leicester) on *The Construction of Interchangeable Lens-screw Fittings;* and Dr. C. P. Goerz (of Berlin) will read a paper upon, and exhibit, *A New Anastigmatic Lens.*

LENS FLANGES.—It is already known that Mr. William Taylor, of Leicester, is to read a paper on this subject before the Photographic Society on Tuesday next. In this he will describe the method in use in the Slate-street Works for the accurate making of lens screw fittings. This he will do in the hope of improving the general condition of screw making, and all those interested in such mechanical work certainly ought to be present on that evening.

WRITING upon the recent conviction of a Chelmsford woman for cruelty to a child, the *East Anglian Daily Times* has the following remarks on the value of photography in this and similar cases:—"The second point is the link in the chain of evidence which bound all the others together, and made escape impossible. It was open to the defence to suggest perjury or exaggeration against any number of people; but, as Mr. Commissioner Kerr pertinently observed, the sun does not tell lies, and the happy thought of Mr. Kidd, in photographing the poor creature just as she had left her tormentor, removed all doubt from the minds of the jury, who gave their verdict without leaving the box. This is a hint which may be commended both to the police and the Society's officers. Nothing would make the lame excuses for cruelty—which some people accept so easily—utterly futile more than an invariable practice of photographing the victims at the earliest possible moment."

IN course of some correspondence of a somewhat chaffing nature that was indulged in between Messrs. Alfred Maskell and Cimabue Brown, jun., in this JOURNAL in the early part of last year, a statement was made by the latter gentleman in which was voiced a belief that the author of a certain article reflecting on the Camera Club was a well-known optician, who, although unmentioned by name, considered that his identity was unmistakable. As we have since then learned and believe that he had nothing to do with the matter, we can only express our regret that any statement which was calculated to give pain or annoyance to that gentleman should have appeared in our columns. While we allow the utmost freedom of expression to our correspondents, and not unfrequently have to tone down the force of their language, still may statements be allowed to pass which on intermediate inquiry would have caused to be eliminated. This is one such case for which we apologise to the person aggrieved.

RICHMOND CAMERA CLUB.—Summer programme, 1893:—Informal Meetings, third Monday in month: June 19, July 17, August 21, September 18. On these evenings members are requested to bring prints from negatives taken during the Club excursions. Excursion: Saturday, June 10, Uxbridge, twenty minutes past two train from Paddington; leader, Mr. Andressen. Saturday, July 1, Eynesford, forty minutes past two train from Holborn Viaduct, or forty-five minutes past two from Victoria; leader, Mr. Williams. Monday, August 7 (Bank Holiday), Oxted (for Limpsfield), forty-five minutes past ten a.m. train from Clapham Junction; leader, Mr. Williams. Saturday, September 2, Godstone (book to Caterham), trains from Charing Cross, five minutes past two; Cannon-street, seventeen minutes past two; London Bridge, ten minutes past two. N.B.—Those wishing to attend this excursion should inform Mr. C. H. Davis, 97 Church-road, Richmond, not later than August 28, so that a conveyance from Caterham Station may be arranged for.

WATER IN DEVELOPMENT.

IN the process of development, the employment of ready-mixed solutions is customary. In pyrogallic acid, or whatever developing agent is used, we have an energetic reducing agent, *i.e.*, one which is susceptible of oxidation. Air dissolved in the water here comes into play as an oxidising agent; any iron present will tend to strongly colour the solution. The water, therefore, in this case, should be boiled and filtered before use. In the alkaline solution almost invariably used in connexion with the reducing agent, the impurities are not so important, as the changes undergone on standing would be but slight. Alkaline reducing agents absorb oxygen much more readily than when in the neutral or acid state, hence the two liquids are mixed only at the time of using them, and a few drops of acid are added to the pyro stock solution to correct any alkalinity on the part of the water. Waste from paper mills or chemical factories discharging into the stream from which the water supply is taken may prove very serious at this point. Hyposulphite of soda is used as an antichlor in bleaching, and even a trace of this substance in the developer leads to disastrous results. Of the numerous chemicals which may be discharged into the streams, the supply is, of course, infinite, many of them exerting a very deleterious action on the development. Then there is the ever-present little microbe, a large number of them harmless, some harmful. Most of the plates used are coated with gelatine, and the introduction of numberless germs tends to set up decomposition, which eventually destroys the picture entirely.

This may seem an exaggeration; but, as a matter of fact, the existence and recognition of these bacteria is to-day determined by mixing a small portion of the water with nutrient gelatine, pouring it upon a glass plate and allowing the germs to develop, after which they are counted and examined. Their solvent action upon the gelatine is very marked, and many cases of frilling are undoubtedly started in this way.

In the Croton water supplied to this city, the number of these minute organisms frequently runs up into the thousands and tens of thousands for every cubic centimetre of water examined. Decomposition by these means is, of course, enormously accelerated by moisture, but then many of our negatives are stored away in places by no means absolutely dry. Upon the continent of Europe the subject of water is still more important. There, almost all of the drinking water of the larger towns and cities is unfit for use, and it is stated of the Seine water that it is capable of bringing out a feeble image upon an exposed plate without the addition of any chemical whatever. Organic matter in suspension and solution is a powerful reducing agent, and, if present, adds another complication to the delicate interaction and reduction characteristic of the development process. This may come either from decaying vegetable matter or through direct sewerage contamination.

In the fixing of the plate many amateurs use a solution of hypo which has been made up some time previously. Now, hypo solution is intensely delicate to all acids, which cause its decomposition with the separation of a white cloud of sulphur. Any quantity of free acid would, of course, seriously affect the strength of this solution, but that is something hardly likely to occur.

—*Anthony's Bulletin.*

THE FORTHCOMING CONVENTION AT PLYMOUTH.

WE have received a list of the papers that are expected to be read at the Plymouth Convention. These are as follows:—

Recent Developers, by E. J. Wall.

Multiple Films, by S. H. Fry.

Artistic Expression with the Hand Camera, by J. Guardia.

Lantern Slide Making, by C. L. Mitchell, M.D.

Some Slides from the Marine Biological Laboratory, by J. T. Cunningham, M.A.

The Special Properties of the Zeiss Anastigmatic Lenses, by Dr. Paul Rudolph.

Photography in Relation to Medical Record Demonstration, by A. Pringle.

Some Points in Connexion with Development, by C. H. Bothamley.

On the Power of Compensating in Development for Variation in Exposure, by Professor W. K. Burton.

There will be several excursions as under:—

July 4.—Steamer excursion to the Yealm and the River Tamar. Invitation excursion of the local committee, the Devon and Cornwall Camera Club, the Devonport Camera Club, and friends, to the members of the Photographic Convention. Excursion to Tavistock.

July 6.—Excursions to Launceston, Totnes, down the Dart, Looe, and the Cheeswing.

July 7.—Excursions to Lydford, Bickleigh Vale, Dockyard and Keyham, Cattewater.

July 8.—Excursions to Princetown, Ivybridge, Virtuous Lady Mine.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1728. Vol. XL.—JUNE 16, 1893.

TELE-PHOTO LENSES PAST AND PRESENT.

Another New One.

Some seed we threw in the ground nineteen years ago, after lying seemingly dormant for so long a period, is at last springing up in various directions. It will be remembered that at that time we pointed out how by the combination of a positive lens and a negative one, the latter of shorter focus than the other and separated some distance from it, a telescopic view of a distant object could be thrown upon the focussing screen of the camera, and we expressed a hope that practical opticians would take up the matter. We foresaw the great usefulness of such a lens, for we had by its agency obtained enormously magnified photographs of subjects in Highgate, the camera being in Wood-green, the distance between the two places being approximately three miles, and we had, as published at the time, obtained a sharp, direct photograph of the sun three inches in diameter, this latter being in our estimation no way inferior in definition to some we had about the same time seen produced in Kew Observatory by a large telescope. We spoke of it to one optician, who gravely told us he believed it could not be done, or, if it could, people would not be inclined to find any use in it.

The late Mr. Thos. Grubb, F.R.S., to whom we had explained it when we met him at the residence of Mr. George Shadbolt, entertained a different opinion of the idea. Fortified by the encouragement of this eminent optician, we ventured to publish an account of what had been done, but it was one of those things ushered into the world before its time. As every one knows, the tele-photo lens is now one of our recognised institutions, and forms the subject of several patents in various countries. One of these, the latest of which we are aware, is that of Mr. A. B. Parvin, of Philadelphia, whose specification is now before us, and will be found given *in extenso* in another page of this issue. The date of this patent is February 28, 1893, and it is presumable that Mr. Parvin has made himself well acquainted with all that has been published in this direction up to that date, and yet in his patent he appears to ignore totally the previously existing tele-photo lenses, so well known on this side of the ocean.

Every one now is aware that a tele-photo lens consists of a positive lens, or combination of lenses, placed at one end of a tube, at the other end of which is mounted a negative or dispersing lens, and that a greater or less degree of magnifying power is obtained by a very slight diminution or increase of the distances between these two lenses. Mr. Parvin does not appear to recognise this as an advantage, for in nine out of his eleven claims he prominently specifies a solid or non-extensible tube as the mount of his lens, a feature to which every optician is likely to make him gladly welcome, seeing that by its adoption he deprives himself of an important feature of the tele-photo lens system. It is much as if one were to patent a camera, a special feature in which was that, being solid from front to back, it was incapable of any extension save that given by its maker.

Looking a little closer into Mr. Parvin's specification, we find that, while the front lens of his combination is similar to those which characterised all lenses of this class that had been brought under public notice prior to the advent of 1892—that is, of the kind employed as the front lens of portrait objectives, viz., crossed, plano-convex, meniscus, achromatised, of course—his back or divergent lens differs in its external form from anything he believes to have been formerly employed. Many years before we had heard of this gentleman interesting himself in this department of optics we had published the fact of an opera-glass of the better class having been successfully employed in tele-photo work.

As he makes a special claim that the two surfaces of his negative lens (the eyepiece in a binocular or Galilean telescope—an opera or field-glass, in fact) must be of different radii of curvature, he may perhaps scarcely thank us for informing him that in numerous negative lenses of this instrument the radii are not similar. In the first one we ever adapted for this purpose, now over twenty years since, the curvature of the surface next to the front was of a much shorter radius than its opposite side. This, being formed of only a single piece of glass, and therefore non-achromatic *per se*, was supplanted by a plano-concave triple, as published in these pages nineteen years since; nay, anterior to that time binocular glasses were made, at any rate sold, in London in which the negative lenses or eyepieces were not double concave, or plano-concave, but the very form insisted on by Mr. Parvin in his patent, viz., convexo-concave or concave-meniscus, the convex side to the outside, as illustrated in the new patent.

We think it unwise in Mr. Parvin to make a special claim for several items in his specification, an infringement of which, if brought into court, would ensure the destruction of his patent. For example, his first claim is for "a photographic objective, comprising a tube provided with a convergent front lens and a divergent rear lens," as if this were not the characteristic of every tele-photo lens hitherto made; or, as in his fifth claim which is for "a photographic objective, provided with a divergent rear lens, having faces or surfaces of different radii;" or, further, in his sixth claim, which is the application of Waterhouse diaphragms to the tele-photo lens, as if this had in any sense been a novelty at the beginning of the present year.

The leading characteristic of the Parvin lens is the substitution of a simple lens of the concave or short-sight spectacle glass class, and of the meniscus form, for the achromatic lenses or combination of lenses hitherto employed for the purpose; and, further, in the employment of a mount, composed of a tube solid from end to end. Now, we say, unhesitatingly, that both of these features are bad, the latter because of the impossibility of effecting any variation in the size of the image, and the former because of the equal impossibility of getting a plate covered with an approximation to marginal sharpness, unless with a stop ridiculously small. Spectacle glasses, we all know, can, in skilful hands, produce photographs, but photographs of quite a different nature from those obtained by properly achromatised lenses; and in such a delicate matter as the production of a direct or tele-photo large view it is absolutely necessary that more than ordinary care should be imported into the achromatising of all the lenses of the objective. Mr. Parvin's lens may, probably does, answer when the magnification does not exceed that obtainable by the use of a moderately long-focus landscape lens, but when tried in contrast, as we have done, with Dallmeyer's tele-photo lens, in which the divergent back is a carefully corrected achromatic combination, then are its deficiencies rendered apparent.

In regard to such points as we have mentioned, Mr. Parvin's patent runs not the very slightest risk of being infringed by any optician in this country, for reasons we have already given. But, if he wishes it to have any force here, we would, in his interests, recommend him to materially cut down his claims. However, we sympathise with his desires to place in the hands of the public a cheap, if not quite an efficient, substitute for the necessarily more expensive lenses of this class now in use.

We close by expressing a hope that our opticians will devise means for supplying negative lenses which may be adapted to the rectilinears already in possession of so many of our workers, but who may feel disinclined to purchase an entire tele-photo outfit.

OUT-DOOR GROUPS.

The writer of the letter, "Young Amateur" (page 384), shows that we have still left unsaid what might be of interest to amateurs, for it is evident that the skilled professional does not need any hints in this particular department. We may reply to his query at once. The fault of his group is that the figures have been in full sunlight when the negative was taken, and no possible dressing in printing or otherwise will enable him to produce a really satisfactory print. Sticklers for artistic propriety are very hard upon studio illumination, and there is no doubt that much lighting of an eminently inartistic character is produced in so-called "artistic effects;" but, at the same time, it must be pointed out that the same thing may be seen in any collection of oil-painting portraits—the seeker need go no further than the present Academy to find examples of the kind. In photography, however, harsh justice is meted out by the painter-artists, and we must do the best we can; that best must exclude direct sunlight illumination. It need not be pointed out that for snap-shot pictures such lighting is a *sine-quâ-non*, at least for the quickest exposures; hence it is evident that snap-shots should not be attempted unless the group or individual is in the shade, or is taken on a day when the sun is not shining. As the latter, however, cannot be commanded at will, all workers should, naturally, lay themselves out for arranging their groups in the shade—either some tall building or under the umbrageous spreading of some large tree. There are objections to the latter, in that, pretty as a nicely posed group appears to the eye when so placed, trees, with the exposure proper for figures, will leave the tree background very black indeed. Taking, then, our figures with some mansion or old wall as a ground (and it often happens that there are steps and porticoes under such circumstances that greatly facilitate pretty grouping), there will be found two difficulties to encounter. Firstly, it frequently happens that, if the group be large, one end is shaded by neighbouring trees, and so comes out much darker than the other. Secondly, the very condition that sends the group behind a building too often necessitates the camera to be placed with the sun shining into it.

This difficulty is very common. If the building be unusually lofty, the instrument may be erected in its shadow; if not so high, then no good results may be expected until the lens be screened until the direct rays are excluded. Such an arrangement, of course, precludes the whole of the building being included with the group; but, to parody a well-known quotation, "the group is the thing," and the building must take its chance. When it must be included, all that can be done by way of precaution is to exclude as much sky as possible by the sunshade, and print in skies to the prints. We cannot lay too much stress upon these recommendations, we have seen so many good pictures ruined from this cause alone; indeed, when portrait lenses have been employed, the skylight alone, without any direct sun falling on the interior of the blackened tube, is quite enough to produce fog unless the lens be shaded.

Regarding the group being darker at one end than the other, we have seen the evil remedied by a kind of preferential intensification. The negative has been wholly intensified with mercury, and then reduced by rubbing the strongest side with a pledget of cotton-wool saturated with weak hypo. This is a method of reducing density that has not received the attention it deserves, for, as we have pointed out before, there are many mercury-intensified negatives in existence as good and apparently as permanent as those made the required density at the first operation; but, as this is matter of argument, we do not lay stress upon it.

With regard to groups, we would refer to the experience of a well-known Oriental explorer, which we related a few weeks ago. He used the ordinary cap for uncovering the lens, and down dropped his savage sitter in a collapse from fright. Now, though we do not liken the probable subjects sitting to those who read these lines to savages, they will yet be subject to the same mental shock when they see the lens uncapped; whether the result be to produce laughter or movement on the part of some members of the group, the result is equally unsatisfactory. Hence we would say, a group should, if possible, never be attempted except with a pneumatic shutter, working in or outside the lens. Besides the advantages alluded to, there is also the vast convenience in using such a shutter of looking straight at the group (not at an individual member), and so seizing the most propitious moment for working the exposure unseen and unknown. We have seen, for instance, a wedding group taken which was quite a failure, because one of the gentlemen, not observing the cap being removed, was in too affectionate proximity to a fair neighbour. With a shutter which enabled the operator to see the group while exposing, of course this would not have happened. We would conclude our observations by quoting the advice of a professional friend; we cannot, however, say we have followed it. He says every photographer who goes in

for groups should have single, not double, slides. There is so much hubbub and confusion, especially in wedding groups, that there is too much danger of double exposures with double slides.

THE TREATMENT OF GELATINO-CHLORIDE PAPER.*

In very many instances no trouble at all will be experienced in connexion with the softening of the gelatine film, though, where the water is naturally soft or free from lime and other salts, the necessity for the alum bath or some substitute will be especially felt. Alum is, as we have shown, objectionable on the score of its acidity; but, as many of the other sulphates possess the property of slightly hardening the film, it is possible to apply a perhaps milder remedy. In the very early days of gelatine plates, for instance, Epsom salts (or sulphate of magnesia) were added to the washing water to prevent "frilling" where any tendency in that direction existed. The same salt answers equally well in connexion with gelatine paper and is free from the objection of acidity, as also are the corresponding salts of potash and soda.

Where soft water is available it is for various reasons preferable to hard for washing the prints previous to toning in spite of its softening action on the gelatine, which can be overcome by the use of sulphate of magnesia. When the water contains considerable quantities of soluble chlorides and carbonates, these act upon the free silver contained in the gelatine film, and except in the case of the combined toning and fixing bath are liable to form a coating of silver chloride upon the surface of the print, which, besides giving a false idea of the progress of the toning, leads also to irregularity in the action of the solution.

Where the water supply is very hard, it is for this reason very desirable, when rain water cannot be obtained, to perform the first washing of the prints with distilled water. It is not necessary that a large quantity be used if the prints are left to soak for some time until the greater portion of the silver has been dissolved out; they may then be finally rinsed in two or three changes of ordinary water without danger of the formation of the film of chloride of silver.

Many operators attach importance to the thorough elimination of all free silver from the prints before toning, and, to ensure this result, use a bath of chloride of sodium. There is every reason to believe that the complete removal of the soluble silver salts conduces to regularity of tone and freedom from the defect known as "mealiness;" but, where the salt bath is used, it should only be after the bulk of the silver has been removed by washing in water as free as possible from either chlorides or carbonates. If a print direct from the printing frame be immersed directly in a bath of salt water, its surface will be covered with a layer of chloride of silver so dense as to completely obscure the tone, and render it quite impossible to judge the progress of the action, at the same time acting as a protective coating and preventing the free working of the toning bath.

In order to bring the prints into as perfect a condition as possible for toning, and to keep them as free as possible from surface deposit, it is well to apply gentle friction to each individual print. In the case of small pictures this is readily done with the fingers in turning them over, or they may be rubbed gently together in pairs, face to face; but with large prints it is better and safer to lay them singly upon a sheet of glass and pass a soft sponge, a tuft of cotton-wool, well wetted, or a broad camel's-hair brush, carefully over the surface.

The exercise of a little care in the minor details—even in so comparatively unimportant a matter as washing—will tend very greatly to improve the quality of the result, as well, perhaps, as the ultimate permanence of the prints, but particularly will it aid in securing uniformity of tone, not only in the same, but in successive batches of prints. Nothing is so likely to bring about an opposite result as imperfect or careless washing, for prints containing variable quantities of soluble matter are not only in themselves in an unfit condition for evenness of action, but they introduce into the toning bath substances which modify or perhaps entirely destroy its action.

The washing after toning should be performed with equal care, although it need not be carried to the same length as the previous washing. On removal from the gold solution, each print should be freely exposed to the action of a considerable volume of water, either from a tap or in a vessel of large dimensions, so as to at once arrest the toning action. If a large number of prints are removed in quick succession from the toning bath into a dish of water in which they have little room for the free circulation of the liquid, the toning action is certain to continue irregularly, with the inevitable result of patchiness.

Where a tendency to softness of surface is exhibited, it is not well to use the alum bath too soon—that is to say, before fixing; or very soon after, before the hyposulphites have been removed. As is well known, alum decomposes the hyposulphites, and should not therefore be allowed to touch the prints until the soluble salts have been, as far as possible, removed. In such cases it is far preferable to add a little sulphate of magnesia to the washing water, which should, of course, be kept at as low a temperature as can conveniently be managed. After a thorough washing in this manner, the alum may be used with perfect safety.

In no case, except where prints are to be mounted in contact with glass, should the alum bath be omitted. One of the strongest objections raised against gelatino-chloride prints is the difficulty of handling them in mounting, on account of the sticky character of the surface. But this is wholly due to neglect of the alum bath, which, if freely used, renders the gelatine surface as easy to manage as the ordinary albumen print. Indeed, a properly alumed gelatine print may be treated in precisely the same way as albumenised paper, even to drying it by heat.

Those who have been accustomed to albumenised paper are very apt to be misled with gelatine paper into over-printing, owing to the comparatively slight reduction that takes place in toning and fixing. Where this occurs a convenient reducing agent is handy, and nothing seems more efficient for the purpose than ferricyanide of potassium and hypo used very weak. When a print is seen after fixing to be only slightly over-done, it may be removed directly from the hypo into a dish of very weak ferricyanide solution containing only sufficient of the salt to very slightly colour it, allowing it to remain until the necessary reduction has been effected. Where greater reduction is needful, the print should be preferably slightly washed after removal from the fixing bath, and then immersed in a dish of similar solution of ferricyanide to which a few drops of hypo solution have been added. The energy of the solution depends upon the former salt, which should not be used too strong or excessive action will take place. The reduction should be gradual, as it is then not only under more perfect control, but is more likely to be uniform.

* Concluded from page 355.

The same means may be adopted in cases where from any cause the tone of the print is irregular. It very often occurs that from misjudgment a print after fixing turns out to be under-toned, the half-tones having reached the cool grey stage while the shadows are still more or less red. In such cases the use of the ferricyanide will very often satisfactorily modify the tone, removing the warmer colour of the unaltered silver, but leaving the gold-toned image intact. Of course, for successful treatment in this manner, the print must be of sufficient depth to bear a slight amount of reduction, though the effect then produced is far less than might be expected, so far at least as toned image is concerned. In most cases the action more closely resembles a continuance of the toning than reduction or removal of a portion of the image as it really is.

The Royal Wedding.—It will be remembered that, last year, when the wedding of the late Duke of Clarence was announced, there was a great run on the portraits of the Royal couple. An equal demand is now being made for the portraits of the Duke of York and the Princess May. The sale of those of the Princess appears, it is said, to be in no way diminishing by the enormous number that were disposed of last year.

A New Lens.—The new double anastigmat lens, described and shown at the Photographic Society of Great Britain on Tuesday evening by its inventor, Dr. Goerz, of Berlin, appears, if we may judge from specimens then exhibited, to be a step decidedly in advance. From its large aperture it is entitled to rank as an aplanat; it is free from astigmatism, and even with a large aperture it has a field that is quite flat. These valuable properties will ensure for it a cordial welcome when it comes to be introduced commercially in this country. It is only by a comparison of its work with that of other lenses formed of the Jena glass that its great advantages can be fully appreciated. Some details as to its nature will be found in the report of the meeting on another page.

The Eclipse Photographs.—The members of the Royal Astronomical Society have now had the opportunity of seeing some of the most interesting of the photographs of the late eclipse. At the meeting last week, with the President, Captain Abney, C.E., in the chair, Dr. A. A. Common, F.R.S., read the preliminary report of the Eclipse Committee, and some of the photographs obtained were described by Professor Thorpe and other members of the expeditions to West Africa and Brazil. At the same meeting some wonderful photographs of the Milky Way, and also of the comets Smith and Holmes, were exhibited on the screen by Mr. Barnard of the now famous Lick Observatory. What would astronomical science do nowadays without photography and the lantern?

The National Association of Professional Photographers.—It appears not a little surprising that this Society receives such scant support from the profession in whose interest it was formed. From the report given in our last issue it seems, although it has now been established some two or three years, it numbers less than a hundred and fifty members. It is obvious that, with this limited roll, with a half-guinea subscription, it cannot achieve much of what it was established to do. There is no question that a society of this description, if properly supported, might be of great service in protecting and furthering the interests of the profession generally. Why, then, is it so little supported? Is it because there is less unanimity among professional photographers than there is with almost every other profession and trade, or is it that the majority of photographers are too lethargic? It is noteworthy that the Association appears to receive more support from photographers in the provinces than it does from those in the metropolis.

Light in the Studio.—A question was raised recently at one of the Societies as to the proportion of light obstructed by the glass of the studio. An equally interesting question is the amount of actinism that is filtered out of the light by some glass, and the dirt that is frequently upon it. It is true that this is not such an important matter now with dry plates as it was in the days of collodion, but still it is worth consideration. Some kinds of glass are very prone to turn yellow with prolonged exposure to light, particularly some of the whiter sorts that are often selected for glazing a studio. We have seen several examples that, after a few years' exposure, had become quite of a yellow tint, and cut off a considerable amount of actinism, as proved by their retarding action when laid on sensitive paper. The dirt that accumulates on the glass in the roof of the studio—particularly in large towns—is of a highly non-actinic nature; especially is this the case with that on the inside, when coal fires are used. From these causes the exposures, in some studios, have to be materially prolonged beyond what would otherwise be the case.

The Award Troubles at Chicago.—The trouble with regard to the awards at the "World's Fair" is at an end. This has been brought about by a compromise that has been accepted, with one or two exceptions, by all the foreign commissions. The compromise is practically a surrender. The awards are now to be made by a jury, instead of upon the report of a single expert—the point of contention—as would have been the case but for the vigorous protests of the foreign commissioners, by the threatened, indeed the actual, withdrawal of the exhibits of something like a score of countries from competition. So far, we may hope the awards will be satisfactory, or, at least, as satisfactory as at most competitions. This gratifying result has been obtained mainly through the instrumentality of the Secretary of the British Commissioners, Sir H. Trueman Wood, whose opinion of Mr. Thacher's system, it is said, is still unaltered; but the notice given on the subject was ample, and the acceptance of the American system was practically completed when the exhibits were sent. We have before mentioned that British interests were in good keeping in Sir H. Trueman Wood's hands. But, there, no one ever doubted that.

STUDIO-BUILDING.*

IV.

Before proceeding to the act of glazing, it would be well to refer to ventilators, a point upon which no branch of the subject gives rise to so great a variety of opinion. The popular idea of ventilation is that, as heated air ascends, if a hole be made near the ceiling of a room, the hot air will go out; and a further elaboration of that idea is that, for this egress to take place, it is first necessary to make another hole near the floor for the cold air to come in. It too often happens under such circumstances that the air will come in at the top and go out at the bottom, the ventilation of a building depending upon such a variety of conditions, both internal and external, as to defy the production of any uniform scheme for self-acting ventilation. When mechanical contrivances are adopted to enforce the egress of air, it simply becomes a matter of paying the required cost and using judgment in selecting an apparatus that is likely to perform in a satisfactory manner. It would make this already long series of articles too long by far to enter into any details on ventilating questions, and, as few photographers would be likely to go to the cost of providing mechanical contrivances, I would briefly say that my own experience has been that, practically, the greatest comfort is brought about by having as many windows as possible at the sides of the studio capable of being opened at will, and as many openiogs in the roof also, not forgetting that a close watch is required to be kept upon the latter against probable showers of rain. During hot weather as many windows and doors will be kept open as conveniently can be. When the studio is overlooked, lattice-work can be placed outside the windows. One set of windows in my present studio is provided with obscured glass and lattice-work, the former opening outside, and the

* Concluded from page 294.

latter fixed internally, the laths being inserted at a suitable slant towards the sitter.

All that now remains to be dealt with is the painters', glazier's, and decorators' work, and the designing and arranging suitable blinds.

The glazier is usually a man of dogmatic turn, who "knows his own business," and resents interference. Painful experience has taught me that he is very far from being infallible, and, as touching the question whether he knows his business, it would be interesting to learn in how many studios in the kingdom he has displayed, or made use of, that knowledge so as to glaze a wood-sashed roof watertight. There are three main points in which his work may be overlooked First, the window bars should have by preference three coats of paint before being glazed (it goes without saying that the wood should be dry; no skill in glazing can counteract the evil effects of green timber). I have seen many, perhaps through the impatience of the owner, glazed when the wood has only had one coat of "priming;" this kind of work is almost certain to leak eventually. Second (this hint was given to me by a glazier who did know his business) it is greatly conducive to the production of a watertight joint to give a coat of paint along the margin for about half an inch on each face of the glass where the putty is applied. The facility of adherence, or "growing-to," as they quaintly express it, between putty and glass is increased to a very remarkable extent, and, when this is done, the bars painted as described on a dry day, and good putty is used, the studio-builder need not have much fear as to future tightness of his roof, provided it be not disturbed or shaken while the putty is setting. Third, let there be contracted for, and care taken that the agreement is carried out, that putty of best quality, and free from water as an adulterant, is employed. This is very important, as water-weighted putty very soon becomes leaky.

This part of the subject may now be dismissed by saying that the roof should be periodically inspected, decayed putty removed and replaced by new, and the whole repainted every year or two. Unfortunately, the best period of the year to do this is the busiest time—early autumn, when the wood is dry and before heavy dews have begun to form, as in the latter case work has to be deferred till the sun dries the roof, and the painters' presence occurs at a time when they are more than the usual nuisance.

With regard to the decoration of the interior of a studio, the proverb, "De gustibus non est disputandum," so strongly applies, that I should not think of laying down any rigid laws. It is often held that the unglazed walls of the studio aid, or should aid, in the general illumination of the sitter, by means of the light reflected from them on to the more shadowed portions of the figure. My present views are that, if the shadows are lightened, when needed, by specially applied reflectors of whatever material or fabric is preferred, there is greater control over the illumination of the sitter, and then the decoration can be done on its own merits. For a long while blue was considered the proper colour for painting the interior of a studio; but, fortunately, the plan has been mainly banished to the more elementary kinds of studios and workers. Still, remembering that the question of taste comes in, I would say, if the paper chosen for the walls be dark, and not striking or garish in pattern—bright yellowish or reddish hues being avoided—the sitters' eyes will experience a degree of comfort quite impossible when lighter and gayer patterns are chosen.

The *blinds* come last under consideration, but they are by no means least in importance. Indeed, it is by judicious arrangement of them in designing the studio, and by artistic arrangement of them in use, that the whole character of the work is influenced. It is here where the artist can show himself, and upon his control and power of control over them will depend, to a considerable extent, the reputation of the professional photographer. Blinds are mainly worked on two broad principles—curtainwise and roller-blindwise. Much depends on the construction of the studio and the various aspects under which the sitter may be arranged. Each has its advocates, and it is usually the case that a photographer, discussing the subject, is ardent in praise of the plan he himself adopts. For myself, I am not prejudiced, as I work both plans; but I have a very emphatic preference for the curtain over the blind style. I have tried roller-blinds and spring-blinds—the latter working up, and down, and sideways—and they have many advantages; but some time or other the cords will go wrong, and, as a matter of course, we all know such disaster always happens at a most critical moment. I will first describe the curtain-blinds I use. Many artists use strong metal rods for suspending them; others use wires. I have tried both, and I most strongly advise the use of the latter. They are cheaper, easier to erect, and they can be always rendered taut by the turn of a screw. My mode of fixing is to attach firmly into opposite walls, or other supports, a specially strong screw-hook for each end of the wire. The latter is, at one end, firmly twisted into a loop, and slipped on one screw-hook; the other end is attached to a swivel screw, constructed on a similar principle to those in use for tightening each length of wire in wire fences. The swivel end rests on the second hook, and a few turns will make thirty or forty feet of wire as tight as a piano string. These wires are laid in pairs along the lower part of the under side of the glass roof, and at a certain height they are made to run horizontally, as there is no object in screening the whole of a lofty roof. Curtains are suspended along these pairs of wires by means of curtain hooks, firmly stitched at intervals along each of the long sides of the material, and then hooked to rings, placed beforehand, on the wires. At first I used to attach the rings direct to the curtains, and thread them on to the wire, but, when they had to be taken down for repair or during decoration, the labour of re-erecting was greater than any one could imagine who had no experience with them. It should be understood that each length of curtain is divided into three separate independent pieces, so that the light can be brought almost anywhere, as a broad or narrow pencil, this being also facilitated by allowing plenty of length in each curtain, so that their combined length, if stretched to their fullest, would be much more than the lengths of the wires they are suspended from.

Lighter screens will also be needed for softening and subduing the light, or for killing the direct rays of the sun when early or late they cross the field of view. I have tried almost everything, but have derived the greatest comfort from the material called "tracing cloth." It is close-grained, robs the light very little, and can be kept quite clean by a simple duster. The kind glazed on both sides should be asked for, and I can promise those unfamiliar with the fabric who care to try it that they will be very pleased with its performance. It is infinitely preferable to the more common plan of whitening the glass during summer-time when the light is strong, for it robs the light of less of its actinic effect, and can be instantly brought into play or folded out of sight according to the exigencies of light. These blinds with me are attached to rollers, and work from the ridge downwards almost close to the glass. To avoid swagging they are each supported by three wires stretched in the direction of thei length from ridge to eaves.

I now take leave of my readers, trusting that what I have written may be of benefit to some. I shall be pleased if any one who wishes for further information would ask me, through the columns of the JOURNAL anything that may tend to further elucidation of what may be insufficiently described in my remarks.

G. WATMOUGH WEBSTER, F.C.S.

AMERICAN NOTES AND NEWS.

A Dark Room for Chicago.—The Cramer Dry Plate Company are enterprising. They have secured the sole right to erect a dark room on the World's Fair grounds in which photographers may change their plates, and they probably have had to pay a large sum for the concession. This, however, is not all; the dark room is to be under the charge of a competent attendant, and this spirited Company are to make no charge to the visitors who choose to avail themselves of its shelter for changing their plates. This is a good stroke of policy, as it is certain to be appreciated, and will eventually richly repay Mr. Cramer and his colleagues. This generosity deserves to be noted. An American visitor to this country not many months ago complained to us that he had been charged seven shillings and sixpence by a dealer in one of the main streets of London for the use of a dark room in which to change his plates, these plates having been supplied from the same establishment. We could only reply that the principal of the business was doubtless ignorant of this act, as it was

evidently so contrary to his interests to amerce a customer in such a charge. The money demanded was paid, but all dealings there terminated.

The "Beacon's" Non-appreciation.—The *Photo-Beacon* is somewhat strongly down on Dr. P. H. Emerson on account of the paper he lately contributed to the Photographic Society of Great Britain. Under the heading "Recantation Recanted," it tries to hold the author up to ridicule, characterising the paper as too silly to be laughed at and as the most absurd matter that ever appeared in a photographic journal. We, on the contrary, think that there is much that is really good in the paper alluded to.

An "Infantometer."—Such is the title given by the foregoing journal to an extract from an article by C W. Canfield, in the *Photographic Times*. This gentleman claims that composite photography was foreshadowed in 1853 by Mr. Mascher, of Philadelphia (where so many things in photography have been discovered), whose circular regarding stereoscopic Daguerreotypes contains the following:—"I have taken a gentleman's picture on one plate, and a lady's on the other, and by placing them in the stereoscope they were blended together, producing the most astonishing effect. The resulting picture is not a true picture of the one or the other, yet possesses the most prominent features of each, making a picture wonderfully like one of their children. From this it is suggested that those true lovers who wish to see what sort of appearance their children, should they be so blessed, will have, have merely to have either a stereograph of this nature, or by preference a true composite photograph taken, and by the union of the lady and gentleman will be obtained a likeness of the desired baby—in fact an 'infantometer.'" We ask with Charles Dudley Warner, Who, after this, dare say that Americans are mentally commonplace and unimaginative?

What the Button-pressers Lose.—The *New York Tribune* says that the enjoyment derived from pressing the button and hiring some one else to "do the rest" is of brief duration, and attended with much expense. The feeling of triumphant success which attends the production of a finished and mounted print by one's own hand is wholly lacking, and with this lacking the chief charm of amateur photography is lost, and there is nothing which can take its place. The artistic treatment of an artistic subject affords a field for work into which few may venture and hope for success unless they are fully determined to master all the details of the work. This is absolutely true, but it does not apply to any reader of the *British Journal of Photography*, as our readers "do the rest" themselves. Indeed, we have a rather firm persuasion that mere button pressers are ignorant of the existence of photographic literature.

A NEW DEVELOPER FOR GELATINE DRY PLATES.

Abstract.

1. A developer containing a soluble salt of silver incorporated with gelatine and suitable reducing agents, whereby in the progress of the development the image is built up electrolytically from the silver contained in the developer itself.

2. Preventing the veiling of the image, or fog during development, by the addition to the developing solution of an easily reducible compound of silver; permitting the development of under-timed plates to be prolonged at will, until all detail impressed by the action of light upon the film is brought out and the desired density obtained.

3. A method of intensification before fixing, enabling a negative worked up to the practicable limit of development by any of the formulæ in use to be further developed until sufficiently dense.

Introduction.

During the winter of 1892, an investigation of the chemical action of the different developing agents employed with gelatine dry plates was conducted jointly by Mr. W. Dinwiddie, of the U.S. Geological Survey, and the writer. In the progress of the experimental work it was noted that, while all soluble salts of silver were rapidly reduced and precipitated by the addition of a solution of ferrous sulphate, hydroquinone, or any other developing agent, yet, if the silver salts were first emulsified or combined with gelatine, no precipitation occurred even by the prolonged action of concentrated solutions.* Further, that suitable developing agents incorporated with the emulsified silver salt constituted a developer of unusual power for gelatine dry plates, specially applicable for instantaneous and under-exposures.

An application for U.S. patent was made for this discovery, and is now pending.

Description.

The accepted theory of the action of the developer upon gelatine dry plates is, that the latent image formed by the action of light upon the film becomes visible through the reduction of the photo-bromide of silver to dark-coloured reduction compounds and finely divided metallic silver by the chemical action of the developing agent, and that the image is further strengthened by a weak electrolytic action induced, whereby the image is built up from the bromide of silver, unaltered by light, remaining in the film.

With a developer containing silver, this electrolytic action may be increased and greatly prolonged, the image gaining additional intensity from the silver derived from the developer.

The veiling of the image, or fog, produced by excessive strength of the developing agent, or by its prolonged action, is thought to result from a reduction of the unaltered silver bromide disseminated in the film. This fogging may be prevented by the addition to the developer of a small amount—less than a half per cent.—of an easily reducible salt of silver. The silver salt in the developer is more easily reduced by the developing agent than the unaltered silver bromide in the film, and protects the latter from reduction and prevents fogging as perfectly as the coating of zinc given to iron in the galvanising process protects the metal from oxidation. This protective action of the silver in the developer is increased by bromide of potassium, which restrains the reduction of the silver bromide by the formation of a difficultly reducible compound, without interfering with the action of the argentic developer. Resultant from this is the power of prolonging development indefinitely without danger of fogging.

This developer may be prepared in two forms, as an emulsion, composed of the double sulphite of silver and soda, combined with gelatine, suitable for incorporation with any of the developers in use, or as a single solution ready for use, containing in proper proportions the argentic emulsion, developing agents, and alkali.

In either form it is an opaque olive-coloured emulsion, miscible in all proportions with water.

The silver salts employed are the different double sulphites of silver and soda. These enter into combination with gelatine, with the formation of stable compounds, capable of existing in a chemically passive condition in the presence of the strongest reducing or developing agents.

It should not be understood that this developer brings out much more detail than can be obtained by the exercise of skill with pyro. What is actually accomplished is a relatively uniform increase in density all over the plate, and a strengthening of the delicate detail in the low lights and shadows.

The ultimate object of development is not the negative, but a print obtained from it; and, by the employment of argentic emulsions, detail visible only as delicate tracery in the film may be built up in silver until it becomes printable.

Measured by practical results, the time of exposure of all well-lighted subjects may be reduced to from one-fifth to one-tenth normal (*e*-5 to *e*-10).

This is equivalent to an advance of two or three numbers in the sensitometer number of the plates used. With Carbutt's orthochromatic plates, Sen. No. 23, well-developed instantaneous views were obtained in bright sunlight with the exposure given by a Prosch shutter and full opening of lens; also in many successful experiments where the normal exposure was carefully determined by Watkins' meter; the exposures actually given were in well-lighted views one-tenth normal, increased to *e*-4 where detail was desired in the shadows.

Small diaphragms can be used in instantaneous views in strong light where there are not deep shadows. With quick plates, a lens of ordinary rapidity (f-d=8), and a shutter speed of one-fiftieth or one-hundredth of a second; a diaphragm of f-16 will afford, by prolonging

* This restraining action of gelatine and other organic substances, such as sugar, starch, glucose, and gum arabic, has been remarked by Abney and Carey Lea. The older text-books on photography describe a method of redevelopment or intensification of collodion wet plates before fixing, by the addition of silver nitrate to the acetic acid and pyro developer.

the development, negatives that almost equal time exposures in detail and definition.

The opaque developer protects the plate from all action by light in the dark room. Precaution should be taken that the plates are not in the least light fogged while in the plate holders, as on development the fog is intensified. Further, by its use, development is reduced to a mechanical process, requiring little attention and easily carried out by any one.

The employment of argentic salts in photographic developers is as yet in the experimental stage; its possible future evolution cannot be predicted. From want of time, the experiments were confined to the development of dry plates; the action of argentic emulsions upon bromide paper is unknown.

Most of the experiments have been made with strongly alkaline eikonogen and hydroquinone developers, a few tests only with pyro, and none with ferrous oxalate or other ferrous developers.

The new developing agents requiring but little alkali, such as amidol and metol, offer the greatest encouragement for investigation. Further, this use of silver salts suggests the possible employment of other metallic salts, such as platinum and gold, in photographic developers.

In astronomical work argentic developers will probably prove of value, and in certain photographic processes requiring negatives of extreme density, they may find a place.

The prevailing rule in landscape photography is to somewhat over-expose, depending upon development to correct the consequent tendency to flatness and lack of contrast in the negatives. It is even stated that there is a greater latitude on the side of over-timing. The experiments made by the writer indicate that below normal exposure the latitude is at least proportionately as great, and that superior negatives result from exposures, which while sufficient to impress upon the film the most delicate detail in the shadows, are yet far under the time thought to be requisite to obtain the best results.

The Argentic Emulsion.

The Preparation of Silver Tartrate.—As silver tartrate is rapidly darkened and decomposed by exposure to white light, this emulsion is best prepared in the dark or under a red light.

A solution of

Nitrate of silver	200 grains,
Distilled water (cold)	12 ounces,

is precipitated by the equivalent weight of tartrate of potash; the amount varies slightly with different samples, but is, approximately,

Distilled water (cold)	2 ounces,
Tartrate of potash	105 to 120 grains.

The bulky white precipitate of silver tartrate is soluble in pure water. It is not washed, but placed upon a filter and allowed to drain. The filtrate contains some silver, which can be precipitated as chloride and recovered.

The moist precipitate of silver tartrate is removed from the filter, paper and dissolved with rapid stirring in a warm solution of

Sulphite of soda crystals (pure)	800 grains.
Distilled water (hot)	4 ounces.
Glycerine (pure)	1 ounce.

If the soda sulphite solution is not distinctly alkaline, it should be made so by the addition of carbonate of potash or soda, twenty to thirty grains, before adding the silver tartrate, to prevent the formation of a precipitate of the difficultly soluble, crystalline double tartrate of silver and potash, which separates in neutral and acid solutions.

The solution of the double sulphite of soda and silver, is nearly colourless and transparent. It is filtered, to remove a slight precipitate of silver sulphide derived from the impurities of the chemicals used.

A solution is made on a water bath, with care to avoid over-heating and decomposing the gelatine, of—

Nelson's sheet gelatine No. 2	100 grains.
Distilled water (hot)	2 ounces.

Then add—

Pure glycerine	2 ounces.

It is advisable to soak the gelatine for one hour in one half of the above quantity of cold water; the swelled gelatine quickly dissolves on the addition of the moiety at the boiling temperature.

The silver solution is gradually added to the solution of gelatine, with constant stirring to avoid the precipitation of the gelatine; both solutions should be warm when incorporated (100° to 120° Fahr.). The resulting solution is made up to a volume of twelve ounces by the addition of water. At first it is clear and transparent, but soon changes to an olive-grey opaque emulsion, that on cooling sets to a thick jelly.

When required for use, the emulsion is liquefied by immersing the bottle containing it in a dish of warm water. It is best kept in the dark, or in a bottle wrapped in opaque paper. Under such conditions this emulsion does not appear to undergo decomposition, the glycerine and sulphites of silver and soda acting as preservatives. On heating to a temperature approaching the boiling point of water, decomposition ensues, with precipitation of metallic silver in the golden-yellow allotropic form described by Carey Lea.* Not infrequently the emulsion is of a beautiful purple shade when viewed by transmitted light, indicating the presence of photo-salts of silver.

This formula affords an emulsion in which the silver salt is strongly restrained; one part of gelatine is combined with two parts of silver salts and eight parts of sulphite of soda. In order to increase the sensitiveness of the silver compound and accelerate the electrolytic action in development, the proportion of the gelatine should be decreased to possibly two-thirds or even one-half of that above given. A few experiments indicate that the addition of Rochelle salt or a solution of inverted sugar makes the electrolytic action more energetic.

It is possible to make the emulsion so sensitive that it will not keep, readily decomposing, with precipitation of metallic silver, forming during development a mirror of brilliant silver over the whole surface of the negative and the bottom of the developing tray.

In place of the tartrate of silver, the metabisulphite may be employed; the solution of nitrate of silver is precipitated by the addition of a weak solution of metabisulphite of soda or potash as long as a precipitate continues to form. The white or pinkish-white, curdy precipitate of silver metabisulphite† is washed by decantation with cold water and dissolved in a neutral solution of sulphite of soda, forming the double salt, which finally is incorporated with gelatine and glycerine in the above proportions.

The grade of photographic gelatine known to the trade as No. 2 appears to be the most suitable. The harder grades of gelatine afford thick and sticky emulsions, while soft gelatines, such as No. 1, have but feeble restraining power.

Glycerine, when forming fifteen to twenty-five per cent. of the volume of the emulsion, is an efficient preservative. The addition of glycerine renders the gelatine more tractable in incorporating the concentrated solutions forming the developer. It has but little restraining action when used alone.

W. P. Jenney, Ph. D.

(*To be concluded.*)

* *American Journal of Science*, 1887-89, 3d ser., vols. xxxiii., xxxviii.

† Whether this silver salt is a true metabisulphite is somewhat uncertain. It is different in behaviour in the emulsion from the silver sulphite produced by precipitating silver nitrate by sodium sulphite.

DENSITY RATIOS AND EXPOSURE.

The question whether latitude in exposure exists in a sensitive film, and, if so, to what extent, is of such wide importance that Mr. W. K. Burton's letter to *Photographic Scraps* on this subject is sure to attract much notice. Anything that Mr. Burton writes is sure to be useful and practical, and with the information given in his article any one can repeat the experiments for himself, and compare the results.

There are one or two points, however, to which I should like to draw attention, as either simplifying the work or tending to confuse the issue. In the first place, I should recommend all experiments to be made either with a screen of some sort or by a series of exposures, as indicated in the last paragraph of Mr. Burton's communication. It is quite easy to compare results obtained in this way, *i.e.*, a series of tints increasing in depth in a fixed ratio. It is, however, practically impossible to do more than give an opinion—in which the personal equation is liable to be unduly prominent—upon the similarity of two ordinary negatives, neither of which may correctly represent the natural original, and in which there is no certain guide as to true representation; that is to say, as to how much deposit should represent a certain portion of the view.

For like reasons a series of deposits of silver caused by the unimpeded action of light is much to be preferred to the results with a coloured screen, such as Warnerke's. It is more easy to compare the tints, and, in case accurate measurement should afterwards be required, more useful. An instrument for the purpose can be made from a half-plate printing frame with the aid of some pieces of cardboard in a

few minutes, and is always handy for comparing one lot of plates with another. Further than this, in the direction of laboratory testing, I do not think it advisable or necessary for the ordinary photographer to go.

Photography has been named an art-science, but, as far as negative-making goes, the two branches are far apart. The artist cares little as a rule as to the *appearance* of his negative, or, at all events, if he does care, he is willing to sacrifice the look of the negative to the appearance of the resulting print, if to secure a good (looking) negative means any loss in the picture itself. The aim of photography, then, to ninety-nine per cent. of its votaries and admirers is pictorial, and is an appeal to the senses through the eye. Whilst, therefore, I am altogether an advocate for the laboratory exposure test as against the negative-making test for ascertaining the qualities and rapidity of an emulsion, I think that the practical photograph for final judgment of its qualities ought to be formed, not from this test negative plate but from *photographic prints* produced in exactly the usual way from those test negatives rather than by measurement of the deposit. And I think this, on the ground which I expect to have my readers' sympathy upon, that every photographer can form his opinion as to the comparative excellence of two or more prints which ostensibly represent a series of gradations from dark to light, each tint increasing in depth in a known and appreciable degree. Moreover, any limitations of the printing process are self-evident and allowed for in the result. It is a pretty generally accepted fact that no printing process can reproduce all the gradation in a fine negative. The scientific measurement is to that extent misleading, and I prefer to compare prints. Were photography purely a science, I should prefer the use of measurements for general purposes; but, as I esteem it an art, I prefer to abide by the tribunal to which it ultimately appeals, viz., the visual faculties and critical sense. Scientific measurements are of more use to manufacturers than to the picture-maker; graphic measurements, if I may so christen my method, are principally useful to the worker.

With these ideas in my mind, I have gone over the experiments on Mr. Burton's lines as indicated in his letter, and, in order to get a wider trial, I have not limited myself to one make of plate, although there is probably little reason why much difference, if any, should be expected on this ground, except it be on the score of difference in the thickness of coating. My trials amply illustrate this point, viz,, that the thicker the coating of emulsion, the more easily is over-exposure tolerated by the plate. Still, different makes of plates do stand, and even demand, very different methods of treatment.

Briefly stated, I do not find that I can, with sensitometer tests (in which one knows what relative density to expect), get negatives, to use Mr. Burton's own phrase, *giving prints that are identical.* Not only can the negatives be distinguished by the difference in colour of the image, but the prints also are marked by certain characteristic differences which, in my experience, have occurred in a consistent and regular manner. These differences mainly are that the tones of the pictures upon the long-exposed plates are less differentiated than in the normal exposures, and that the pictures seemed to be pitched in a lower key. I have always noticed that photographers who back their plates, give long exposures, and then trust to restrained development, get pictures of this character. Now, these are very pleasing of their kind, but they are quite different from, and can be easily distinguished from pictures whose original negatives have been made with what is usually called correct exposures. I mention the point, however, as it confirms me in the belief that it is going too far to say, as Mr. Burton writes, that "*an experienced photographer cannot tell which is from the negative that has had the longest exposure,* and which from the normal exposure."

A good negative can be made from the plate receiving the longer exposure, and by the method he indicates, but it is different in gradation in the middle-tones, and with a sensitometer test, such as I mentioned in the earlier part of this article, can be fairly easily recognised.

There is one point which I should like to add to these remarks as to Mr. Burton's method of development, viz., that the developer, strong in pyro and bromide, seems to have but little effect upon a plate *if tried in error.* For example, suppose one is not sure which plate is the over-exposed one. If it be tried in the strong developer and no image appears, the plate can be washed and development recommenced with a normal solution without, I think, any perceptible alteration of tone rendering.

I have not referred here to the use of the citrates for remedying the effects of over-exposure—although I am inclined to prefer them to Mr. Burton's method — nor which sort of picture, viz., that obtained with normal or prolonged exposure, will appeal most strongly to the majority of photographers, but simply to state the opinion that, as critically examined under conditions which admit of it, the gradations in the two cases under discussion are dissimilar. A thicker coating of emulsion, and effective backing, both materially assist in reducing this dissimilarity, but do not overcome it.

S. Herbert Fry.

"IN DARKEST PHOTOGRAPHY—THE WAY OUT."

In reference to the great depression now existing in the businesses of professional photographers, and how to remedy such a state of affairs, it would, perhaps, be as well to seek the causes of the disease (which are, doubtless, many) before suggesting a remedy, and which remedy should be as complete as possible, considering the gravity of the complaint.

That a large number of workers have joined the ranks of professionalism since the introduction of gelatine plates is, alas, only too true; but, are they possessed of the same amount of skill and ability as the old wet plate workers? There can be only one answer to this question, No! Unfortunately, No!

Now, there are numbers of men in most of the large provincial towns in the kingdom who trade as so-styled artists and photographers, when they are, in fact, nothing of the kind. They have no studios, are quite incompetent to take a negative, and much less finish a print. Who are these individuals? Why, simply canvassers, men who have been previously employed by some big firm as travellers for club or subscription portraits, and by some little smattering obtained in the course of their business as to certain items in the same, and by forming a tolerably good connexion, and by saving a little money, have been enabled to dissociate themselves from their employers and make a start for themselves as "full-blown" photographers. They enlist the services of some local man (who possibly might be better employed), and arrange with him "to take" for them at a certain price per negative, which is to become their sole property. Possessed of this, they send it firstly to some firm of enlargers for an enlargement to be made therefrom, and secondly send *that* elsewhere to be finished either in colours or monochrome, according to their instructions. These gentry can purchase mounts and frames as cheap and as readily as any professional, and thus they daily, weekly, and yearly compete, with no knowledge, or very, very little, of photographic details, against the man who has served a lifetime to the profession, and who, figuratively speaking, "knows more in his little finger than they do in the whole of their bodies." Are they photographers? Have they the slightest pretensions to be styled as such? Is it not a perfect anomaly? Is it not preposterous that they should be allowed to designate themselves as such? Is it not time that the closure should be adopted towards stopping such a state of affairs?

But these are not the only delinquents who cause professional bad trade. There is another and a very big one, and possibly a more difficult problem to deal with, and that is the amateur. We are continually informed that they do no harm to the professional, that the big guns of the profession suffer in no way by them. But, for all these reiterated statements, it may yet be said they do no good. Many instances might be quoted where they have supplanted the professional and the services of amateurs have been engaged as against the man whose living it is, much to his detriment and financial loss, and it is quite obvious that a man who earns his bread by the profession that he follows *should not* be ousted by one who only attempts such work as a pastime and amusement, and draws the means of his support from some other source altogether. It seems somewhat surprising (to those especially who can remember a different state of affairs to exist) that the photographic press generally should take so much cognisance, and report the proceedings of amateurs and their societies. If less prominence were given to their savings and doings, they would most probably return to that obscurity from whence they came.

And now as to the cause of the existence of so many amateurs among us at present. The profession has certain members of their own profession to thank for that. What would you think of a photographer (?) proudly boasting of the following—that he had supplied some 200 cheap camera sets, quite promiscuously to any one that chose to buy, and on the further understanding that if they also purchased their plates, chemicals, &c., from him, *he would give them free instruction,* and supposing that the locality was already overstocked with legitimate workers, here were another 200 let loose to still further undermine the interests of the profession and inevitably cause a reduction of prices of work.

There is too great a tendency at present among professional photographers, to add the sale of apparatus, chemicals, &c., to the ordinary

branches of their businesses. It is a system much to be deprecated, and tends to lower the status of the profession, causing those who follow such a practice to descend to the level of a shopkeeper, &c.

Having now touched upon some of the most likely causes of photographic depression, let us try and suggest some means whereby to avert it. Some years ago it was strongly advocated in these columns by Mr. John Traill Taylor, and also in the *Photographic News*, by the late Mr. George Wharton Simpson and others, on the desirability of founding "A National School of Photography," whereby all who carried on the business of photographers, should be subjected to an examination to qualify as members of the profession, and there is but little doubt that the present state of affairs would not be in existence if that project had been properly entertained; the apprentice system, which nearly every one decries, would have been abolished, and the amateur would also have been nowhere.

But as the establishing of a "National School of Photography" would take some little time to bring about, and as "trade depression" requires an almost immediate remedy, the quickest, easiest, and safest mode to adopt now is the systematic "registration of photographers," no one being allowed to dub himself as such unless holding an Inland Revenue licence, the fee for which can be hereafter determined, and such licence to be given to only those who can pass a certain test examination, and at the same time afford the proper authorities such information as may be required, that the applicants intended carrying on the businesses of *bonâ fide*, and duly qualified photographers.

Any one who has really the interests of the profession at heart will not object to the test proposed, as with our leading and skilled men it would only be to them a mere matter of form after their many years' experience, and the registration and licensing of photographers would probably tend to a system of trade protection and organization, the want of which at times has been sorely felt.

The "Sale of Poisons Act," as now carried out in connexion with photography, needs some better supervision, as any amateur possessed of the scantiest of photographic knowledge can obtain any chemical, however dangerous, as easily as any professional photographer. This should not be; but, under the proposed scheme before referred to, a chemist should be empowered to refuse the sale of any poison required in photography, unless the purchaser could produce a photographer's licence.

It is hoped that, at the forthcoming Convention of the profession, to be held on the 3rd proximo at Plymouth, the proposition contained in this paper will be brought forward with the endeavour that, before the end of this year, it may be fairly on its way to realisation, and that it may prove to be a satisfactory solution to the present congested state of the profession, and a sure "way out of darkest photography."

"Pioneer."

AMIDOL-HAUFF AND METOL-HAUFF.

Having had some experience with these two developers newly put on the market, I send a short account of my experiments, hoping it may be of interest to those who are beginners, and also trusting it may lead those who have tried these developers to give their experience, as I feel sure a short discussion on this matter would be of interest to the readers of the photographic papers.

I am led to believe by what I hear that it is the general opinion of the photographic public that metol-Hauff is brought out to replace amidol-Hauff. I do not think so, as both are good developers, each having its own good points, but which is best must depend on the person who uses it. Personally, I prefer amidol-Hauff for most work, but for lantern slides and time exposures I find metol-Hauff works the best. Certainly, if one requires a developer that will keep in liquid solution, metol-Hauff is far ahead, as amidol-Hauff will not keep well in this form whatever it is mixed with. When mixed with sulphite, as per formula sent out by the makers, it will not last over eight or ten days, and when mixed with metabisulphite, as per formula I gave, it will keep much longer; but it is not certain in its results if kept over two months, and therefore in this point metol-Hauff has a distinct advantage, as it will keep well; indeed, I should say for any length of time, as I have some stock solution which I mixed when it first came out, and which is as good now as on the first day it was mixed.

But I have found that both amidol-Hauff and metol-Hauff work best when kept in a dry state and mixed as required.

Which is the best developer for one to try who has not tried either is the point upon which I should like to start a discussion. As far as my opinion goes, I say amidol-Hauff for *those who are old hands* at development, and for beginners, metol-Hauff, as I have found that in cases of bad under-exposure one can, with adding potash solution, get fog with amidol-Hauff, but in no case could I get developing fog with metol-Hauff by forcing with potash. For ordinary exposures of, say, one-fiftieth second up, I think metol-Hauff is as good a developer as it is possible to have, but for very fast exposures of, say, one-three-hundredth to one-six-hundredth, I cannot get as good results with metol-Hauff as with amidol-Hauff. This may, however, be my own fault, as one of our greatest authorities (Mr. A. Pringle) says that metol-Hauff is as good a developer as any known, and he certainly knows better than I do; but I can only say as regards myself that with fair exposures I can get about equally good results using either amidol-Hauff or metol-Hauff, but for extra fast work I prefer amidol-Hauff.

Now, as to which is the best for bromide paper, I say amidol-Hauff certainly when mixed with sulphite, as if you only use enough amidol you can get a good, clear black, and use your developer for four or five prints without loss of tone; but, when using metol-Hauff, one must not use it more than two or three times, or one will get a bad colour on the bromide print: also, on no account must one dilute the metol-Hauff developer if a good black is required. Metol-Hauff has one point which amidol-Hauff has not, viz., one can develop a bromide print to a brown tone by giving a long exposure and then diluting the developer, adding a lot of bromide, and using carbonate of soda in place of carbonate of potash. Of course, it is impossible to give a fixed rule for mixing a developer for brown tones, as so much depends on the negative used and the colour you want to get; but I can say that a good brown can be got by this developer (metol-Hauff) if used as above. I only mention it for a hint to others to help me with their experiments, as I have only been trying it a few days myself.

For lantern slides, as I said before, I prefer metol-Hauff.

Another point with metol-Hauff (not that I think it an extra good one) is that it works specially well with ammonia in place of carbonate soda or carbonate potash, and one gets very fine black on bromide paper by using ammonia. The amount of ammonia to use must be found out by experiment, as one brand of paper requires more than another.

The formulæ I use are as follows:—

Amidol (stock solution).

No. 1.

Amidol-Hauff	1 ounce.
Metabisulphite	1 „
Water	10 ounces.

No. 2.

Water	10 ounces.
Carbonate potash	2 „

For use for bromide paper take—

Amidol-Hauff solution No. 1	1 drachm.
Potash solution No. 2	1 „
Water	1 ounce.

and four to five drops of a ten per cent. solution of bromide. For ordinary snap-shot work use the same without any bromide, and for time exposures dilute by adding one ounce more water and bromide as required.

But I think the best plan is to use the amidol-Hauff dry, as it will dissolve in a few minutes. The way I use it in this case is: I keep a saturated solution of sulphite of soda on hand, a good quantity —say, ninety ounces or so—as it keeps well in a stoppered bottle. For use I take, say, saturated solution of sulphite, six ounces (six grains per ounce); amidol-Hauff, thirty-six grains; and four to five drops per ounce of a ten per cent. solution of bromide for my bromide papers and ordinary snap-shot work. For time exposures one should use the sulphite solution diluted with equal part of water and more of the bromide; but, if one wants density, the amidol-Hauff should not be reduced.

For metol-Hauff I use the formula sent out by the makers for a stock solution, or else I use it dry, as follows:—

Mix thirty-six grains of metol-Hauff in three ounces of water, and, when dissolved, add three ounces of saturated solution of sulphite, six drachms of twenty per cent. carbonate of potash, and a few drops of bromide; this works well with bromide papers and for ordinary hand-camera negatives. If the negative is under-exposed, add carbonate of potash solution, thirty drops at a time, till you get all you can out of the negative. For time exposures, use more bromide, up to one drachm or one and a half drachms of a ten per cent. solution of bromide per ounce. For density I find it best to trust to my bromide instead of diluting the developer with water.

Now, I have given my experience with these two developers, and had my say, and started the ball, and I hope others will follow, for I think that, although we have often heard of our old friend, pyro,

being replaced—but did not think it would be so yet—in my opinion either of these developers (I fancy metol-Hauff) will do it, and, being so confident, I wish to hear others on the same subject, so as to see who agrees with me.

A. R. DRESSER.

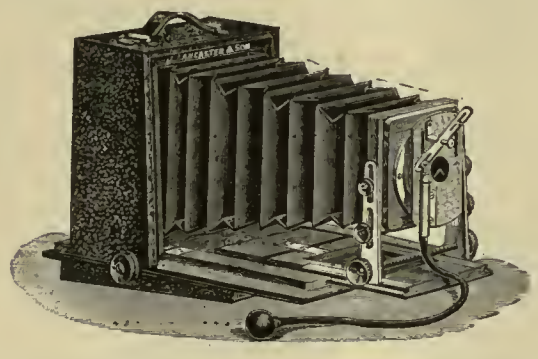
SUMMER NOVELTIES IN APPARATUS, &c.

MESSRS. J. LANCASTER & SONS, BIRMINGHAM.

In the opening pages of their Catalogue for 1893, which has just been issued, Messrs. J. Lancaster & Sons, of Colmore-row, Birmingham, point with pardonable pride to the circumstance that, up to date, they have sold 105,000 cameras and 160,000 lenses. This in itself may be accepted not only as an evidence of the prosperity of Messrs. Lancaster's business, but also as some faint indication of the extent of photography itself, which, though it may be a trite enough thing to say, is nevertheless true, that it has grasped the interest and attention of all classes of people to a degree that characterises no other pseudo-scientific recreation.

The Catalogue in question includes, in addition to illustrated particulars of the firms' many familiar specialities, several new and novel designs in photographic apparatus for the current season, many of which were shown us on the occasion of a recent visit to Messrs. Lancaster's establishment. First of these may be mentioned the aluminium-mounted Instantograph, a camera which, by reason of the substitution of aluminium mountings for brass, is ideally light.

The camera, which is made out of selected mahogany, of the smallest possible size, with a due regard to strength, has aluminium binding, aluminium front stage, plates, screws, &c., as well as double swing back, long extension, reversing back, and all recent improvements.

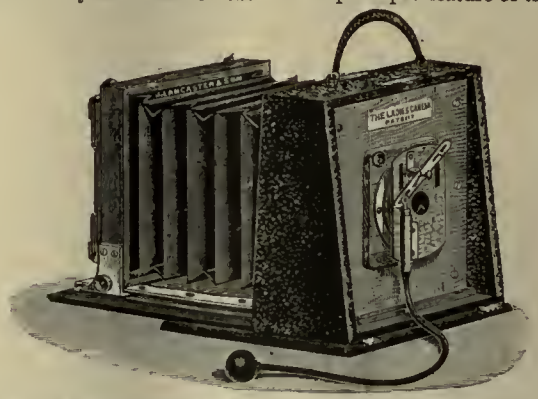


The lens is mounted in aluminium, and has the firm's patent aluminium see-saw shutter. The stand has an aluminium top.

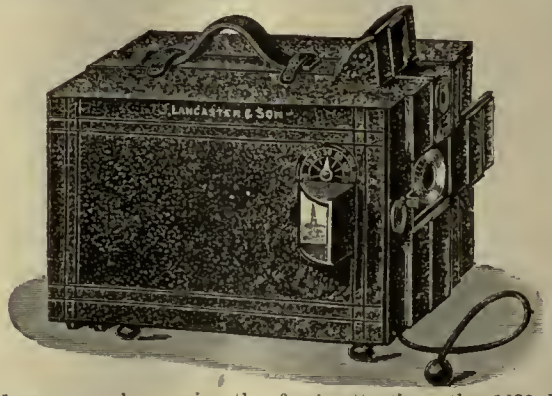
This stand top is an especially well-finished piece of work. Regarding the working of aluminium, Mr. Lancaster informs us that, in experimenting with it as a substitute for brass, considerable time and money have been expended.

The 1893 special brass-bound Instantograph is a handsome camera of the best finish, designed to meet a general wish for a high-class brass-bound camera having all necessary movements. The 1893 Portable Instantograph is a new hand and stand camera, with which a light stand is supplied for the latter purpose. It will be observed that, folded up, it presents an appearance as unlike a camera as it well could be, thus imparting to it a character which may easily elude the observation. Messrs. Lancaster are taking advantage of this happy idea to impart a "detective-camera"-like appearance to their "Ladies' Camera," a camera with but few movements, and therefore eminently suitable to the fair sex. This camera, when folded up and carried in the hand of a lady, looks not unlike a reticule or some similar receptacle which ladies are in the habit of carrying.

Among the other varieties of Messrs. Lancaster's cameras which may be mentioned are the 1893 Pocket Instantograph, which is extremely light and portable, has aluminium binding, runners, front stage, &c., and which, with the lens, shutter, and double slides, are packed and carried in a very small leather case. The principal feature of the Extra



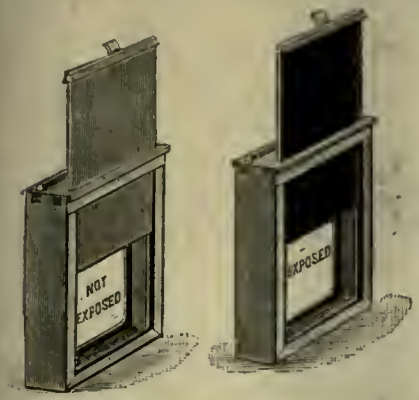
Special camera is that it has a triple extension, thus enabling one to obtain a very great length of focus. In reference to the use of aluminium, Mr. Lancaster showed us samples of the metal, which, for experimental purposes, had been gilded, to give it the appearance somewhat of brass. The Rectograph series of lenses are now aluminium-mounted if desired, and are also supplied in cases similar to those in which jewels are placed, thus giving them a highly chast and taking appearance. Among the firm's sets, that for boys at a guinea, which includes every thin necessary to enable a lad to make his first experiments in photography, is a marvel of cheapness and completeness.



Hand cameras also receive the firm's attention, the 1893 Perfect Omnigraph being their latest pattern.

Among its other features, it has horizontal and vertical finders in the same plane as the lens, registered adjustment for any focus, which is obtained

by moving the lens. It is fitted, at the pleasure of the purchaser, with either metal slides or a special changing box. The slides, which are shown in the cuts, are made of light metal, and the top of the frame is hinged, so that the plates can be removed without the least danger of scratching or rubbing. The woodcut on the left shows the slide closed, and that on the right side shows the frame open to receive plates. The plates are placed back to back in the grooves, with a sheet of opaque material between them.



The changing boxes are fitted with metal carriers, each carrier being constructed to hold two plates, with a division between them; the frame is then closed and fastened by means of a sliding pin. The three carriers are then put into the changing box.

Throughout the extensive range of the firm's specialities, a vast deal of ingenuity is involved, all classes of photographers being catered for, so that it is not surprising that Messrs. Lancaster's weekly output runs to an average of 400 cameras.

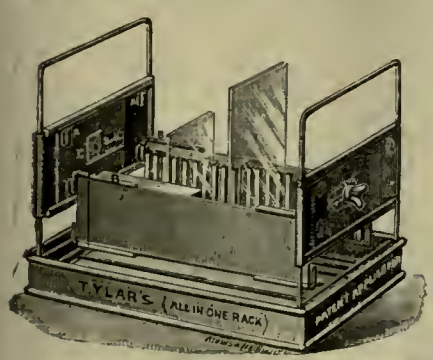
Atkinson's New Backgrounds.

Mr. J. J. Atkinson, of Manchester-street, Liverpool, showed us some new series of backgrounds which should be welcome to professional photographers on the look-out for novelty and variety in this direction. One of these, the "Children's" series, which are produced by Seavey, of New York, represents a number of artistically painted scenes, interior and exterior, which are calculated to suit youthful sitters. The backgrounds are made in the usual sizes, and the subjects are so much out of the common, both in selection and style of treatment, that they are certain to be popular with our professional friends.

Seavey's skill is also well exemplified in the Columbian series for adults, curtained windows, divans, artistic furniture, &c., being made to do duty with uniform success. A third series is that of Bryant (for whom Messrs. E. & H. T. Anthony, of New York, are the agents, but which are also in the hands of Mr. Atkinson, for this country). These represent a number of charming landscapes, unconventional and delicate in treatment. A wider adoption of natural and truthful backgrounds, such as those of Mr. Atkinson, should prove a great service to many photographers in improving the quality of their work and increasing their business.

The "All-in-One" Platewashing Racks.

Mr. W. Tylar, of High-street, Aston, Birmingham, is introducing a new form of adjustable platewasher under the above title. Its principal feature is that it takes any size up to whole-plate, either eighteen $3\frac{1}{4} \times 3\frac{1}{4}$, $4\frac{1}{4} \times 3\frac{1}{4}$, 5×4, stereoscopic, half-plate, $7\frac{1}{2} \times 5$, or nine whole-plates, being inserted at one time in the grooves, or nine whole-plates; or, for mixed sizes, nine each of either $3\frac{1}{4} \times 3\frac{1}{4}$ or quarter plate, 5×4 or $7\frac{1}{2} \times 5$, &c.



It is made of zinc, and packs up into a small compass. In use, the arms carrying the grooves are fixed at different distances on the sides of the rack, which is rendered rigid by screws at each end. The "All-in-One" should prove very convenient where a number of different plates are desired to be washed at one and the same time.

Messrs. Jas. Woolley, Sons, & Co., of Manchester, who occupy large and handsome premises in that town which are devoted to the distribution among chemists, doctors, &c., of drugs, chemical and scientific apparatus, &c., also include among their numerous departments one set aside for photography, which is filled with an extensive and assorted stock of all photographic requisites. Among the recent novelties embraced in their catalogue is the "Sandell" fixing tank, which has been introduced to meet the requirements of the Sandell plate. It has a light and dust-proof cover, and a strong rack, which can be suspended from the top. The plates are placed vertically in the tank, and for draining purposes are held in the rack at the top of it.

Calling in upon Mr. J. T. Chapman, of Albert-square, Manchester, when in that town, we were pleased to hear from him that he was extremely busy in photographic apparatus and materials, &c., a fact of which we had ocular evidence. Indeed, photography generally, or rather that branch of it which concerns itself with the supply of materials, especially to amateur workers, seems in the north of England to be in a very healthy condition—a state of things, no doubt, in some measure due to the recent fine weather.

Our Editorial Table.

Amateur Photographers' Annual for 1893.

London: Hazell, Watson, & Viney.

This Annual is illustrated by no fewer than fourteen pictures, and several articles, mainly of a practical nature. These are headed by the editor, who leads off with a good article on the carbon process, in the course of which he tells us as succinctly as possible all that is known concerning it. He is followed by Mr. A. Horsley Hinton, who treats on subjects connected with pictorial composition, and the trimming of prints. The other articles are "Practical Work," by John A. Hodges (the leading one in the volume), and "Protecting Inventions," by Naunton. Then follow, arranged in dictionary fashion, a holiday guide, in which, like the *A B C Railway Guide*, the population of numerous places, their distance from London, and other useful information are given. The Annual is well got up and will prove useful for reference.

J. Lancaster & Sons' New Catalogue.

As far as catalogues go, this one for 1893 is a work of art. It contains four pictures, taken, as may be well understood, with Messrs. Lancaster's apparatus, besides numerous cuts illustrative of cameras, lenses, stands, lamps, and every other thing required in photography. Lancaster's Catalogue, unlike others, is confined to objects of their own manufacture, and they are very numerous and varied. They fill eighty pages. The Catalogue, which sells at *4d.*, is a model of excellence.

Mills' Mountant.

Mr. G. W. Mills, Highgate, sends us a sample of a mountant he prepares for enamelled and similar prints in which the gloss is desired to be maintained. Its basis seems to be dextrine, to judge from the smell. The directions for use are to apply it to the back of the print with a stiff brush and then rub well in contact with the mount. It will answer its intended purpose well.

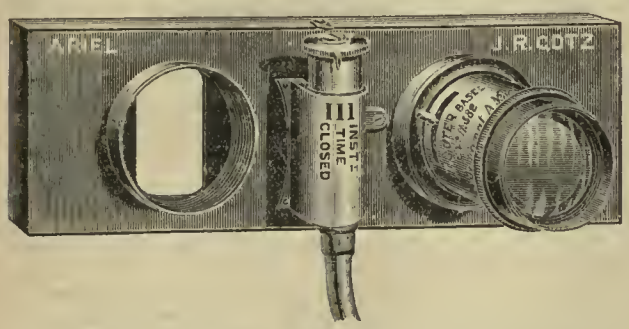
Flashlight Portraits.

By W. E. Debenham, 46, Haverstock-hill, N.W.

Mr. Debenham has submitted to us for inspection a series of portraits taken on the occasion of a fancy-dress ball by means of a flashlight. Excepting, perhaps, the presence of the cast shadows, it would be difficult to discover that these portraits were not studio work naturally lighted, the absence of harshness of lighting usually seen in such results being very noticeable. There is a roundness of feature combined with softness of texture which speak well for the management of the light and the accuracy of exposure. As examples of this kind of portraiture, Mr. Debenham's results are very successful.

New Shutter for Stereoscopic Photography.

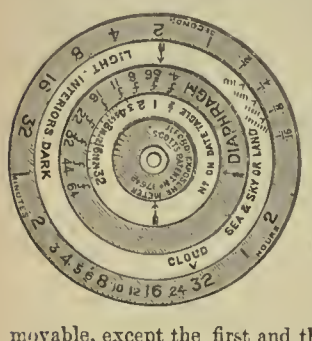
Mr. J. R. Gotz, 19, Buckingham-street, W.C., has brought out a new form of shutter—the Ariel—which is simplicity itself, or, as Mr. Gotz expresses it, the *reductio ad absurdum* of shutter action. The



cut shows its external form. Pressure upon a pneumatic ball drives up a box piston which loosely fits the cylinder, and this, in rising, engages with a double lever by which the shutter blades are opened and closed, either instantaneously or are amenable to time exposure. The blades are cut square, so as to give a square aperture. This shutter is so convenient, and of such pocketable dimensions, as to ensure a large demand for it.

The Ilford Exposure Meter and How to Use it.

Those who possess an Almanac for the present year are doubtless familiar with Mr. John Howson's article on "The Ilford Exposure Meter," which had not at the time of issuing this Annual been quite ready. A specimen is now before us, and is illustrated by the adjoining cut. The Meter, which has been invented by Professor J. A. Scott, of Dublin, in order to furnish a convenient method for performing the various calculations necessary in estimating photographic exposures in a purely mechanical manner, consists of three movable circles or discs, which revolve freely on a central axis, to which are fixed two circular plates, one forming the centre of the front, and the other the back of the instrument. These discs respectively are: "Plate Circle," "Date Circle," "Diaphragm Circle," and "Subject Circle." On the outside is the "Exposure Circle." These are all movable, except the first and the last. The Meter is elegantly made in ebonite, and can be carried in the pocket without the slightest inconvenience, being only three inches in diameter and weighing one ounce. From the well-known reliability of everything that emanates from the Ilford Company, it is almost superfluous to say that this useful exposure meter can be quite depended upon. We endorse the statement on the front of the pamphlet of instructions, that it is a common-sense and certain means of gauging exposures.



RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,971.—"An Improved Construction of Frame for Photographs and other Pictures and Designs." L. Wake.—*Dated June 5*, 1893.

No. 11,179.—"Improvements in Magazine Cameras." S. D. Williams.—*Dated June 7*, 1893.

No. 11,210.—"Improvements in Photographic Cameras." S. H. Brittain and G. D. Hughes.—*Dated June 8*, 1193.

No. 11,212.—"Improvements in Photographic Cameras." J. F. Parsons.—*Dated June 8*, 1893.

No. 11,303.—"Improvements in the Construction of Photographic and other Folding Tripod Stands." Complete specification. H. J. Spratt, A. S. Spratt, and G. A. Spratt.—*Dated June 9*, 1893.

No. 11,353.—"Improvements in or relating to Photographic Cameras." C. Peczenik.—*Dated June 9*, 1893.

No. 11,365.—"Improvements in Photograph and other like Frames." Communicated by S. Posen. A. Cohn.—*Dated June 9*, 1893.

PATENTS COMPLETED.

Improvements in Photographic Objectives.

No. 4377. Albert Barber Parvin, 3213 Powelton-avenue, Philadelphia. *May 13*, 1893.

My invention has relation to photographic objectives which are adapted to magnify the image of an object or objects at great distance, range, length, or position from the camera, and with characteristic sharpness in detail.

It is generally understood by those skilled in photography that the size of the image of an object upon the ground glass of a camera depends upon one of three conditions: first, the focal length of the objective; second, the distance of the same from the object to be photographed; and, third, upon the size of the original. Two of these conditions, under certain circumstances, are subject to variation, that is, the distance from the object and the focus of the lens. Of course, if the object to be photographed can be approached, or lenses of different focal power are at hand, then an image of the required size can be obtained, but such favonrable conditions do not exist in everyday practice of the photographer. The required approach to the desired object is often impossible or impracticable, because the required distance is too great to afford recognisable detail in the resultant negative, requiring lenses of extreme long focus, which necessarily are rather circumscribed. Suppose, for instance, a photograph is required of an inscription upon a rock about 300 feet high, to obtain a fair view without distortion the operative would have to locate about 700 feet from the rock, and this would bring the inscription about 800 feet in a direct line from the lens. To secure distinctness or sharpness as to detail, the letters of the inscription would have to appear at least four inches high on the object in the resultant picture. To attain such a result, say, with a lens of 5×6 meters focus, would require a camera with about an eighteen feet extension. Then, again, small images with subsequent enlargement suffer from the disadvantage of the grain of the plate, for even by slight enlargement such is apt to become so objectionably prominent as to destroy all detail. The efforts to overcome such difficulty in exposure has suggested the use of a telescope as a substitute for a photographic objective; but such in practice was found to be awkward and unstable, and, moreover, with the use of the firmest tripod, the slightest breath of air or the least tremor was calculated to spoil the image of the object.

The principal objects of my invention are, first, to overcome the above-mentioned disadvantages and objectionable features, and to provide a photographic objective of comparatively simple construction and effective action for enlarging the image of an object or objects at equal or unequal distances from each other with respect to the position of the camera; second, to provide a photographic objective having a non-extensible tube provided with a single negative lens ground according to a mathematical formula to certain radii, to a compound positive lens ground according to a mathematical formula to different radii, and the construction and arrangement being such that the image of an object or objects at distant points or positions from each other are appreciably enlarged or magnified with marked sharpness of detail in the resultant negative or sensitive film or plate; third, to provide a photographic objective with a non-extensible lens tube, having a slit formed in the wall thereof for the reception of a perforated slide or diaphragm for correcting marginal rays and with compound convergent positive lens and a divergent negative lens; fourth, to provide a photographic objective with a non-extensible tube, having a convergent compound lens and a divergent single lens, respectively ground to different radii, and the length of the lens tube being proportioned to the diameters of the lenses, whereby increased magnification and sharpness of detail of the image of the distant object with respect to its real location and position are obtained; fifth, to provide a photographic objective with a tube having a double front lens of certain radii, and a single back lens of different radii; sixth, to provide a photographic objective with a single divergent lens having each face or surface thereof of different radii; seventh, to provide a photographic objective with a convergent positive lens, and with a negative divergent lens having different radii in respect to the sides or surfaces thereof; eighth, to provide a lens tube having two lenses, the radii of each of which have a fixed relation with respect to the length of the tube; ninth, to provide a photographic objective having a non-extensible tube, with a concavo-convex lens of certain radii of inside curves, and of certain radii of outside curves, to afford certain focal length, and a convexo-concave lens of certain radii adapted to enlarge and to define with decided sharpness of detail the image of a distant object transferred to a film or plate; and, tenth, to provide a photographic objective adapted to an ordinary camera, and comprising a non-extensible tube, provided with a convergent compound or double lens and a divergent single lens, and the radii of said lenses with respect to each other being different on the respective faces or surfaces thereof, in order to give, by the combination, greatly increased magnification or enlargement and great depth of focus.

My invention consists of a photographic objective comprising a tube having a compound convergent lens and a single divergent lens suitably mounted therein.

My invention further consists of a photographic objective comprising a non-extensible tube, with convergent and divergent different radii lenses mounted therein.

My invention further consists of a photographic objective comprising a non-extensible tube provided with a double or compound convergent lens, and with a single divergent lens, and respectively of different radii.

My invention further consists of a photographic objective having convergent and divergent lenses of respectively different radii as to inside and outside curves, faces, or surfaces thereof, and adapted to greatly magnify or enlarge the image of distant objects with sharpness of detail.

My invention further consists of a photographic objective comprising a non-extensible tube having a fixed relation to a compound lens of certain radii, and to a single lens of two different radii, the construction and arrangement thereof being such that the image of a distant object is greatly magnified and sharply defined, so that the different positions of the objects are brought on to a film or plate with characteristic sharpness and clearness of detail.

My invention further consists of a photographic objective comprising a smal tube provided with a compound lens of certain or fixed radii of inside and out-

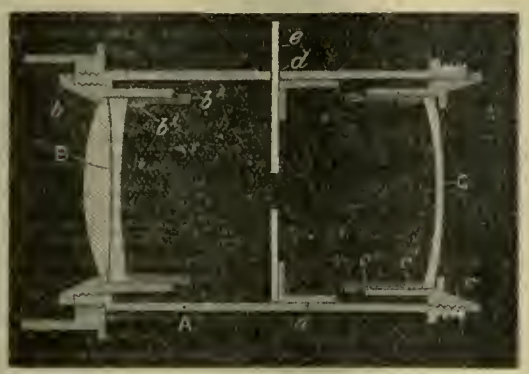
side faces, curves, or surfaces, and with a single lens of different radii of inside and outside faces, curves, or surfaces, and the lenses respectively having convergent and divergent properties, in order to give great depth of focus and permit the image of distant objects to be transferred in magnified form to a photographic film or plate, with characteristic sharpness as to detail, and with remarkable clearness or distinctiveness of field.

My invention further consists of a photographic objective provided with a non-extensible tube having convergent and divergent lenses of certain or defined radii with respect to each other and the length of the tube, and susceptible of being increased or decreased in length proportionately as the diameters of the respective lenses are increased or diminished; and

My invention further consists of the improvements in photographic objectives hereinafter described and claimed.

The nature and general characteristic features of my invention will be more fully understood from the following description taken in connexion with the accompanying drawings forming part thereof, and in which

The figure is a longitudinal central section through the photographic objective, showing a non-extensible tube provided with a detachable perforated diaphragm or slide adapted to correct marginal rays, and with a concavo-convex positive lens, and with a convexo-concave negative lens, the latter embodying features of my invention.



Referring to the drawings, A is a brass or other tube provided with a barrel, *a*, and with detachable threaded coupling rings and sleeves, *b*, b^1, b^2, *c*, c^1, and c^2, for supporting in proper position in the barrel, *a*, the respective lenses, B and C. About midway of the barrel of the tube A, and between the lenses B and C, is provided a slit, *d*, adapted for the insertion of a detachable perforated diaphragm or slide, *e*, for correcting marginal rays. The tube A is provided in the front extremity thereof with a compound lens, B, ground according to a mathematical formula with respect to the inside and outside curves, faces, or surfaces therof, to certain radii, and at the rear extremity of the barrel of the tube A is mounted a single lens, C, ground according to a mathematical formula as to inside and outside curves, surfaces, or faces, to different radii. The tube A, with the lenses B and C, constitutes what is generally known as a "photographic objective." The tube A, for a 5×7 or 5×8 plate or sensitised film may be about two and one-quarter inches in length to lenses each about one and one-quarter inches diameter. It should be borne in mind, however, that as the tube is increased or diminished in length, so proportionately the diameters of the lenses will be increased or diminished. With respect to the lenses, it may be remarked that the main feature of this invention is to provide a single lens, ground according to a mathematical formula on the inside and outside curves, faces, or surfaces to certain radii, and of a compound lens of certain other radii as to the inside and outside curves, faces, or surfaces thereof. Moreover, these lenses, mounted in the tube A, have respectively convergent and divergent proclivities, and are adapted to give greatly enlarged image of the distant object, that is to say, to the extent of ten, twenty, and even a hundred-fold without impairing in the least any of the characteristic sharpness of detail embraced within the field of the objective. Moreover, the image of the distant objects transferred to the sensitised film or plate, and in the resultant picture, according to my invention, is much more pronounced than heretofore was possible by the use of any of the commercial camera objectives. The negative single lens C, mounted in the tube A, is ground on the faces or surfaces thereof to different radii, and is used in connexion with the compound or double positive lens, ground to different radii, in lieu of the generally employed compound lenses for such purposes. Furthermore, the positive lens is a convergent one, while the negative is a divergent lens. By providing the non-extensible tube A with respectively convergent and divergent lenses, it has been found that great depth of focus is obtained, as well as magnification or enlargement of the image of distant objects, without in the least losing any of the characteristic detail required.

In order that my invention may be fully understood by those skilled in optics and in the art of photography, the relation which the back lens, C, bears to the front lens, B, will now be given.

The front compound lens comprises preferably a double convex lens, ground respectively to the radii of 2½ and 1⅞ inches, more or less, to outside curve, face, or surface thereof, and with a double concave lens, ground respectively to the radii of 1⅞ and 31 inches, more or less, to inside curve, face, or surface, and as so combined such compound lens has a focal length of 6¼ inches, more or less.

The back or single lens may be a convexo-concave or periscopic lens, ground to the radii of 25½ inches, more or less, to the outside face or surface thereof and ground to the radii of 4¾ inches, more or less, to the inside face or surface, and this lens has a focal length of 5¼ inches, more or less.

The above combination of lenses, mounted in the tube having a length of about 2¼ inches, may be applied to any ordinary commercial camera, and will give a depth of focus of about 20 inches, more or less.

In the practice of my invention with a photographic objective constructed as described, images of objects have been taken at 6600 feet to two miles distant from the camera with greater sharpness of detail in the prints than ordinarily can be obtained in prints taken at 100 feet distant from the camera. The foregoing advantageous features of my invention are due to the character of lenses employed in the non-extensible tube, and to the depth of focus obtained from the use thereof.

In the practice of my invention, neither spherical aberration nor astigmatism is present, so that the objective is achromatic.

Having now particularly described and ascertained the nature and objects of my invention, and in what manner the same is to be performed, I declare that what I claim is:—1. A photographic objective comprising a tube provided with a convergent front lens and a divergent rear lens, the construction being such that great depth of focus is obtained, and enlargement of the image of a distant object ensured in its transfer on to a sensitised film or plate, substantially as described. 2. A photographic objective comprising a non-extensible tube provided with a compound front lens and a single rear lens, of different radii with respect to each other, substantially as and for the purposes described. 3. A photographic objective comprising a non-extensible tube provided with a detachable diaphragm or slide, a compound front lens of certain radii, and a single rear lens of different radii, substantially as and for the purposes described. 4. A photographic objective, comprising a non-extensible tube, provided with a detachable perforated slide or diaphragm, a compound convergent front lens, and a single divergent rear lens, of different radii in respect to the faces or surfaces, and of different focal length, whereby great magnification or enlargement of the image of a distant object is ensured with characteristic sharpness of detail, substantially as described. 5. A photographic objective provided with a divergent rear lens having faces or surfaces of different radii, substantially as and for the purposes described. 6. A photographic objective, comprising a non-extensible tube, provided with a detachable perforated slide or diaphragm, a single convexo-concave rear lens of certain radii as to inside and outside faces or surfaces, and a compound front lens of certain radii as to inside and outside faces or surfaces, substantially as and for the purposes described. 7. A photographic objective, comprising a non-extensible tube, provided with a compound front convergent lens and a single divergent lens respectively, of different focal length, substantially as and for the purposes described. 8. A photographic objective, comprising a non-extensible tube, with a detachable perforated diaphragm, a compound front lens, and a periscopic rear lens, substantially as and for the purposes described. 9. A photographic objective, comprising a non-extensible tube, provided with a compound front lens of certain radii, and a single rear lens of certain radii, substantially as and for the purposes described. 10. A photographic objective, comprising a non-extensible tube, provided with a compound concavo-convex convergent front lens and a single convexo-concave divergent rear lens, substantially as and for the purposes described. 11. A photographic objective, comprising a non-extensible tube, having a compound front convexo-concave lens and a single periscopic rear lens, the arrangement being such that great depth of focus is obtained, and the transfer of the image of distant objects embraced within the field to a sensitised film or plate is ensured with great magnification and with characteristic sharpness of detail, substantially as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 19	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 19	Fillebrook Athenæum	Fillebrook Lecture Hall.
,, 19	Hastings and St. Leonards	
,, 19	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 19	Richmond	Greyhound Hotel.
,, 19	South London	Hanover Hall, Hanover-park, S.E.
,, 20	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 20	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 20	Hackney	206, Mare-street, Hackney.
,, 20	North London	Canonbury Tower, Islington, N.
,, 20	Paisley	9, Gauze-street, Paisley.
,, 20	Rochester	Mathematical School, Rochester.
,, 21	Bury	Club Rooms, 13, Agar-street, Bury.
,, 21	Leytonstone	The Assembly Rooms, High-road.
,, 21	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 21	Southport	The Studio, 15, Cambridge-arcade.
,, 21	Southsea	3, King's-road, Southsea.
,, 22	Glossop Dale	
,, 22	Hull	71, Prospect-street, Hull.
,, 22	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 22	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 22	Oldham	The Lyceum, Union-st., Oldham.
23	Cardiff	
23	Croydon Microscopical	Public Hall, George-street, Croydon
23	Holborn	
23	Maidstone	"The Palace," Maidstone.
23	West London	Chiswick School of Art. Chiswick.
,, 24	Hull	71 Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

JUNE 13,—Ordinary Meeting,—the President (Captain W. de W. Abney, C.B., F.R.S.) in the chair.

It was announced that the Sheffield Photographic Society had been admitted to affiliation.

THE CONSTRUCTION OF INTERCHANGEABLE LENS SCREW FITTINGS.

Mr. WILLIAM TAYLOR read a paper on this subject, prefacing it by pointing out the disadvantages of the present system, and saying that by the use of

interchangeable screws the lens would always arrive home in one place, and that there would be no trouble about the engagement of the screw, inasmuch as it would be known that three turns would complete. Lens makers were at last realising the importance of adopting standards, and it was to the credit of Messrs. Ross & Co. that they had adopted the Photographic Society's standards. He proposed to speak on the technical methods of making and measuring, and in that connexion was of opinion that the mechanical practice of opticians must reach a higher level than at present. He complained that accuracy in screw making was neglected by opticians who paid every attention to the glass work. There was an important difference between interchangeability for lenses and that for bolts, gas fittings, nuts, &c., which might be forced together, whereas lenses must fit the flanges freely. That was a condition of "free interchangeability." Before him were five lenses and five flanges, the lenses having the Society's two-inch male screw, which, if it were one-one-thousandth of an inch larger than the normal would prevent it entering the flanges. Therefore every male screw must be at least as small as the normal, and every female screw must be at least as large as the normal. These were conditions of free interchangeability. A screw had three principal elements—diameter, pitch, and the form of its threads. The distance between the two threads was the pitch. The outer diameter of the male screw was usually taken by means of the plain measuring faces of a micrometer gauge or measuring machine. The Whitworth form of thread which had been chosen by the Society was beautifully adapted to the purpose. Having described it, he said the depth of the screw was measured by a small triangular test piece of hardened steel, nicely ground, so that it touched only at the root of the thread. It might be right within one-five-thousandth of an inch would be sufficiently accurate for practical purposes. A cylindrical gauge was used for the sides of the threads. Knowing the diameter of the gauge and the angle of the threads, its proper relation to the crest and root of the thread could be calculated. He (Mr. Taylor) constructed a small gauge for each pitch, and used a series of gauges to measure the angle between the sloping sides. In the common methods of making screws he said there were certain defects. Opticians generally employed a ring gauge and a plug gauge. These must be made of steel left soft, and they were especially liable to become worn. If the ring gauge fitted easily it had to be eased, and if they were only one one-thousandth of an inch wrong, they did not fulfil the conditions of free interchangeability in keeping and assuring such accuracy as were wanted. The workmen said they were all right when they fitted loosely. How loosely? Even if the gauges were correct, any method which depended on the workmen could not be considered satisfactory. Having described the ordinary plan of cutting screws, and pointed out that it admitted of variations and errors, he said he designed a chaser several years ago which was itself a portion of a screw. It had little screws, with only two threads, and was produced in a screw-cutting lathe. The form of thread was easily measured by test pieces. The tool retained its original cutting angle and it was impossible to set it wrongly. There was no temptation for the workman to neglect the sharpening of the tool. Having described the chaser in action, Mr. Taylor said it had been used at Leicester for some time with a remarkable degree of accuracy. A hardened steel gauge was applied as a caliper to gauge the full outer diameter of male screws, one side of the gauge being one-one-thousandth of an inch less than the other. Disc gauges were used for female screws, one gauge being of the correct diameter, the other one-one-thousandth of an inch larger. Having noticed the American screw and pointed out that its flat crest allowed of the sides being easily pressed out of shape, he said the Whitworth screw was better adapted for English lenses. In conclusion, he referred to the plan he had devised of making the lenses arrive home in one position by making the threads of every male screw arrive at the thread of the female screw in one uniform position in relation to the diaphragm indicators, and compared it with the ordinary method of screwing home lenses, which he pointed out was uncertain.

Mr. Leon Warnerke congratulated Mr. Taylor on his championship of the standard-screw system.

In reply to Mr. Bolas, Mr. Taylor said the chaser he had devised was not adapted for hand work.

Mr. T. R. Dallmeyer pointed out that in manufacturing screws, opticians had for years worked with two gauges; the master gauge and the gauge for the workman. If the gauges were too large or too small the master gauge would correct them. He thought Mr. Taylor in his modesty had made too little of his work in making all lenses arrive at one point. In his experience people did not want the Society's standards, although if he (Mr Dallmeyer) were starting to morrow he would make his screws to those standards.

After other discussion, a vote of thanks was passed to Mr. Taylor.

A New Lens: "The Double Anastigmat."

Dr. C. P. Goerz, of Berlin, read a paper on this subject, in which, having briefly traced the efforts of opticians to produce lenses free from astigmatism, he alluded to the efforts of Mr. Emil Von Hoegh, his scientific adviser, to produce a symmetrical anastigmat perfectly corrected for spherical aberration and astigmatism. The lens is called the Double Anastigmat, both combinations being anastigmatic, and is composed of two compound lenses, each of which is a cemented triple. In both combinations a flint is enclosed between two crowns. One of the crowns has a higher refractive index than the middle flint (a necessary condition for anastigmatism and the other a lower index of refraction (a condition for freedom from spherical aberration). The astigmatism is corrected over the whole field up to the angle of 72°, and the image is perfectly flat. The two optical systems are placed very near each other, ensuring uniform illumination. The lens is made in two series—III., with largest stop *f*·7·7; and IV., with *f*·11. Series III. takes an angle of 70° with full aperture, and with a smaller stop 90°. Series IV. is intended for reproduction work. The paper concluded with a reference to some comparative trials of the lens against other lenses. A large number of prints in illustration of its capabilities were passed round.

Mr. W. E. Debenham complimented Dr. Goerz on the fairness of his reference to the work of other opticians, and said that, by the specimens shown, the lens appeared to him to be a great additional power in the hands of photographers, especially as it enabled them to work over a flat field without introducing small apertures.

Mr. Dallmeyer said that, by following up what had already been done in the double form of producing a system free from astigmatism, and by using triple combinations, Dr. Goerz had arrived at a larger aperture with flatness of field and greater rapidity than hitherto. He (Mr. Dallmeyer) had not been able to obtain an intensity ratio of more than 1 : 10 with three samples of Chance's glass, similar to that employed by Dr. Goerz.

Mr. Warnerke saw Dr. Goerz's lens last February, and then suggested to him to bring it before the Society. The anastigmatic properties of the lens seemed to him better evidenced in the diagrams shown than on the ground glass, and he therefore suggested that the Kew, or optical, method of testing lenses required supplementing by the camera test.

Mr. Goerz expressed his willingness to allow the lens to be tested against English lenses. The English makers' lenses would not be too much behind, but they would be a little.

The President, in proposing a vote of thanks to Dr. Goerz, which was cordially given, spoke of the excellent nature of the pictures given by the lens. He combated the remark of Mr. Warnerke that the Kew method of testing lenses should be supplemented with photographic tests, saying that just as good results could be obtained by optical means.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

June 8,—Mr. Alexander Mackie in the chair.

Mr. S. H. Fry called attention to a letter in a photographic journal referring to some remarks of Mr. Everitt at a previous meeting on the Sandell plates as to range of gradation.

Mr. P. Everitt said the complete rendering of such gradation was not possible. The scale on a plate, say, one to fifty, would be one to twenty on paper; therefore the paper renders the range imperfectly.

Mr. Debenham thought the terms gradation and density were not clearly expressed. Ordinary and Sandell plates differed in respect of density.

Mr. A. Cowan did not see why if one plate gave density another plate should not.

Mr. J. S. Teape quoted his experience as to the printability of dense parts of plates on paper, but could get a much better gradation on positive plates.

Mr. Fry, in reference to the Sandell plates, claimed that they in themselves were an advance, and that their gradation was an inducement to find a printing process better than that which now exists.

Mr. R. Child Bayley considered that, in development, it was possible to have in view the after-process of printing, but this was thought to be a reversal of the order of things.

A discussion arose on Mr. W. K. Burton's paper in *Photographic Scraps*.

Mr. Cowan promised to make some experiments with reference to what he said on the latitude of exposure, and bring results up at the next meeting.

MANCHESTER PHOTOGRAPHIC SOCIETY.

June 8,—Mr. Abel Heywood, jun. (President), in the chair.

After the election as a member of Mr. F. W. Masters,

Mr. J. Wood opened a discussion on *Development*, which, in a manner, is a subject that has been pretty well thrashed out time after time; but for all that there is always something to be learnt from the comparison of methods and results. In spite of the many new agents, ammonia and pyro, from the tone of the discussion, are not yet displaced amongst the Manchester members.

The President gave the results of some experiments in the intensification of platinum prints. He said that, seeing an article in the Journal on the subject tempted him to give the method a trial, and he considered the result he obtained on some under-developed prints showed that a flat picture could be improved to some extent. The principle was much after the manner of the silver intensification of a wet plate.

Mr. Wrigley gave a report of the first outdoor meeting at Smithell's Hall, which had been well attended and successful as regards photography. He exhibited results of his own work, which were in every way excellent. Other members also showed profitable results from the outing.

THE AFFILIATION OF PHOTOGRAPHIC SOCIETIES.

June 6,—Meeting of Delegates, at 50, Great Russell-street, Bloomsbury, Mr. Andrew Pringle (Photographic Society of Great Britain and West Kent Amateur Photographic Society), Chairman, presiding.

The minutes having been read and confirmed, a balance-sheet up to April 30, showing a balance in hand of 27*l.* 7*s.* 10*d.*, was read by the Secretary, and adopted.

It was proposed by Mr. Beckerton (Richmond Camera Club), seconded by Mr. Criswick (Greenwich Photographic Association), and carried, that a balance-sheet should be prepared by the Treasurer up to December 31 in each year, and, having been audited by two auditors appointed at the first meeting of delegates in the same year, shall be presented at the first meeting in the ensuing year.

Messrs. Hodsoll (North Kent Amateur Photographic Society) and Beckett (Hackney Photographic Association) were appointed auditors for the current year.

It was proposed by Mr. Marchant (North Middlesex Photographic Society), seconded by Mr. Bickerton, and carried, that Mr. Scamell be asked to continue to act as Treasurer.

A discussion took place upon the question of approaching the railway companies with a view to the reduction of fares to photographers. A letter from the Birmingham Photographic Society having been read upon the subject.

Mr. Horton (Birmingham Photographic Society) detailed the steps already taken by his Society in the matter.

The Secretary announced that the aggregate number of members represented by the Affiliation was, roughly, 5000.

A Committee, to consist of Messrs. Mackie (Photographic Society of Great Britain) and Oakden (South London Photographic Society), and the Secretary, was appointed to investigate the whole question of reduced railway fares to photographers, to report at the next meeting.

A letter from the Hon. Secretary of the Phototographic Society of Great Britain was read, announcing that that Society was arranging for a Congress, and asking for the consent of the Committee for the words "of Affiliated Societies" to be added to the title, "The Congress of the Photographic Society of Great Britain," which was agreed to. The letter also asked the delegates to invite suitable members of their Societies to furnish papers for the Congress.

The CHAIRMAN announced that the papers already promised were from men of the very highest standard in the photographic world. He also made some remarks as to the powers of the Committee of delegates, and, after some discussion, it was resolved that a sub-Committee be appointed to consider the question of additions or alterations to the existing rules, on the understanding that their recommendations should be on the Agenda paper of the next meeting, the sub-Committee to consist of Messrs. Mackie and Marchant.

It was agreed that the hour of meeting should be 7.30 p.m.

A discussion took place upon the subject of a uniform ticket, and it was understood that the Secretary should urge the affiliated societies to have their members' tickets stamped with the Affiliation stamp.

North London Photographic Society.—June 6, Technical Meeting. Mr. Tanner in the chair.—Mr. GROVER intimated that the Sandell plate was doubtless a good plate when you knew it, but you had got to know it first. He showed prints from a negative taken on one. Subject, the interior of a church. Exposure, one hour, in the afternoon. Development took twenty-five minutes. Around the east window there was as much halation as he knew what to do with. After taking a print, he rubbed down the density about the window, and the after-prints showed a great improvement. Mr. BISHOP had again tried the Lomberg plate, this time for portrait work, and was much pleased with the working of them. Mr. WALKER, referring to the latitude of exposure with single films, showed prints from negatives taken on Edwards's plates, backed with "anti-halation paper." No. 1 plate was exposed for twenty-three seconds (the normal exposure, according to Watkin), and, immediately after, No. 2 was exposed for two minutes fifty seconds, developed with pyro and ammonia. He could be happy with either, but perhaps preferred No. 1. There was very little difference in the prints. Mr. Bishop showed dark slides he had made of strawboard and bookbinder's cloth. A piece of the board, covered with black velvet, fitted against the back of the plate. The slides were extremely light and effective, and very ingeniously made. Mr. TANNER recommended leatherette, a material used for covering furniture instead of the bookbinders' cloth. Mr. Tanner showed a good collection of prints from negatives taken last Saturday at the Trooping of the Colours. Asked as to the necessity for obtaining permission to take photographs on the occasion, Mr. Tanner said he did not know if it was required. He used the *suaviter in modo* process, with the addition of a little free silver, and usually found that sufficient.

Hackney Photographic Society.—June 6, Mr. E. Puttock in the chair.—Mr. Magnus was elected a member. The Hon. Secretary distributed samples of the Barnet plates. Mr. A. Dean then gave in report of excursion to Loughton on Derby Day, which concluded with a social. Work was then shown by Messrs. Hensler, Dean, Richardson, and Wire. The rest of the evening was devoted to a private exchange and sale, the idea being that many members had accumulated a lot of photographic accessories which were useless to them, but would be valuable to others.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

CENTRAL PHOTOGRAPHIC CLUB.

To the EDITOR.

SIR,—The delay in issuing the prospectus of the proposed Company has arisen owing to the time occupied in the further negotiations which have taken place between the executive and the landlords of the premises proposed to be taken, and their solicitors, with reference to the form in which the landlords are willing to lease the property.

Most of the points at issue having been now disposed of, a provisional prospectus is now being issued (a copy of which I send you). We wish to take this opportunity of apologising to the numerous applicants for copies for the apparent neglect on our part to furnish same before.—We are, yours, &c.,

W. FENTON-JONES,
CHAS. H. OAKDEN, } *Hon. Secs.*

Central Photographic Club, Fleet-lane, Ludgate-circus, E.C., June 12, 1893.

Provisional Prospectus. June 10, 1893.

THE CENTRAL PHOTOGRAPHIC CLUB COMPANY, LIMITED. FLEET-LANE, FARRINGDON-STREET, E.C.—Capital, 1000*l.*, divided into 200 shares of 5*l.* each; 2*l.* 10*s.* payable on application; 2*l.* 10*s.* payable at twenty-one days' call. *Hon. Directors:* Thomas Fall, Esq., 9 and 10, Baker-street, N.W., President of the National Association of Professional Photographers; John Howson, Esq., Brockenhurst, Ilford, E.; George Mason, Esq., 180 and 186, Sanchiehall-street, Glasgow, President of the Photographic Convention, 1893; with power to add to their number.—*Bankers:* The City Bank, Ludgate-hill, E.C.—*Auditor:* E. A. Whitby, Esq., Accountant, 26, Philpot-lane, E.C.—*Hon. Secretaries:* W. Fenton-Jones, 12, King Edward-road, Hackney, N.E.; C. H. Oakden, 51, Melbourne-grove, East Dulwich, S.E.

It is proposed to form the above Company, with such alterations in its constitution, capital, directorate, and otherwise as circumstances may render necessary, for the purpose of providing, fitting up, and furnishing a Club-house, and other accommodation and convenience for the use of the Central Photographic Club, which has recently been formed to provide a central meeting place for all gentlemen interested in photography, whether professionals, amateurs, or traders.

Negotiations have been opened with the owners of premises at the back of the Memorial Hall in Farringdon-street, which are considered most suitable for the purposes of the Club, subject to certain structural and other alterations, which, if negotiations are carried through, the owners will make.

The terms of the negotiation are, that the Company shall take a lease, subject to the usual covenants, for twenty-one years (determinable at the option of the Company at the end of seven or fourteen years), at a rental of 200*l.* per annum, in addition to the amount paid for fire insurance, and that the Company should, in some manner to be hereafter agreed upon, secure the payment of the rent, and performance, and observance of the covenants of the lease; it has been suggested that this security shall be a charge on uncalled capital of the Company to the extent of 250*l.*

The premises, if acquired by the Company, will be fitted up with dark-rooms, enlarging-room, smoking-room, and will contain a large meeting-room (capable of accommodating over 200 people), committee-room, library, and lavatories, &c. Negotiations are also in progress for suitable refreshment accommodation.

Amongst the objects aimed at in the formation of the Club are the providing of premises (1) Where photographers (amateur and professional) may develop plates, make enlargements, or leave their cameras during the day or evening. Lockers will be provided at nominal fees; (2) Where they may also have opportunities of meeting for the discussion of matters of mutual interest; (3) Where manufacturers and dealers can meet their agents, customers, and friends.

Besides these points, the usual attention will be paid to the holding of regular weekly meetings, for the discussion of photographic matters, demonstrations, lantern nights, and the exhibition of photographic novelties in apparatus and inventions.

The promises of support in the way of intending members of the Club are most satisfactory, and fully justify the promoters of the Club in saying that, if the capital necessary to suitably equip and furnish the Club premises is forthcoming, the Club will be a success, both financially and socially.

After the premises have been acquired and fitted up by the Company, they will be sub-let to the Club at a rental which, it is anticipated, will be sufficient to pay a dividend of five per cent. on the subscribed capital, and to provide a sinking fund for the sustentation of the premises, and the renewal of the furnishings, &c., and the expenses of carrying on the Company.

Before going to additional expense in the formation of the Company, and the further promotion of the Club, the promoters feel that it is necessary to ascertain how far they may hope to be supported by the photographic public in the matter of capital, and with this object you are invited to fill up and return, at the earliest possible moment, the enclosed form, specifying how many shares you will be willing to take in the proposed Company.

The liability of the shareholders will be limited to the amount of their shares, and no promotion money has been or will be paid, and, in the event of the non-formation of the Company, the provisional committee will bear all the expenses incurred.

Promises to take shares have already been received from Miss C. W. Barnes, Mrs. Welford, Messrs. Birt Acres, R. Beckett, T. Bedding, Frank Bishop, A. Cowan, Austin Edwards, B. J. Edwards, Thomas Fall, W. Fenton-Jones, J. T. French, T. E. Freshwater, J. O. Grant, John Howson, J. Martin, George Mason, T. J. Powell, John Reynolds, J. T. Sandell, Woodham Smith, J. S. Teape, E. J. Wall, H. Snowden Ward, W. D. Welford, W. Wentworth, E. A. Whitby, Britannia Works Company, and Percy Lund & Co.

Your particular attention is directed to the fact that, unless a sufficient number of shares in the Company is subscribed for and taken up by those interested in the matter, the Club, which promises to be of such great value to the photographic world, and to which so many promises of membership have been already received, will not be brought to a successful issue. You are earnestly requested, therefore, to give the matter your careful consideration, and to return the enclosed form, filled up, on or before the 24th instant.

Date.....1893.

In the event of a Limited Liability Company being formed on the lines mentioned in the Provisional Prospectus of the CENTRAL PHOTOGRAPHIC CLUB, LIMITED, *of the 10th day of June*, 1893, *with such variations as circumstances may render necessary, I will subscribe for and take up*.....*shares in such Company, to a nominal value of not exceeding* £.....*as and when I shall be required so to do.*

Name.....
Address.....
.....

To MR. C. H. OAKDEN, 51 Melbourne-grove,
East Dulwich, S.E.

HALATION.

To the EDITOR.

SIR,—I notice a letter from Mr. Stringer in the "Correspondence" column of your last issue respecting halation, in which he disputes the tendency of very rapid plates to this fault. I spoke from my own experience as to the effect of rapid and slower plates for the difficult class of subjects alluded to, and have *invariably* found the slower plates give the best results. The reason is sufficiently simple. All emulsions, and I have made many, when examined by the transmitted light of a gas flame, are, at the outset, orange. As the emulsifying progresses, this orange colour gradually disappears, and gives place to blue or grey; at the same time the emulsion becomes more and more rapid to a certain

point, the particles of bromide having become, from a very fine closely compacted condition, in which they were when the emulsion transmitted orange light, more loosely aggregated and larger—that is, the silver salt becomes coarser when high sensitiveness is obtained, and in a much less resistent state with regard to the lateral dispersion of actinic light, than before. If we could get the orange or fine state of division, at the same time exalted sensitiveness, there is no doubt I should have reason to alter my opinion, but at present this desirable combination has not, I am aware of, been found. If iodide exists in any considerable quantity in a film, it will impart a creamy yellowness when examined by daylight, different to when it is only in minute quantities or absent, and this larger quantity of iodide I prefer for the work alluded to. Mr. Stringer may produce the best results—that is, negatives entirely free from halation—on the very rapid plates; I cannot, and I do not think myself singular in this experience.—I am, yours, &c., EDWARD DUNMORE.

THE LIGHTING OF GROUPS.

To the EDITOR.

SIR,—You would add to the interest of your "Groups" article if you would tell me how to avoid the heavy shadows and strong lights I get in outdoor work, as per the enclosed example.—Yours, &c.,

YOUNG AMATEUR.

[See Leader.—ED.]

Answers to Correspondents.

J. MILNE (Aberdeen).—Received. Thanks.

LENS.—A lens of the Euryscope type is commonly employed for studio groups.

B. MITCHELL.—The best and safest hypo eliminator from prints is water, frequently changed. Nothing is better.

W. BIRRELL.—We fear we cannot assist you in the matter. Write to the gentlemen named who may be able to advise.

N. S. BROWN.—You are wrong in your surmise as to the plates having been tampered with in the manner suggested. Some other hypothesis will have to be adopted.

F. F. W.—We cannot say the actual pressure in pounds or hundredweights that a print is subjected to in burnishing. Of course, that would all depend upon the adjustment of the regulating screw.

T. O. FOX.—In all probability the lantern you saw in the demonstrations at the Society of Arts last year was illuminated by the electric light. The arc light is, we believe, solely employed in the Society's lantern.

SINED.—We can give no definite clue to the yellow spots. They may have arisen from particles of hypo in the air that have settled on them in course of preparation, but this is merely a surmise. We do not think the mounts are in fault.

R. T. A.—Unless you have some chemical knowledge, and we gather from your letter that you have not, we fear the results arrived at will not be very conclusive. You cannot do better than get the works named: Fresenius' *Analysis: Qualitative and Quantitative*, 2 vols.

A. T.—English plates may be obtained at most of the principal towns on the Continent, but there is, of course, the possibility that they may have been a long time in stock. The only way of avoiding the chance of getting stale plates is to procure them direct from the makers and taking them with you.

COUNTRYMAN.—You will not be allowed to photograph any of the objects of the British Museum unless permission is first obtained, even with a hand camera surreptitiously, for, unless we are mistaken, parcels are not allowed to be carried about the building. There will be no difficulty in obtaining the necessary permission if you write to the Trustees stating your object.

T. W.—Although the engraving is your own property, and you have paid a high price for a proof print, it will be illegal to copy it, even as a lantern slide, without the sanction of the owners of the copyright, and that, we know, they will give. It is true the print is yours, as you have purchased it; but possessing the print does not entitle you to infringe the copyright in it.

ALF. BENYON says he recently bought a portrait lens, bearing the name of a well-known maker, through an advertisement, but cannot obtain a sharp image with it. On taking it to pieces, he finds that the back lens is a single piece of glass, a concavo-convex, and asks if the back should not be made up of two lenses?—Yes certainly. One of the glasses is missing. The front combination may, however, be used as a single lens for such purposes as it may serve; but as a portrait lens the instrument, as it is, is worthless.

MR. W. A. BEZANT writes: "Can you give me any information as to the possibilities of photography—that is to say, of obtaining pictures during a trip to Norway on one of the yachting steamers so much advertised? Of course, some work could be done on land; but what I want to know more particularly is whether much good could be done from the deck of the vessel with a stand camera, and if the light is good enough to permit of shutter exposures with, say, a Ross rapid rectilinear at *f*·16 or *f*·22, or would you recommend me to trust to a hand camera?"—Doubtless many of our friends who have photographed in Norway will be glad to give Mr. Bezant the information he requires.

S. A. H.—The studio shown in sketch No. 3 will be by far the best for general all-round work. No. 1 is very good in skilful hands, but is seldom used now. With regard to No. 2, it has only been put forth as a suggestion, and is scarcely likely to be adopted—at least by professional photographers.

T. EVANS writes: "I wanted a dead-black varnish for the inside of some lens mounts, and mixed some lamp-black with thinned white-lard varnish. The black was dead enough when dry, but the surface was quite rough and covered with small lumps. I cleaned this off and mixed some lamp-black with black varnish, and this also behaved the same. Why is this?"—The reason is that the black was not intimately incorporated with the varnish. Had it been ground up in a mortar with the varnish there would have been no unevenness.

O. Z. says: "The solar camera I am told can be used, and is used abroad, for making enlargements from small negatives direct on albumenised paper. If that is so, surely direct enlargements in carbon can also be made, as the sensitiveness is about the same, and thus avoid the trouble and cost of having to make first a transparency, then an enlarged negative to print from. Has the thing ever been tried, or is my idea original? It must certainly be practicable."—Well, the idea is not original, as enlargements are being produced daily by this means in some countries. As however the solar camera cannot be worked when the sun is not shining, the system is practically useless in this country.

RECEIVED.—H. L. Morel, John Rowden, M. H.

MR. J. BISHOP, photographer, has removed from 41, St. George's-road, N.W., to 19, Princess-road, Regent's Park-road, N.W.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.—June 24 (half day), Barkby and district. July 13, Warwick. August 10, Chesterfield and Bolsover. September 14, Ashby and Coleorton.

NORTHERN PHOTOGRAPHIC AND SCIENTIFIC ASSOCIATION.—June 21, Lecture on *The Chemistry of the Dry Plate*, by Mr. Charles Coulter. July 1, Excursion to Natural History Department British Museum at South Kensington.

LEYTONSTONE CAMERA CLUB.—June 17, Hayes and Keston, Kent. Leader, Mr. F. Lohmeyer. The Club will proceed by the train leaving Cannon-street at quarter to three, arriving at New Beckenham at thirteen minutes past three.

THE AFFILIATION OF PHOTOGRAPHIC SOCIETIES.—The meeting of Judges of photographic Exhibitions, which has been already mentioned in our columns, will take place at 50, Great Russell-street, W.C., on Tuesday, June 20, at 7 p.m.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.—June 17, Gawsworth and Marton. Leader, Mr. Fleming. Train, London-road (L. & N.W.), one o'clock p.m. for Macclesfield. Fare, 1*s.* 6*d.* By carriages, Macclesfield to Gawsworth. 21, Arley and Great Budworth. Leader, Mr. J. Davenport.

THE two following titles of papers to be read at the Convention arrived too late to be included in the list published last week:—*Our Pictorial Failures*, by the Rev. F. C. Lambert, M.A.; *Latitude in Exposure and Speed of Plates*, by Dr. F. Hurter.

WE are extremely sorry to learn that Mr. Walter Clayton, photographer, who recently disposed of his studio, Portland House, London-road, Leicester, and who has since made his home at St. Luke's-road, Bayswater, was drowned on Thursday afternoon while bathing. He was accompanied by his son, who missed his father soon after the latter had entered the water, and at once went for assistance. Three boatmen responded to his call, and succeeded in finding the body after about ten minutes' search. Efforts were made to restore animation, but without success. Mr. Clayton was staying at Torquay with his wife and family.

THE STAMPING OF WORKS OF ART.—At the inaugural dinner of the Incorporated Publishers' Association, recently held at the Hotel Victoria, considerable business was combined with the pleasure. Sir David Salomons, Mr. W. L. Wyllie, A.R.A., and Mr. Frank Walton, R.I. were elected Vice-Presidents of the Association. The rules and regulations for the stamping of literary works were adopted, and the following amendment to Clause 7 of the regulation for the stamping of works of art was carried. "That when the painter and publisher of a work of art reside in a foreign country, and the work is engraved or reproduced in another, such work may, at the option of the Council, be permitted to be stamped before the signature of the artist is affixed to the first State impressions." This amendment is introduced to meet the case of American publishers who are having native pictures reproduced in England or France, and to save them the extra outlay of time and money which a double journey across the Atlantic would entail, together with Customs and other duties.

*** *Owing to exceptional pressure on our space, several Society reports, letters, answers to correspondents, &c., have had to be held over.*

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1729. Vol. XL.—JUNE 23, 1893.

JUDGING AT PHOTOGRAPHIC EXHIBITIONS.

An influential meeting of gentlemen who have been accustomed to act as Judges at Photographic Exhibitions was held in the rooms of the Photographic Society of Great Britain on Tuesday evening, under the presidency of Captain Abney, F.R.S. It was called together on the suggestion of the societies affiliated to that of Great Britain to arrive at some common basis of action relative to judging at exhibitions.

Among those who were present were Captain Abney, Valentine Blanchard, F. P. Cembrano, A. Pringle, W. England, Colonel J. Gale, L. Warnerke, Rev. F. C. Lambert, W. L. Colls, W. E. Debenham, W. D. Welford, and J. T. Taylor. Out of thirty-eight Judges, letters expressive of entire sympathy with the objects of the meeting were received from twenty-six, who, living for the most part at a distance, or owing to other engagements, could not be present. Various rules and recommendations were adopted, and those present were understood as agreeable to abide by them on all occasions on which they in future might be called upon to officiate in a judicial capacity.

In what follows, we give in condensed form the rules and recommendations adopted, it being premised that, while nothing important has been omitted, they are here given in only a somewhat crude form, for, having to go early to press, we do not wait till the Secretary has had time to draft them in regular form. When this has been accomplished, we will again reproduce them, as it is a matter of importance to all societies who purpose holding exhibitions.

In all Exhibitions the Judges' decision is to be final as regards their awards. The Judges shall have power to withhold any award. They also shall have power to give special awards when they see fit. The Judges shall have the right to exclude from the room every person while making their awards. The travelling and, where necessary, the hotel expenses of the Judges shall be paid. When the Judges have to spend a night from home, it is suggested that they should not be lodged at the house of any of the competitors. The number of awards are strongly recommended to be limited, seeing that a lavish distribution of medals tends to lower the value of such awards. No awards are to be made for pictures produced by, or sent to advertise the wares of any trading firm, and it is suggested that Committees of Exhibitions discourage any offers of assistance by special trading firms. Pictures previously medalled must be exhibited in a class by themselves. Each picture of a *set* which has received an award shall be considered as a medalled picture for competitive purposes. An award is to be made to one picture only, unless from the nature of the subject the pictures bear an obvious relationship to each other. No distinction between professionals and amateurs shall be made. No production from the same negative, whether ordinary print, enlargement, lantern slide, or otherwise, can receive more than one award. It is recommended that the number of classes in an exhibition be as few as at all possible, and it is also suggested as being very undesirable that any award take the form of a money prize. No picture shall receive more than one award at the same exhibition. With regard to lantern slides, no award shall be made for a slide without its having been projected on the screen.

For a long time past dissatisfaction, whether well or ill founded or not we shall not now stay to inquire, has been expressed with regard to the action of Judges at photographic exhibitions. Primarily, this has arisen from there not being on the one hand a set of generally recognised rules by which societies and exhibitors were to be bound, and, on the other hand, regulations to which the Judges themselves could, on occasion, refer as the source of their authority. By the heads of the agreement arrived at in the course of the meeting above referred to, these difficulties will be removed, so that in future societies, Judges and exhibitors will have the ground cleared of many obstacles to a general understanding on the subject.

As a basis for a set of working regulations, the resolutions come to at the meeting referred to strike us as difficult to improve on. In placing the powers of Judges within wide limits great wisdom is shown, especially taken in reference to the fact that the rules for exhibitors are also to be laid down with equal clearness. The movement in favour of the abolition of distinction as to classes simplifies the course to be followed by societies and individual exhibitors, and the praiseworthy determination to place under a ban those exhibitors who are fond of puffing up by their pictures individual vendors of photographic preparations will cleanse photography of an undesirable element which threatened to assume unpleasant dimensions. That there should be no distinction between amateurs and professionals for competitive purposes is also a step in the right direction; and the especial provision instituting a champion class for pictures previously distinguished by awards is also a salutary one in the interests of less successful exhibitors. On the whole, these and the various other resolutions, to which we hope to revert, are, we consider, conceived in a spirit likely to lead to the elevation of the status of Exhibition photography, and we hope that a universally acceptable set of conditions will result from them.

ANOTHER SOCIETY WANTED.

Considering that there are so many photographic societies already in existence, it may seem somewhat anomalous to suggest that even a single one more may still be desirable. There are, it is true, societies in almost every large town, yet there is not one in the whole of the United Kingdom which is confined exclusively to operative photographers. There was, and possibly is now, one in New York, and a very excellent and useful Association it was to its members. It will be remembered that an attempt was made in London a couple of years or so ago to start an Assistants' Union, but that was to have been conducted on Trade Union lines, with the object of fixing a definite rate of wages, regulating the hours of labour, and like matters. As we indicated at the time, such a combination was scarcely likely to meet with much success in a business like photography.

The society which at the present time may be desirable is one of operative photographers that would confer some kind of status upon its members. We are led to this idea by the comments made at the last meeting of the National Association of Professional Photographers with regard to the subject of *certificates*, where the President is reported to have dwelt at length on the "very unpractical character of the certificates now issued by the London Polytechnic Institution, which were merely good for a limited *chemical* knowledge." At the meeting the Council expressed a strong desire that a system should be devised to bring really capable assistants within reach of professional photographers, and it also suggested that, before the Polytechnic certificates are issued, "the students should be examined by some representative, capable, and experienced photographer." Possibly, however, this practical test might not prove altogether satisfactory to many of the students.

It may appear strange to some, now that so much of the material employed in the profession is purchased ready for use, that there should be a dearth of really capable operators; but, if one may judge from report, such seems to be the case. Some even go so far as to say that many who have gained high-class certificates in technical schools are the most incompetent in actual practice, and, what is more, they sometimes are the most difficult to teach anything beyond what they learnt in the class-room, and for which they were awarded their certificates. We have heard similar opinions expressed by Continental employers of many of the students turned out of the technical schools abroad, particularly with reference to photo-mechanical processes, a special feature in most foreign schools. One gentleman remarked to us that, in his establishment, in Germany, he preferred to take any intelligent person knowing nothing of the work, and teach him from the beginning rather than have one who had graduated in some of the technical schools. This certainly ought not to be the case either here or abroad. Still, it is a fact that many of our best and most successful workers now, and in times past, have had no theoretical or chemical knowledge whatever of the processes they employ. This was even the case with the wet-collodion process, in which a chemical knowledge was infinitely more essential than it is in modern photography.

But to go back to our subject. What professional photographers require, and what it is stated to be difficult to obtain, are assistants, not only with certificates of theoretical knowledge, but also with an assurance that they possess the practical ability to apply it in every-day practice. Seeing this, would it not be to the advantage of skilled workers in the various branches of the art to form a society or association amongst themselves for a mutual exchange of ideas, and furthering their interest generally, on a similar basis to that founded at New York? Should such a society be started, and only those of proved ability in actual practice, or of long experience in the various departments of photography, were eligible as members, its membership would carry with it credentials of a certain degree of ability, as does membership in some other crafts. The head-quarters of the society might be in London, meeting, say, monthly, with branches in most of the large towns. The meetings of these, where the members are few, might, to save expense, be held in any ordinary room. If formed, the society might be affiliated to the Photographic Society of Great Britain, which would add still further to its status. We imagine the Parent Society would gladly welcome any association established on the lines indicated, and afford it every facility. It was incidentally mentioned a little while ago, in connexion with photography as a business, that since the introduction of dry plates some people, with comparatively very little practice, and perhaps a little class instruction, feel themselves justified in styling and advertising themselves as operators. It is of this kind of thing that employers complain. Of course, this type of "operator" would not gain admission to a society such as that in question.

While writing, it occurs to us that the National Association of Professional Photographers might really take the initiative in the matter and invite operators to join their Society. Surely an operator is a professional photographer in every sense of the term, and, if he is of known ability and standing in the profession, why should he not be eligible for membership if only elected by the general body of members? The Association would then have the assurance that all those they have elected as members of their body are really capable men. It is more than possible that this idea, mentioned in the crude, if put into practice, might prove of mutual advantage to all concerned. There are plenty of societies composed professedly of amateurs, but there is not a single one consisting exclusively of professional photographers—to deal with trade subjects—which includes both employers and *employés*.

THE PERFECT FIXATION OF NEGATIVES.

Since we wrote on this subject a few weeks back, we have had a number of letters the burden of whose complaint is that there is no certain means of knowing when a plate is perfectly fixed or washed. Some of our correspondents go to the extent of averring that it is impossible to properly free some of the thickly coated plates now in use from hypo and hypo compounds so that they will go into the printing frame without danger of subsequent change.

This argument is based on the fact that after protracted immersion in the hypo solution—long after the apparent removal of the haloids—and when two, and in some cases three, successive baths have been used, followed by a washing of long duration, still signs of discolouration of the film have made their appearance in a very short time after the negative has been exposed to strong light in printing, or a worse evil has arisen when intensification has had to be resorted to. Without admitting the argument of impossibility of fixing, for we showed in our previous article the way out of that difficulty, we fully concur in the general desire expressed for a test of when a negative may be considered safe for future use in the printing frame or for further treatment with intensifiers.

It is now many years since we first decried the use of so-called "hypo-eliminators," and most of our correspondents seem to be at one with us in that matter. Although with ordinary plates—that is to say, with films of ordinary thickness, such as were the rule eight or ten years ago—and a fairly long immersion in the fixing bath, and proper washing afterwards, no harm would ensue upon the use of an eliminator even if the image had to be subsequently intensified, the case is quite different when abnormally thick films are in question. In the first instance, the fixing bath would have time to do its duty, and an hour or so's after-washing, if properly performed, would suffice to bring it into such a state that any decomposition products formed by the use of an eliminator would be present in such infinitesimally small quantity, if present at all, as to be quite harmless. Now, it is possible to put into the printing frame an apparently perfect negative which is so impregnated with silver compounds as to be itself sensitive to light, or which, if submitted to the action of any of the ordinary eliminators, or more especially to intensification, would give immediate evidence of the insufficiency of its previous treatment.

This is not a satisfactory state of affairs, and we have ourselves been latterly considerably troubled by it, but we believe we are in a position to point out a perfect safeguard against the evil of uncertainty as to the stability of the negative. The method we have to describe is neither in the form of an eliminator, nor is it a labour-saver in the matter of washing, but is a sure test of the presence of silver compounds, that may be applied without in any way injuring the negative or introducing dangerous decomposition products that may eventually lead to its destruction.

The action of the fixing bath is, we believe, pretty well understood, at least by those who take any but a mechanical interest in the production of negatives. The removal of the unaltered silver haloids is the first object aimed at, and, if this be effected in a sufficient volume of fresh solution of hypo, perhaps, under ordinary circumstances, no further difficulties would accrue. Thus, if a single negative were immersed in a considerable volume of hypo solution, until its unreduced haloids had just disappeared, it is probable that but an infinitesimally small quantity of soluble silver salts would remain in the film, the bath extracting nearly the whole, and what little remained would be easily removed by washing.

But when an unlimited number of negatives is fixed in the same bath, or when a thick film of gelatine, heavily charged with silver, is submitted to the action of even a fresh solution of hypo, the pores of the gelatine are so clogged with crystalline matter that perfect fixation becomes an impossibility, and subsequent washing, so far from helping matters, only tends to precipitate a portion of the silver as an insoluble form. Silver forms two combinations with hypo, the one soluble, the other insoluble, or nearly so; the former containing the larger proportion of hypo, and being formed only when the conditions are such as tend to perfect fixation. The latter results from the employment of a spent bath, or from insufficient action. The opalescent appearance we have spoken of as removable by washing no doubt consists of the former compound precipitated in the film, owing to its richness in silver, the comparatively small proportion of water contained in the wet gelatine being unable to hold in solution the quantity of double salt formed. Subsequent washing dissolves the bulk of it, but decomposes a portion, leaving on the film, it may be, a minute trace of the less soluble compound, which, besides being more or less sensitive to light, is also readily decomposed, leaving sulphide of silver as a brown stain.

The use of alum as an eliminator, by decomposing the sodium and silver hyposulphite, leaves the latter metal in the form partly of sulphate, partly sulphide, so that, if there be any considerable quantity present, the ultimate stain is only hastened. Peroxide of hydrogen or hydroxyl leaves the silver in the form of sulphate, a soluble salt which is removable by washing, though it leaves its influence on the gelatine, which will eventually discolour. The hypochlorites, in whatever form employed, convert the silver ultimately into chloride, besides acting upon the image itself in the same way, and without leaving any immediate signs of danger render the re-employment of the fixing bath a necessity.

It is a well-known fact that chloride, bromide, and iodide of silver dissolve in hypo in very different proportions, the first-named being very soluble, the last comparatively and slightly. If a solution of a soluble iodide be dropped into a hypo bath that has been used for fixing chloride or bromide films, even though it be far from saturated, a precipitate of iodide of silver will be formed, owing to the stronger affinity of iodide for silver in the first place, and the comparative insolubility of iodide of silver in the hypo in the second. No other decomposition occurs, and no change takes place, except between the iodine and chlorine. Here, then, is the basis of the test for perfect fixation.

If a gelatino-bromide negative be taken from the fixing bath as soon as the bromide has apparently been removed, simply rinsed in water, and immersed in a dish containing a solution of iodide of potassium, it will be found, in a very short time, to have reverted to much the same state as before it went into the hypo, in consequence of the soluble silver salts it contains having been converted into iodide. The density of the deposited iodide will, of course, depend upon a variety of conditions, but chiefly upon the thickness of the film and its original richness in silver, and upon the energy or strength of the hypo.

If the negative has been sufficiently fixed—that is to say, if the hypo has had sufficiently free access to the film to thoroughly convert the silver into the more soluble compound already alluded to—and is then submitted to a thorough washing, the iodide bath will produce no effect, and it will be known that all is right. But, if the fixing has been insufficient, and the less soluble hyposulphite of silver is present, or if the washing has not been sufficient to remove the soluble salts, then the iodide will tell its tale by converting any silver that remains into *visible* iodide, which can be removed by refixing.

The change—that is, the formation of iodide of silver—is not always rapid—does not, in fact, always make its appearance in the iodide bath itself, unless it be a case of imperfect fixation. If it is only insufficient washing, it frequently or generally occurs that the iodide is only precipitated on the film after the plate is removed into the washing water after the iodide bath, possibly on account of the solubility of iodide of silver in excess of iodide of potassium. It is desirable, therefore, always to allow the plate to rest in water for some time after treatment with iodide before finally drying.

This treatment, of course, necessitates a second fixation if silver prove to be present; but, as we have already stated, there is no danger to the negative, and the test is an infallible one. The quantity of silver remaining in the film as iodide is so comparatively small that there is little danger of a second fixing and washing leaving any at all. It should be under-

stood that the test is only to be applied after the ordinary washing is considered to have been sufficient, and preferably before the negative has seen strong daylight.

The addition of a few grains of iodine to the solution of iodide of potassium will hasten matters; but, as it may possibly lead to the formation of tetra-thionates salts, as unstable as the hyposulphites, it is better to adhere to the plain iodide.

Society of Arts Silver Medals. — The Council of the Society of Arts have awarded the Society's Silver Medal to Thomas R. Dallmeyer for his paper on *Tele-photography*, and to H. Van Der Weyde, for his paper on *The Pictorial Modification of Photographic Perspective by the use of the Photo-corrector or Visual Lenses in Portraiture and Landscape*, read during the Session 1892-93.

Technical Instruction for Beginners. — The North Middlesex Photographic Society, in their syllabus for the next few months, have arranged one or two personally conducted outings for beginners, subsequent evenings being devoted to the development of the plates then exposed. The classes are open to non-members of the Society, and should be productive of a large amount of practical good for those commencing photography. The North Middlesex Society is, so far as we are aware, the only Society that vouchsafes free instruction, and their action is deserving of every commendation.

Cheap Oxygen.—We are sure that the photographic fraternity will echo Sir H. E. Roscoe's hope—expressed in a review in *Nature*, upon the article on "Oxygen" by Dr. Thorne, in the newly completed grand *Dictionary of Applied Chemistry*—that oxygen may ere long be produced at 1*s.* per 1000 feet. According to this article, 3*s.* is the present cost, though the compressed gas necessarily costs very much more. Sir H. E. Roscoe says of the proportional cost of oxygen by the Du Motry process, improved by Fanta, given as from 3*l.* to 4*l.* per 1000, that he cannot help thinking it is incorrect. In any case, there is every chance for photography in these reduced prices. We can only hope with the reviewer that they will continue to grow—downwards.

High and Low-class Photography. — A correspondent whose business is principally with professional photographers, writing on the subject of photography as a business, remarks that in the depression of the last two or three years it is the middle-class man, who supplies a good picture at a moderate price, that has suffered most. The highest class houses, he says, have suffered less, while the lowest class with the most "cutting prices" have been least affected. If this be correct, and we have heard similar opinions expressed before, it does not look very promising for the artistic side of photographic portraiture amongst the upper middle-class public. With too many people a portrait is judged solely by the likeness, artistic quality in addition being quite ignored.

Eclipse Expedition Photographs.—Professor Therpe, the editor of the work above-named, exhibited some very interesting eclipse photographs at the recent Royal Society's *conversazione*, including autotype enlargements from photographs taken by himself, illustrative of the recent African Eclipse Expedition, the eclipse party, the observing party at Fundium Senegal, taken immediately after the eclipse, the duplex chronograph, the prismatic camera, the integrating photometer, the equatorial photometer. These were Professor Thorpe's exhibits. The Joint Eclipse Committee exhibited another class of eclipse photographs. They had photographs of the corona taken in West Africa, also of the spectra of the corona and prominences taken in West Africa, the corona taken in Brazil, photographs of the spectra of corona and prominences taken with the objective prism in Brazil; and photographs of the stations. These pictures, all taken together, greatly assisted those inspecting them in forming an idea of eclipse work, its ends, and the difficulties connected with the means.

Interference Bands.—Among the exhibits at the *conversazione* was one which possesses a special interest to photographers. Since the advent in a practical form of pinhole photography much has been said about interference bands and their effect upon the image. Indeed, the theoretical minimum diameter of a pinhole, capable of giving the best definition without interference bands destroying it, has been worked out by Lord Raleigh; but what these bands are is not very well understood. In the example we refer to light was allowed to fall on a mirror thinly silvered, so that about half of the light is reflected and half transmitted. The two rays pursue paths which are normally perpendicular, are reflected back by two ordinary mirrors, and, on meeting, interfere. The interesting part of this arrangement is that, by its means, the bands can be reflected on a screen; and this fact, together with the simplicity of the arrangements, will make the method a very useful lecture illustration.

Professor Thorpe on Past and Present Astro-Photography.—Professor Thorpe, lecturing on the Eclipse Expedition at the Royal Institution, explained how photography had altered the whole process of observing solar eclipses. Since the red-letter day, he said, in 1860, when Warren de la Rue first applied his photo-heliograph to the observation of the eclipse, the camera and its various modifications had come into use so as to practically supplant ocular observation. The camera was not troubled with nervousness, and, having no imagination, simply set down actual facts. The selection of an appropriate site for viewing the eclipse was not without difficulties. As everything depended on getting right under the moon's shadow, they had to follow that shadow about all over the earth for each new eclipse. Professor Thorpe entered into considerable detailed explanation of the arrangements, and said that the observations were very successful. The various prominences, rifts, and configurations in the great gaseous envelope of the sun were most clearly brought out, while some most important results were expected from an examination of the spectroscopic slides. One interesting question had been practically settled by these observations—namely, that the corona suffered no change of structure during short periods, for the Brazil photograph, taken one hour and a half later, was identical with the African one.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

PLYMOUTH MEETING, JULY 3 to 8, 1893.

THE following is an official synopsis of proceedings:—

MONDAY, JULY 3.

No excursion. Opening of the Convention, and Reception by the Right Worshipful the Mayor of Plymouth (Mr. W. Law) at the Art Gallery and Lecture Hall of the Athenæum (6.30 p.m.). Presidential Address (7.30 p.m.). Optical Lantern (9 p.m.).

TUESDAY, JULY 4.

Steamer excursion to the Yealm and the River Tamar; Tavistock.

WEDNESDAY, JULY 5.

No excursion. General Meeting, 10 a.m. Meeting of General Committee, 11 a.m. Convention Group at the Guildhall-square, 12 a.m. Papers, to be read from 2 p.m. to 5.30 p.m.:—*Recent Developers*, by Mr. E. J. Wall. *Lantern-Slide Making*, by Mr. C. L. Mitchell, M.D. *Artistic Expression with the Hand Camera*, by Mr. J. Guardia. *Multiple Films*, by Mr. S. Herbert Fry. Reception at the Guildhall, Devonport, by the Worshipful the Mayor of Devenport (Mr. W. Waycott), 7 p.m. Optical Lantern, 8 p.m. Papers, to be read from 8.30 to 10.30 p.m.:—*Some Slides from the Marine Biological Laboratory*, by Mr. J. T. Cunningham, M.A. *The Special Properties of the Zeiss Anastigmatic Lenses*, by Dr. Paul Rudolph, read by Mr. J. Stuart. *Photography in Relation to Medical Record and Demonstration*, by Mr. A. Pringle. The morning and afternoon meetings will be held at the Western Law Court. The reception and papers in the evening will take place at the Guildhall, Devonport.

THURSDAY, JULY 6.

Excursion to Launceston, Totnes, and down the Dart. Leader. Mr. R. Hansford Worth (leaving Millbay at 7.55 a.m.). Excursion to Looe. Leader, Mr. G. Barnston (leaving Millbay at 9.10 a.m.). Excursion to Cheeswing. Leader, Mr. J. S. Hawker(leaving Plymouth by steamer about 8.45 a.m.). Papers to be read from 8 p.m. to 10.30 p.m.:—*Some Points in Connexion with Development*, by Mr. C. H. Bothamley. *On the Power of Compensating in Development for Variation in Exposure*, by Professor W. K. Burton. *Latitude in Exposure and Speed of Plates*, by Dr. F. Hurter and Mr. V. C. Driffield. *Our Pictorial Failures*, by the Rev. F. C. Lambert, M.A. The papers will be read the Western Law Court.

FRIDAY, JULY 7.

Excursion to Lydford. Leader, Mr. R. Burnard (leaving Millbay, North-road, or Mutley at 7.55 a.m. Excursion to Bickleigh Vale, Leader, Mr. Crook or Mr. Moore (leaving Plymouth at 8.25 or 11.20 a.m.). Excursion to Dockyard and Keyham, Cattewater. Leader, Mr. Tweedy (leaving Plymouth at 8.25 or 11.25 a.m.). Dinner and Smoking Concert at the Western Law Court at 6.30 p.m.

SATURDAY, JULY 8.

Council meeting, 9.30 a.m. Excursion to Princetown. Leader, Mr. Burnard (leaving Millbay, North-road, or Mutley at 8.45 a.m.). Excursion to Ivybridge (leaving Plymouth at 10.45 a.m.). Excursion to Virtuous Lady Mines. Leader, Mr. H. Alger (leaving Millbay at 11.20 a.m.).

All communications after June 27 should be addressed, the Hon. Secretary, Photographic Convention, Art Gallery, Athenæum-buildings, Plymouth.

A NEW STUDIO.

MESSRS. HILLS & SAUNDERS, the well-known photographers of Oxford, Eton, Harrow, &c., have recently opened a new photographic studio in London. It is situated in Sloane-street, in the very heart of the fashionable quarter of the town, among the denizens of which the quality of Messrs. Hills and Saunders' work entitles them to expect a good share of patronage.

The suits of rooms occupied by the firm is entirely on the ground floor, two tastefully furnished reception rooms, adorned with a good collection of specimens, and presenting a most agreeable *coup-d'œil* to the visitor, being immediately reached from the front entrance. To the right of the second of these is the dressing-room, an unusually attractive and spacious apartment, the appointments and decorations of which are in faultless taste. This admits a sitter to the studio.

The studio is of unexceptionable size, being seventy feet long and twenty-three feet wide, and of proportional height. It was formerly, we were told, the music room of a town mansion. Around the walls are arranged a large number of groups representing the Eton and Harrow cricket and football teams for a great many years past. The studio has evidently been arranged with an eye to handsomeness of effect, and the accessories, backgrounds, &c., are of an artistic nature. The electric light is exclusively employed, a Pilsen lamp, with a concave radiator, being swung so as to be readily adjustable. Power is derived from the Company's mains a light of eight to fifteen thousand candle power being obtained, the average exposure being from one to two seconds, which may, on occasion, be considerably reduced for children, &c.

The new studio, which we understand was arranged partly in accordance with the ideas of Mr. A. Cowan, is illuminated throughout with the electric light. It is a most elegant and luxurious addition to metropolitan studios, among which it is in several respects unique.

REVERSED NEGATIVES.

ALL who have had any experience of the different photo-mechanical processes, or of carbon or pigment printing are aware of the important part which reversed negatives play in such processes; and there is no doubt that many workers have been deterred from taking up the carbon process, in spite of its beauty and permanence, by the necessities represented by reversed negatives on one hand, and double transfer on the other. In ordinary practice, such negatives as I have referred to are prepared either by making a negative in the camera from a transparency (a carbon transparency by preference, or else by stripping the original negative film and reversing it), the process being often varied by mounting the stripped film on a collodion or gelatine skin, so that it may be conveniently handled, and, if necessary, used from either side. It has been hoped that the use of celluloid films would enable the negatives taken upon them to be used either direct or reversed; but, although this may be possible with some "rollable" films, the ordinary cut films show a marked loss of a definition if printed from the wrong side.

Having occasion to deal with some cases in which reversed negatives were needed, I have been much impressed by the advantage that would be gained could such be produced from original negatives by one process instead of by two or three, and some experiences which had occurred to me in connexion with the reversing action of light (now so fully recognised) led me to think that assistance might be found in that direction. I remembered that a good many years ago I carefully prepared a batch of emulsion for lantern plates, which was supposed to be very slow, but with which I could only print negatives. I wondered at the time what was wrong, and in my inexperience I threw the emulsion away, but since then I have learned to put the trouble down to the then practically unrecognised action of light reversal. Remembering this, and calling to mind what has been more recently written on the subject, I took up a series of experiments which have led me to a successful result.

I find that the process of making a negative from a negative by direct contact printing is as simple as printing an ordinary transparency or making a bromide print, the only difference being that the print is made on an ordinary bromide negative plate, and that the exposure is extended so as to secure the reversal of the image without over-doing the operation. Working with Ilford ordinary plates the exposure required with a good crisp negative I find to be about five seconds in strong daylight, not direct sunshine, the exposure being increased if the light be poor, even up to thirty seconds at about sunset. It is here, of course, that judgment becomes necessary, both as to the quality of the negative to be reproduced and the actinic power of the light employed, but only in the same degree as in bromide paper printing.

My earlier experiments were with the ordinary hydroquinone developer, and were successful, though development was slow. I prefer for this purpose to use pyro and ammonia, or best of all the new metol-Hauff, which, with a little bromide, works like a charm, the reversed negative coming up with all the crispness and force of an original. In the case of over-exposure, the image sometimes appears first as a ghost of a positive which sinks in and dies away as the negative comes up, but in such cases the result will not be satisfactory. If the exposure has been about correct, the negative will develop out in just the ordinary way, except that, the light having penetrated the film so deeply, care must be taken in judging density by looking through the film.

I find that I can depend definitely upon obtaining good reversed negatives every time by being careful, and I very cordially invite all who may be interested in such matters to take up the process, which theoretically should be a perfect one, and with the experience to be gained by more extended trial may, I believe, be made perfect in practice.

WM. BISHOP.

COMPENSATION IN DEVELOPMENT FOR VARIATIONS IN EXPOSURE.

[London and Provincial Photographic Association.]

ACCORDING to promise, I have brought to show you to-night the result of a few experiments on the question of "Compensation in Development for Variations in Exposure," on the lines suggested by Mr. Burton's paper. When the question was brought up at the last meeting, I ventured to say that, from my own experience, I did not think it was possible to get negatives giving identical prints, or so nearly similar, that an experienced photographer could not tell the difference between two negatives—one having the so-called correct exposure, and the other forty or eighty times more—unless the range of tones was practically limited to, say, two tones or little more. In the examples I have developed, one plate may be considered to have had a normal exposure, viz., a series of light intensities varying from half a second to thirty-two seconds, each step being double that of the previous one, and in the others an over-exposure of thirty-two times, viz., the first having sixteen seconds, and the last of the seven 1024 seconds.

I here show you the results, the negatives themselves, and also the curves of the densities as measured by the photometer, and

I scarcely think any one can imagine that the various negatives can by any possible means be considered identical. The first one (the normal exposure) was developed with—Pyro, 1 grain; anhydrous sodium carbonate, 4 grains; and potassium bromide, ½ grain; and the three over-exposed ones respectively by doubling the pyro and bromide each time, the last one having eight grains of pyro and eight grains of bromide to the ounce, the alkali in each case being kept constant. The time of development varied from six minutes in the case of the normally exposed plate to one hour and forty minutes in the case of the eight-grain pyro one.

I should explain here that what I tried to do was to make the lowest tint in the scale of each as nearly of the same density as I possibly could, leaving the higher ones to go on in their own way.

I notice that Mr. Burton in his article says his statement is not compatible at all with Messrs. Hurter & Driffield's, where they say the density ratios cannot be altered by development. Now, I think it should be clearly understood what they did say, which, if I understand them, is this: They first define what they consider to be a perfect negative, as one in which "the opacities of the gradations are proportional to the light intensities," and, after many pages of mathematical reasoning and records of many experiments, they say:—

"We have thus arrived at an answer to the question. Can negatives be produced such as we defined to be theoretically perfect? and the answer is they *can* be produced, but only by so carefully adjusting the time to the intensity of the light that the exposures may fall between the period of correct representation."

I must say, from my own trials of Mr. Burton's method, I cannot upset this contention. I may say here that I sent to four members of this Society duplicate pieces of each of the plates here shown, and I hope we may be favoured with the results of their experiments in the same direction. All I can say, in conclusion, that, at the present time, I am not able by Mr. Burton's method to upset the theory that correct exposure is the principal determinary factor in the production of correctly graduated negatives. That abnormal exposures can be made by alteration in development to give certain pictorial results, I am perfectly open to admit; but, in a subject of this kind, that is not the question. But what we are talking about is, Can forty or eighty times the correct exposure be made to give identical results by modification in development?

A. Cowan.

SUMMER NOVELTIES IN APPARATUS, ETC.

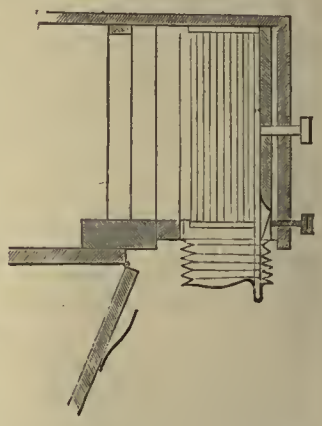
E. & T. Underwood, Granville-street, Birmingham.

When present at Messrs. Underwood's works, we were shown not merely specimens of their tourist cameras in the finished form, ready to be sent out, but the bodies and slides in various stages of completion, so that we could see the kind of work that is put in them. This we have little hesitation in saying is of a very high degree of excellence. The cameras, brass work, lens mounts, &c., are all made on the premises. Messrs. Underwood profess to keep their makes of cameras from ¼ to 15×12 in stock, but recently a difficulty has been experienced in adhering to this rule on account of the pressure of orders, which even while we were present were coming in by post. An especial favourite appears to be the "Club" camera, which, with all the requisite movements, is marked by great lightness and portability.

Among Messrs. Underwood's recent introductions are several hand cameras, which are distinguished by great simplicity of movement. "The Argosy" takes twelve plates in sheaths, the changing being effected from the outside. The sheaths being filled ready for exposure, to remove the exposed plate the camera is held with the shutter end slightly down, and the small knob at top of right side pulled out. The plate then falls forward on to the floor of the camera. The knob is pushed in again, and the second plate is in position. Every time the knob is drawn out a plate is released, and every time the knob is pushed in a plate comes forward ready for release. The sheath is held in position at each of the four corners, and, when released from the top corner, it is not allowed to go loose into the body of the instrument, as is the case in many cameras. The lower corners are provided with pivots, working in grooves, the return of the plates being prevented by suitable springs, and the plates cannot in travelling get cornerways, crossways, or in each other's way.

The "Argosy," which is fitted with finder, the ever-set shutter, and a single achromatic lens, is well made, and is exceedingly cheap.

Two other varieties of hand camera are the "City" and the "Sphynx," the latter being of a superior variety, having a rectilinear euryscope working at *f*·6·7, fitted with an iris diaphragm. The shutter is a roller blind working between the lenses. The focussing gauge outside is set instantly from five feet to forty feet, or infinity, and the camera has finders for horizontal and vertical subjects, accurately centered and deeply sunk, and measures 9½×5¼×4¼ inches. To both the "City" and the "Sphynx" cameras a bellows changing arrangement of great neatness and excellence is fitted, by which the front plate is removed to the back with ease, smoothness, and certainty in a few seconds, and without possibility of hitch, dust, or undue wear. The door at the under side of camera is unfastened and allowed to hang down, and the larger knob at the end of camera is pulled out firmly. This draws away the spring pressure, which keeps the front plate up to register, and allows it to drop into the bellows. The plate is then grasped through the flexible end of the bellows, conveyed along guides to the back, and pushed into place. The second plate of the series is then in focus and ready for exposure. The plate drops inside the bellows, clear of, and not touching, the folded sides, so that there is no wear or friction, no dust, scrapings, or loose plates. The mouth of the bellows is attached to a metal frame, fitting in a groove, and is kept in place by a small milled head outside back of case. This milled head being screwed out a short distance, the bellows are raised, the sheaths taken out, fitted with plates, replaced and screwed in.



Great simplicity is displayed in Messrs. Underwood's hand cameras, a feature which, with excellence and inexpensiveness, distinguishes all their apparatus. A handsome and serviceable 15×12 studio camera that we were shown exhibited these two latter qualities at their best.

W. I. Chadwick, St. Mary's-street, Manchester.

"What Lancashire thinks to-day England will think to-morrow," was a saying at one time frequently quoted, and that seems not unlikely to have some measure of application in the photographic world at the present time. To form an exact idea of the extent which what has been termed the stereoscopic revival has proceeded in amateur photographic circles, would be a difficult task that would, perhaps, not pay for the accompliahment; but we are probably not far wrong in the conjecture that, be that extent great or little, the immediate future will witness a still more marked popularity for stereoscopic work of possibly greater endurance than the present rage for the hand camera. If only some exalted personage would set the fashion for binocular pictures, society at large would be sure to follow, with, maybe, more æsthetic profit than is obtainable from the gentle art of pressing the button.

Photography is under a debt of gratitude to Mr. Chadwick for his efforts to revive interest in binocular photography and the stereoscope, and that considerable success has rewarded those efforts is due to the by no means common circumstance of the advocate understanding his case. For Mr. Chadwick not merely points the stereoscopic aspirant the way he should go, but lends him a helping hand. How valuable such assistance is, coming from an admittedly practical stereoscopist, everybody can appreciate who has encountered the vague apprehensions of abstruseness and difficulty which are commonly thought to be involved in stereoscopic work. To sit under Mr. Chadwick for half an hour, however, is to have stereoscopic photography presented in an aspect that looks, as the phrase runs, as easy as shelling peas.

It is not to be wondered, therefore, that Manchester, under the influence of Mr. Chadwick, has developed quite a stereoscopic colony; indeed, while in that town the other week, we were surprised at the number of amateurs who had adopted this fascinating branch of photography. That their number is so great is, of course, due to the presence in their midst of one so competent to instruct and advise as Mr. Chadwick.

The Chadwick stereoscopic camera, of which we spoke in terms of commendation two or three years ago, remains the perfection of what such an instrument should be. It takes plates of the size 6½×4¼, has two fronts, one for two lenses and one for a single lens, that are simply placed *in situ* by fitting under a brass cross piece on the front. These lens boards are reversible, so that the lenses may be packed inside the camera. The camera has a landscape-shape body; swing back, with the centre of motion in the axis of the lens, and a spring roller for the

stereoscopic division. It is made rigid by pushing the baseboard forward, and by an elongation of the slot in which the camera screw is placed it is attached to the head with a minimum of difficulty. Barnett's single dark slides are used, and altogether the camera, which has a rising and falling front, and may at will be utilised for upright single pictures, is the *beau idéal* of a well made, practicable instrument, without a single superfluous or complicated movement.

The Chadwick Improved Hand Camera.

The Chadwick Hand Camera embodies several features of a nature sufficiently distinctive to stamp it as possessing the character Mr. Chadwick claims for it, namely, practical. As we have previously pointed out, it is not a magazine camera, slides being used. It is of variable focus, from three to about six inches, focussing being effected by rack and pinion, operated by a milled head outside the camera, an aperture on the former showing a disc having an index for various distances. The lens fitted is either a single landscape at *f*-11 or a rapid rectilinear at *f*-7, the shutter being Kershaw's Instantaneous. For time exposures Mr. Chadwick recommends the use of the cap, with, of course, the camera on the stand. The view meter consists of three pin heads on the top of the camera in the form of a triangle, with its base on the extreme edge, by which the picture is sighted. The camera has a focussing screen, and may be used for both vertical and horizontal pictures. The lens front is removable and reversible, and the board having a boss when the latter operation is performed and a very short focus lens is used, the cap acts as a kind of plug. The size of the camera is $7\frac{1}{2} \times 5\frac{1}{2} \times 4\frac{1}{2}$, and the body is mahogany, polished black.

Several improvements have recently been applied to the camera. A rise and fall front, and a swing back for both upright and horizontal pictures, have been applied, and also a side swing; these adjustments do not in any way add to the size or weight, the only visible difference being two little screw heads on the side.

Scott's single dark slides for plates, or the double variety for films, are used with the camera, and as these slides are extremely light and portable, a considerable number of them may be carried about in the pocket for use as occasion demands.

Like all Mr. Chadwick's productions, the Practical hand camera is at once simple and effective, and has the advantage of having been worked out by one whom experience has given a grip of the requirements of amateur photographers.

Philip Harris & Co., Birmingham.

The Cytox Hand Camera of Messrs. Philip Harris & Co. has many points of novelty. It is of the fixed-focus type, and a small aperture in the front cuts off light from the lens, which is fitted with the usual diaphragms. A shutter of the oscillating-plate pattern, giving a minimum exposure of one-twentieth of a second, is employed. The plates are contained in

sheaths which may be bent to admit plates of any thickness. These sheaths are covered with a dead black of peculiar excellence, the preparation of which we are informed is a secret. The lens has iris diaphragms adjustable from the outside, and the camera may be used vertically or horizontally. To remove a sheath with an exposed plate a button on the top of the camera is pressed.

The camera is used as follows:—Having placed the dry plates or films in the sheaths, place the camera on the table, front downwards, then pack the sheaths one on the top of the other, inside the camera. The first one must be carefully placed, so that the front of sheath touches the wooden (c) stop in camera; when this first sheath has been put into position one hand should be placed in the camera, and the back of the fingers of this hand should slightly press the bottom of the sheath to keep it in its proper position, while the other sheaths are being put in with the other hand; the wires of sheaths must be in the grooves (B) on either side. When the twelve plates (or any less number) have been placed, insert the spring inside the camera, seeing that the wires of plate follow the grooves (B). To change the plates, press the button A on the top of camera, which presses the plunger inside and forces the front plate below the stop C. The plate then falls to the bottom of the camera, face downwards, protected from the light by the sheath and screens. The second plate is now pressed forward automatically by the spring at back, and is removed just like the first. When the camera is used in the vertical position the exposed plate must be fixed by screwing up the button D. The shutter is very simple, but very good. For instantaneous exposures pull the string as far as it will go, the shutter is then set, and may be released by a very slight pressure of the button at side. For time-exposures pull the string to the first catch, then, after exposure, press the button to close aperture.

It is the habit of Messrs. Harris before selling a Cytox to a customer to exhibit its capabilities by taking a picture with it.

Among the firm's other novelties is an electric lamp for the dark room, in which the battery consists of five cells, with an arrangement for raising or lowering the carbons and zincs of all five cells simultaneously, and fixing them, when raised, by means of side screws to allow carbons and zincs to drain, and stop action and waste of zincs. When required for use, carbons and zincs are lowered by unscrewing side screw. The lamp is five-candle power, and when ruby light is required the ruby cylinder is over it. When required for lighting, the cylinder is removed. Bichromate solution is to be used in the inner cells, and dilute sulphuric acid (1 in 35) in the outer cells. The framework is mahogany, polished, and the outer cells glass. Any number of cells may be used up to five, or any cell may be used separately.

As showing the great utility of photography to business firms, we may mention that at the time of our visit Mr. Belcher, the manager, was busily engaged in photographing chemical apparatus for a new catalogue, he explaining to us that this would obviate the engraver misdrawing the specimens, which was probable, as they were required to be arranged in a particular way. The photographic catalogue contains particulars of cheap and useful sets, &c.

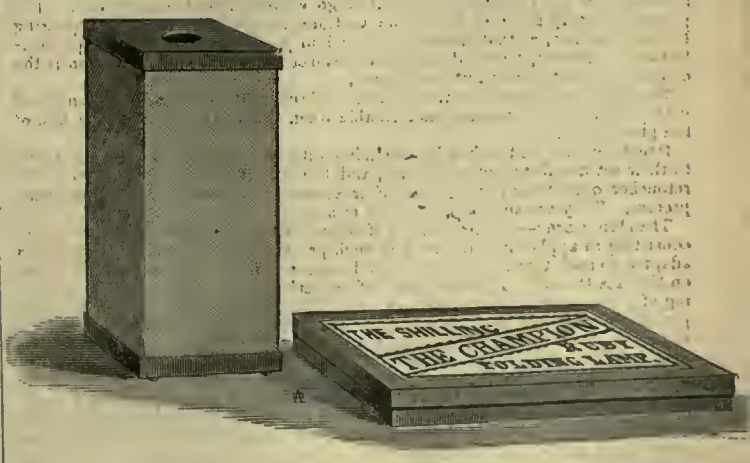
Archer & Sons, Lord-street, Liverpool.

The "Archer" combined hand or stand camera, has had several improvements applied to it since its introduction a few weeks ago, among others, the slides are held at the top and sides of the box, in which the camera proper is contained, thus economising space. For closing the back and front spring catches are applied. Messrs. Archer are also introducing an exceedingly light tripod stand, the legs of which, when opened up, are secured by a simple spring catch. The stand is made of polished walnut.

Our Editorial Table.

The Champion Folding Lamp.

In the following cut we show, both folded and erected, a lamp (procurable of all dealers, price one shilling), which occupies very little



pace when folded for travelling, while, when set up, it is roomy and well ventilated.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,789.—"Improvements in Photographic Cameras." A. W. Pocock.—*Dated June* 15, 1893.

No. 11,796.—"An Improvement in Photography." F. Sternberg.—*Dated June* 15, 1893.

No. 11,823.—"Improvement in Cameras." Communicated by E. Decker. P. R. J. Willis.—*Dated June* 15, 1893.

No. 11,841.—"Improvements in Photographic Cameras." G. D. Hughes.—*Dated June* 16, 1893.

No. 11,869.—"Changing Arrangement for Hand Cameras." G. S. Whitfield.—*Dated June* 16, 1893.

No. 11,872.—"Improvements in Photographic Developers." Communicated by the Actien Gesellschaft für Anilin Fabrikation. C. D. Abel.—*Dated June* 16, 1893.

PATENTS COMPLETED.

Improvements in and relating to the Colouring of Photographic Prints, Transparencies, and Negatives.

No. 7343. Charles Klary, 22, Rue de Beaune, Paris, France. *May* 13, 1893.

The object of this invention is to provide a method and means for colouring photographs, which differs from other methods in the beauty of the effects which may be obtained without any previous preparation of the photograph to receive the colours.

The invention is applicable to photographic prints on paper as well as to transparencies and lantern slides on glass, and is also suitable for the retouching of negatives.

The improved method consists in colouring the photograph, if a paper print, by the application of colours, prepared as hereinafter described, to the back of the photograph, so that they penetrate the paper and appear underneath the photographic film as seen from the face of the picture.

This process, which I have termed "Chromophotophane," does not require any previous preparation of the usual paper print, either for rendering it transparent or translucid, or for removing the paper wholly or partly from the back of the film.

The colours are applicable to transparencies, lantern slides, and negatives, in fact, to any photographic film either on glass, or paper, or without, being applied to the back or front as may be most suitable. It does not interfere with the subsequent burnishing of paper prints.

The colours are prepared as follows:—Aniline colours are taken and dissolved either in water or in alcohol, such solutions being made as strong as possible whether by use of heat or in the cold. It has been found that some of the aniline colours so prepared will not soak properly into or through the paper as this process requires, and in such cases, which can be found by experiment, it is necessary and sufficient to add acetic acid to the alcohol.

The number of colours, natural or by mixture, which can thus be prepared is practically without limit, and will afford every necessary colour for this purpose.

The colours so made should be put up in bottles, which should be kept tightly corked.

The vehicle or medium for the employment of these colours is alcohol, or a mixture of alcohol and acetic acid. By use of this medium the artist may reduce any of the different colours to any state of tenuity that may be necessary to give the desired tint.

To colour a photograph, the latter is placed face downwards on a retouching desk or the like, so that it may be viewed by transmitted light, and the design on the face may be sufficiently visible from the back to guide the artist in colouring the photograph. The colours are laid on in the usual way with a brush or pencil, care being taken not to pass over the outlines. The colours immediately soak through the texture of the paper, and act more as dyes than surface colours. They quickly dry through evaporation of their solvent. The photograph may be lifted from time to time to ascertain the tint appearing beneath the film, so that the amount of colour used may be made proportionate to the tint desired, a second coating, or several if needed, being added until the desired depth of colour tint is obtained.

Photographs coloured in this manner exhibit a delicacy of tint combined with photographic clearness unattainable when colour is applied to the face of the photograph.

Negatives may be touched by colouring with the described colours according to their actinic absorbent capacities, and the use of such colours offers to the retoucher opportunity of delicacy of treatment unattainable by the ordinary process. They are applied to the face of such negative.

The claims are:—1. The method of colouring photographic prints on paper consisting in applying to the back of such prints colours dissolved in a medium adapted to soak through the paper, and appear beneath the photographic film on the face thereof. 2. The method of preparing colours for use in the colouring of photographic paper prints as described, or for the colouring of other photographic prints such as transparencies, optical slides, or for retouching negatives, consisting in dissolving aniline colours in water, or alcohol, or a a mixture of alcohol and acetic acid. 3. The method of colouring photographic prints on paper, transparencies, optical slides, or glass, or other carrying vehicle, consisting in applying to the back of paper supported films, or to the face of glass supported films, or to the back or face of unsupported films, aniline colours dissolved in water, or in alcohol, or in a mixture of alcohol and acetic acid, and diluted with a medium composed of alcohol, or of a mixture of alcohol and acetic acid. 4. The method of retouching negatives consisting in applying to their surface aniline colours in solution of suitable tenuity, and of more or less actinic absorbent nature substantially as described.

Improvements relating to Photographic Apparatus.

No. 10,796. Hermann Mackenstein, 6, Rue du Havre, Paris, France. *May* 13, 1893.

This invention relates to an improved mode of constructing photographic frames with rollers, in which the sensitive material (pellicle, paper, fabric, and the like) form a continuous strip of any length, previously wound upon a cylinder from which it is unwound to a suitable length for winding upon a second cylinder when it is necessary to bring in front of the aperture of the frame another part of the strip in order to make a new plate.

All the parts of my improved frame have been carefully thought out, and are combined in such a manner that, while reducing as much as practicable the size of the frame, I ensure the regular operation of the system, prevent the light from deteriorating in any case the roll of sensitive material, and render the use of the frame as convenient as possible.

The said frame is also provided with an automatic counter, which indicates to the operator the number of exposures he has already given, and consequently enables him to ascertain how many he can still give without having to renew the roll. It, moreover, at the same time marks this number on the plate by means of the luminous impression. A numbering device, which I will term a series-numbering device, is also arranged which provides the plate with a simple or multiple number or sign to indicate whether he has obtained the impression from the first roll put in the frame since the commencement of the operations or with the second, third, and so on; this series-numbering device is operated by hand for causing it to advance through one division each time when the roll is renewed. The details regarding the arrangement of this device as hereinafter given, will show that it enables the operator, for instance, when on an excursion to obtain a great many series numbers, which multiplied by the number of exposures in each series (that is to say for each roll employed) gives hundreds of distinctive numbers, which permits the excursionist to establish the relation between all the plates which he has been able to make and the indications in his memorandum book in which he has noted the subject of each of them. This series-numbering device can, however, be dispensed with by putting a sufficient number of discs in the device for counting the exposures for enabling it to number in succession all the plates which may be made in one excursion.

In carrying my invention into practice, the pellicle or other sensitive material, which is wound upon an upper delivery roller, passes from the latter over an upper guide roller, which also serves, as hereinafter explained, for marking the line of separation of the plates, and for actuating the device for counting the exposures; the material then passes over a lower guide roller to the receiving roller, upon which it is wound to the desired extent after each exposure, so as to replace by a fresh part of the strip or band the part which has just been used. If desired, the lower guide roller can be replaced by a fixed circular guide.

Behind the part stretched between the guide rollers is arranged a plate preferably made of aluminium and fixed upon the front of the roller-carrying frame. The said frame is situated entirely in a box or case, wherein it is held by a full sliding cover; the box is, moreover, provided with a blind, and with grooves for enabling it to be fixed to any photographic chamber.

The displacement of the sensitive strip or band after each exposure is obtained by turning the receiving rollers through the medium of a key which, as hereinafter set forth, is arranged that it can never be detached from the box or case, while it may be either attached to the axis of the cylinder for enabling it to be turned, or rendered independent of the same in order to permit the removal of the roller-carrying frame, for the purpose of again providing it with a strip or band.

The delivery roller is provided with a brake, which prevents it from turning easily, and which consists of a disc which is bent or twisted a little and pressed against the side of the frame by a disc screwed upon the axis; the action of this brake is regulated in such a manner as to give the strip or band the proper degree of tension. Besides having the effect of exposing a very plane surface to the action of the light, this tension also causes the upper guide roller to be moved by the strip or band without any sliding, so that the unwinding of a given length of the said strip necessary for a plate of a definite size always corresponds to an invariable number of revolutions of this roller, which number will, of course, be different according to larger or smaller diameter of the roller and the length of strip to be wound off.

Now, I utilise this rotary movement of the said upper guide roller firstly for causing it to mark upon the strip or band the line where it must be cut for separating the plate which has just been wound up from that which is about to be made; and, secondly, for actuating the device for counting the exposures.

For obtaining the first of these two results, I fix upon the axis of the upper guide roller a pinion which turns a toothed wheel keyed upon a transverse shaft, and I provide this shaft with two cams which, when it has made one revolution, will push back a bar arranged in this cylinder and provided with points after the manner of a comb, which then project to the outside and perforate the strid or band the extremities of the said bar pass beyond those of the cylinder for permitting this action of the cams. Spiral or other springs cause the said bar to move back with its points into the cylinder as soon as the cams escape from its extremities.

On the other hand, in order to utilise the upper guide roller for actuating the device for counting the exposures, I place at the end of the shaft outside the frame a small crank, which in every revolution turns through a distance of one tooth, a front star wheel bearing numbers corresponding to that of its teeth so that, each time when a fresh length of the strip or band is wound off, a fresh number appears at an aperture provided in the box. The star wheel engages with a similar lateral wheel which is at right angles to it, and upon the axis of which is fixed a disc bearing the same numbers as at the front star wheel; this disc is in front of the sensitive strip or band and behind the frame, which is pierced with an aperture small enough so as not to uncover more than one number at a time. It will now be understood that the numbers on the disc being cut out to form an opening upon an opaque bottom, or being opaque upon a transparent bottom, at the moment when it is exposed to the light, the latter will produce upon the sensitive strip or band the image of the number behind the aperture which is the same as that which is visible through the aperture.

As a roll of sensitive material generally provides for more exposure than the

numbers which the star wheel and the corresponding disc bears, I provide a second disc fixed upon the axis of a lateral star wheel which turns one tooth in every revolution of the lateral wheel above it, and which then also turns through a distance of one tooth, a perpendicular front wheel with which it gears; this periodical movement is obtained by placing the lateral wheels sufficiently far away from each other, so as not to touch, except at the time of the passage of one of the teeth of the latter which is longer than all the others. A second aperture is pierced in the frame for uncovering one of the numbers of the second disc, in like manner a second aperture is formed on the side of the box by the side of the first for showing a number of the lower front star wheel. With this arrangement, and by giving to each disc twelve numbers, the upper disc will print upon the first twelve plates one of the numbers from 1 to 12 respectively, while the lower disc will print upon all the number 1, the following twelve plates will be marked 1 to 12, and 2 the third dozen will be marked 1 to 12, and 3, and so on; thus all together I obtain for 144 plates (12×12) a distinctive mark consisting of a double number.

In case of necessity, it is clear that I could add one or more discs with corresponding wheels, in which case I may also add apertures in the frame and in the box.

The numbers could evidently be replaced by letters or other signs on all the discs, or on one or more of them.

In order that the operator may ascertain very easily, and with exactitude, when he has wound from the delivery roller and wound upon the receiving roller the length of sensitive material corresponding to an exposure, I have placed upon the side of the box of the frame an index, which makes one revolution while this length is developed, so that it is necessary to discontinue turning the key when this index has returned to the point whence it left. The movement of the index is obtained by means of a toothed wheel keyed upon its axis, and which is actuated by a pinion mounted upon the extremity of the axis of the upper guide roller.

It is sometimes an advantage to be able to impart to the index a rotary movement independent of the toothed wheel in order to bring this index exactly opposite the point marked upon the box, if it should not be in that position after the roller-carrying frame has been removed and put back into its place. This may be obtained by various means: the simplest, which I preferably employ, consists in mounting the toothed wheel upon a shaft in such a manner that it can slide along the latter in order to be engaged with the pinion or to be disengaged therefrom, and to subject it to the action of a spiral or other spring, taking its point of support upon the interior face of the box, and which engages it as soon as a pressure tending to draw it to the outside is released. A knob is fixed at the end of the socket, to which the toothed wheel is fixed, this knob enabling the wheel to be easily drawn to the outside for disengaging the same.

I may, if desired, dispense with the index, and also with the mechanism belonging thereto, and in lieu of this employ a ratchet device which at the proper moment will automatically prevent the continuation of the movement for winding up the sensitive material, this ratchet device being actuated by the winding-up mechanism itself. After the system has thus been fixed, it will be sufficient for releasing it to move the ratchet device by hand back to its original position.

The series or mark number which the light produces upon each plate at the same time as the number of the exposure is obtained in a similar manner to the latter by combining, every time when this may appear useful, two alphabets or two series of figures or signs, so that each letter of one of the alphabets may serve for marking a great number of plates, by employing it alone first, and then with each of the lettera of the other alphabet successively. Thus, for example, the frame may be provided at the upper or lower part with a rule bearing the letters from A to Q. all the plates of the first series—that is to say, obtained with a first roll of material—may be marked simply with A at the top. Those of the second series may be marked with A at the top, and with A below those of the third, fourth, fifth, and sixth, and further series may always bear A at the upper part; but B, C, D, E, and so on respectively, at the lower part. There are, therefore, eighteen series of plates marked with A at the top. I replace the A by B at the upper part for the following eighteen series with the different letters from A to Q successively at the lower part, then I replace the B by C, and so on, so that altogether, as there are upon each of the rules seventeen letters, I have a means of marking different signs eighteen times seventeen series—that is, 306 series—each comprising as many plates as are contained in one roll, which evidently exceeds the requirements even in the case of explorations or in any other particular cases. It is understood that I may diminish the number of the letters, figures, or signs employed, and I may also if desired augment it in like manner.

In order that the plates obtained with one frame shall not be confounded with those made in another, which would render the above-stated precautions useless, the number of the frame is likewise marked upon the plate at the moment of the impression. Thus, the plate indicates a number cut out in the lower left-hand corner of the frame. The place might manifestly vary, and also the mode of producing the number, or the letter, or other sign which is to designate the frame.

In a general manner—that is to say, in such a manner as may be conveniently used for the number of the frame as well as for the exposure numbers and the series numbers—I may mark these numbers upon the plate either in white or in black. Accordingly, they may be formed by cutting them out from an opaque piece (thin metal, natural or artificial parchment, or the like), or, without being cut out, they may be left transparent upon a piece of glass, mica, enamel or imitation enamel celluloid, or the like, the remainder of whose surface may be opaque; or, on the contrary, they may be opaque upon a transparent bottom, or cut out full with a space around.

When the letters or signs intended to indicate the series are carried by rules, each rule may be actuated by means of a rod passing out of the side of the box, and graduated so that the operator may see upon this rod what letters are exposed at the apertures in the frame.

This arrangement may be replaced by a modified arrangement, which consists in fixing upon the edge of the box a small plate, in which is arranged a disc bearing the desired letters or numbers, and which is turned through a division in each change of series so as to move to the upper part the characters which are suitable. These characters, being then exposed at an aperture pierced in the frame, projects its image upon the plate at the moment when the light acts. The disc may be pivoted to a screw, which serves as an axis for the same, or may simply be held in its place by being fitted in the plate, the said disc being milled at its circumference for enabling it to be easily turned.

In order to be able to number a greater number of series of plates, I may use several discs of this kind in the same manner as I have just indicated the employment of several numbering rules.

I may, if desired, dispense with what I have termed the series-numbering device—that is to say, rules or the discs—and retain only the exposure-numbering device by augmenting the number of the discs, the numbered wheels and the apertures, and also the actuating wheels, as much as may be necessary.

On the other hand, instead of using wheels with twelve teeth and putting twelve numbers upon the discs and upon the wheels behind the apertures in the box, I may provide these discs and wheels with the figures from 0 to 9, and employ wheels having only ten teeth, so that the first disc marks the units, the second the tens, the third the hundreds, the fourth the thousands, and so on, and in the same manner for the wheels placed behind the apertures. Each plate will then be designated only by a single number indicating its order in the plates made since the commencement of the excursion and by the invariable number of the frame.

I will now proceed to describe the special construction of the delivery and receiving cylinders, upon which is wound the pellicle or other sensitive material. Each cylinder is made of two parts, connected by a longitudinal hinge. After opening the cylinder I introduce into it the extremity of the strip, then I close it again, pinching the latter between the two parts, one of which is provided with a row of points for preventing the strip from escaping. Each cylinder has at one of its extremities a central hole, into which is inserted a journal forming the prolongation of the delivery roller axis and its nut which carries the brake disc, or a journal prolonging the receiving roller axis which receives the key. Each of these axes terminates in a small disc provided with the central journal and with two pins, and these three projections enter holes formed in a disc and in the cylinder, which is thus obliged to turn with the axis. The disc which is applied against the extremity of the cylinder prevents the light from passing through the spires of the roll of sensitive material, and from deteriorating it when it is necessary to recharge the frame outside the laboratory.

At the other extremity of each of the rollers is also a protecting jaw or disc, which is simply pierced with a hole at the centre, into which hole is inserted a journal fixed to the extremity of a spring strip, the other extremity of which is secured to the side of the frame. A similar spring-strip may, if desired, carry the above-mentioned journal. It would then be fixed upon the frame by its centre.

It will be understood that, for enabling the rollers to be removed, it is sufficient to pull the strip so as to disengage the journals from the holes of these rollers, and that, on the other hand, when the cylinders have been put back into their place, it is only necessary to let these strips pass back into their original position for holding them therein.

The axis of the receiving roller carries a ratchet, with which is engaged a spring pawl carried by one side of the frame, and which prevents the rear movement.

The frame, which composed of two cheeks of metal, connected at the front part by the plate of aluminium or other material, which serves as a support for the stretched sensitive material. This frame carries the rollers and the whole mechanism, except the parts carried by one of the sides of the box, and except the series-numbering devices, which are carried by the lateral frame fixed to the box.

It now only remains to describe the arrangement which I use for enabling the key to always remain attached to the box of the frame, while enabling it to be detached at will from the axis for permitting the removal of the roller-carrying frame, or enabling it to be fixed for permitting the turning of the receiving rollers in order to give a movement of translation to the strip or band of material.

This arrangement consists in providing the rod of the key with a shoulder where it passes through the centre of a small cylinder, against which shoulder acts a spring, which tends to push it back to the outside, but prevents its complete removal by means of a screw or other stop. On the other hand, the extremity of the rod of this key is screw-threaded, and it is sufficient to turn it by pressing above, so as to overcome the resistance of the spring for enabling it to be screwed upon the axis and unite it therewith without danger that it will turn the axis the wrong way, because, if turned to the left, it would be unscrewed.

It will be readily understood that the system herein described may be applied to frames of any dimensions and any proportions, and that the rollers and axes, which are in this case parallel with the narrow sides, might, on the contrary, be parallel with the large sides. In either case they may be mounted upon the box itself, and also the whole mechanism and the frames might be dispensed with, which would not make any material difference in the system.

On the other hand, the position of the delivery roller and of the receiving roller might be reversed; that is to say, I might place that which is below at the top, and *vice versâ*. This would simply necessitate the placing of the key and of the exposure-numbering devices on the left of the box in lieu of placing them on the right-hand side.

INSTEAD of the words attributed to him at the meeting of the London and Provincial Photographic Association, on June 8, Mr. R. Child Bayley said "that it was quite possible, by suitable development, to produce a negative which, showing the full number of gradations the plate could register, was printable throughout. A negative which possessed a scale of densities greater than could be printed was simply improperly developed."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 26	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 26	North Middlesex	Jubilee House, Hornsey-road, N.
,, 26	Richmond	Greyhound Hotel, Richmond.
,, 27	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 27	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 27	Hackney	206, Mare-street, Hackney.
,, 27	Halifax Camera Club	
,, 27	Lancaster	Springfield Barracks, Lancaster.
,, 27	Leith	165, Constitution-street, Leith.
,, 27	Paisley	9, Gauze-street, Paisley.
,, 27	Warrington	Museum, Bold-street, Warrington.
,, 28	Bath	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 28	Burnley	Bank Chambers, Hargreaves-street.
,, 28	Leytonstone	The Assembly Rooms, High-road.
,, 28	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 28	Southport	The Studio, 15, Cambridge-arcade.
,, 29	Glossop Dale	
,, 29	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 29	Hull	71, Prospect-street, Hull.
,, 29	Liverpool Amateur	Percy-buildings, Eberle-street.
,, 29	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 29	Oldham	The Lyceum, Union-street, Oldham.
,, 30	Cardiff	
,, 30	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 30	Holborn	
,, 30	Maidstone	"The Palace," Maidstone.
,, 30	Swansea	Tenby Hotel, Swansea.
July 1	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 15,—Mr. A. Haddon in the chair.

Receipt of a copy of the *Amateur Photographer's Annual* for 1893 was acknowledged.

Prospectuses of the new Central Photographic Club Company were distributed.

Mr. J. Howson passed round the original prints from which the reproductions in the June number of *Photographic Scraps* illustrating Mr. W. K. Burton's remarks on density ratios were made made.

COMPENSATION IN DEVELOPMENT FOR VARIATIONS IN EXPOSURE.

Apropos of Mr. Burton's recently published experiments, Mr. Alexander Cowan read a paper on the above subject [see page 389].

Mr. W. E. DEBENHAM said that Mr. Cowan had not quoted the part of Messrs. Hurter & Driffield's theory which Mr. Burton had called in question. One might have subjects which were not within the range of correct exposure. The question was this: Seeing that we could not ensure a subject which shall only have its intensities within the limit of correct gradation, when the exposures are beyond the limit, can we by development differentiate so as to show considerable difference between the brightness of one high light and another high light? If we can differentiate those lights which are out of what is known as the limit of correct exposure, and make them show gradation something resembling the original, that is a valuable achievement. Mr. Burton showed an instance of it in direct contradiction of Messrs. Hurter & Driffield.

Mr. P. EVERITT disputed the claim that the prints shown were identical.

Mr. HOWSON said Mr. Burton's point was, Can we alter the ratios of the densities by a difference of development? He (Mr. Howson) contended that the prints shown proved that it could be done. Dr. Hurter, some time time ago, stated at the Photographic Society of Great Britain that the ratios could not be altered, but it was the general opinion of photographers that they could. The difference of opinion lay in the meaning of the terms, density and opacity.

Mr. COWAN asserted that the ratio of gradation was not altered by any known developer. Mr. Burton had said that two identical negatives could be obtained with varying exposures.

Mr. EVERITT thought that possibly the assertion of Mr. Burton had a double meaning. Did Mr. Burton mean that it was impossible to say which was the over-exposed one in the sense that both prints were identically alike, or was it that you could not distinguish between the two which was which?

Mr. T. BOLAS was of opinion that most photographers would conclude that of the prints shown the short exposure was the longer.

Mr. DEBENHAM asked Mr. Cowan if there was any reason to suppose that, carrying development a little less far, he could have got a result that appeared less exposed?

Mr. COWAN replied that in his experiments he had developed two intermediate slips, and they bore out the contention that the curve was shortened.

Mr. EVERITT challenged Mr. Debenham to take the other side and say there was *no* reason to suppose that by carrying development a little less far a less-exposed result could be obtained.

Mr. S. HERBERT FRY had made tests which bore out the contention that there was a shortening of the scale. He had made twenty-five experiments, and had matched the prints, having used Thomas's Extra Rapid and Ilford Red Label. The universal average, as judged from the prints, was, the longer the exposure the shorter the distance where the prints went black, and where there was no detail at all, thus confirming the contention that over-exposure shortened the scale and compressed it.

Mr. J. S. TEAPE showed results from the strips forwarded to him for testing by Mr. Cowan. He had erred slightly on the side of full exposure. Nos. 1 and 2 had normal exposure, one being developed for two, and the other for two and a half minutes. No. 3 had been developed by Burton's formula, substituting four grains of anhydrous sodium carbonate to the ounce, one grain pyro, four sulphite, and less than half a grain of bromide. No. 4 had been put for ten minutes in a twenty-grain solution of bromide, and then in a developer of 8 grains pyro, 20 bromide, 3 soda, and 96 sulphite. The image appeared in three minutes and was complete in twelve. It appeared to him that it was only in the densest portion there was a little difference from the normally developed strips. The normal exposures were from ½ second to 32 seconds; the abnormal 16–1024 seconds. No. 5 had to the eye very little difference. It was put for thirty minutes in a twenty-grain solution of bromide, and developed the same as No. 4; the image appeared in six minutes and was veiled; it was then put in the bromide solution for another five minutes, and then in the developer for seven minutes. He had also some negatives which he thought beat Mr. Burton's results. They had had 1 and 40 seconds' exposure on a similar subject to Mr. Burton's, and with his developer. He (Mr. Teape) would be inclined to take the one which received the longest exposure as the one which had had the shorter.

Mr. COWAN remarked that he did not see how the range of gradations in a negative could be tested without measurement. Quoting a recent article of Mr. Burton's on tentative development, in which the writer stated having given forty times the normal exposure, and the moment the image appeared he instantly put on a very powerful developer, which immediately intensified the image, Mr. Cowan said he thought this of more use than Mr. Burton's other article.

Mr. DEBENHAM said, years ago Mr. W. B. Bolton had recommended one to start with over-exposure and a normal developer, and, as soon as the image appeared, to remove the developer and apply bromide, keep that on for a short time, and then place the plate in pyro and add ammonia, when density would be obtained without proportionately bringing up the weaker parts of the negative, which should be restrained. He often used the plan with success.

Mr. Teape and Mr. Cowan had also found it practicable.

Mr. EVERITT said Mr. Cowan had sent him two normally and four over-exposed strips. Using anhydrous soda, after the lapse of a quarter of an hour no image appeared—possibly the soda was not anhydrous, or the bromide excessive. Washing off the developer, and using ordinary soda crystals as 4 : 1 of anhydrous, and reducing the bromide to Mr. Burton's proportion, the plate developed in five minutes, the image being thin throughout. No. 5 was developed in 1 grain pyro, ¼ bromide, 4 sulphite, and 4 soda to the ounce; it had more pluck throughout, taking five minutes to develop. No. 2 was developed with 8 grains pyro, 8 bromide, 32 sulphite, 16 soda carbonate; the image appeared very rapidly, and was complete in twenty minutes. No. 3 had 8 pyro, 10 bromide, 32 sulphite, 12 soda crystals; no image appeared for five minutes. Ten grains of soda were added in successive doses, and in seventeen minutes the image appeared, and was complete in twenty-two minutes. No. 6 was tried with ammonia, and was developed in about five minutes. What struck him as peculiar was that there was no marked difference between the normally and over-exposed plates.

Mr. COWAN said that Dr. Hurter had stated that a range of 3 : 60 could not be detected pictorially, but was apparent on measurement. He did not think the eye could detect these differences.

Mr. FRY said that was an argument in favour of Mr. Burton.

After other discussion the meeting closed.

Holborn Camera Club.—June 16, Mr. J. F. Stevens in the chair.—Mr. S. Herbert Fry gave a practical demonstration on the Sandell plate. Mr. FRY said he had made it a practice never to develop a plate at a club meeting, but as most of the advantages of the Sandell plate had been published, and the members of the Holborn Camera Club were nothing if not practical, he had decided to break that rule and develop a few plates. He passed round a number of prints from Sandell plates, and made a few remarks on the advantages and peculiarities of that plate. Two plates were afterwards developed, Mr. Fry demonstrating in a most practical way the method of developing these plates. On Saturday last, on the invitation of the President of the Holborn Cycling Club, the members of the Camera Club visited Mill Hill, and sat down to tea with the members of the Cycling Club.

North Middlesex Photographic Society.—June 12.—A question was asked as to the best way of copying a Daguerreotype, it being very difficult to avoid reflections. One member recommended that it should be done by artificial light by using two lamps, standing them at the sides some distance away, so that the light falls from each side of the picture. Copying could often be done this way which would be quite impossible by daylight. Mr. STEWART suggested that the method adopted in photographing silver plate might be successful, viz., to form an artificial dew on the surface, which would prevent the reflections from the bright surface of the plate. The paper of the evening was one by Mr. C. O. Gregory on *Dodges*. He covered a very wide field, giving hints on every conceivable topic, such as exposure—for which he constructed out of a small weight and piece of string a second metre—developing, dodging by means of a brush, intensification dodges by matt varnish, tissue paper, colours, pencils, &c., reduction by rubbing with spirit, printing, vignetting, printing in skies, &c. The paper was full of matter, and the simplicity of his methods caused a good deal of amusement. Six new members were nominated.

Harringay Photographic Society.—On Thursday evening last the above Society held its first half-yearly *conversazione* at the Public Hall, Finsbury Park, which was in every way a great success. It consisted of a programme of vocal and instrumental music, also an oxyhydrogen lantern entertainment. The President (Mr. Dudley Towers), in his opening remarks, said that, owing to the great increase of its members, they had moved to larger premises and a more central position at 8, Station-road, Finsbury Park, where they had much better accommodation for meetings, which in future will be on the second and fourth Thursdays in each month. The musical portion of the programme was much appreciated. During the evening a set of beautifully coloured views of London and Paris were exhibited on the screen by Mr. Towers and Mr. Ball.

Hackney Photographic Society.—June 13, the President in the chair.—Mr. Hudson showed negatives developed with his modification of pyro-soda. Mr. Beckett showed three negatives, each having had a different exposure varying from three to nine seconds, the density in each being equal. Mr. S. J. Beckett showed and explained the Ilford Exposure Meter. The HON. SECRE-

TARY said when he was away from home he had used the paper around the box of plates as a sort of store case, by cutting a lid at the end of paper, and sliding the box in and out. Mr. Barnes asked what was the best developer for Eastman's films. Mr. Sodeau preferred amidol. Mr. Salmon showed a home-made camera which could be used in the hand. The Hon. Secretary showed the "Uno" hand camera, a cheap article capable of holding twelve plates; he hoped to try the same and report on at next meeting. Mr. Houghton then read a paper on *Advice to Beginners*, and advised half-plate camera, with plenty of extension, swing back and front, with rigid tripod with large head. For lens one of eight-inch focus and wide-angle lens. He recommended that really good lenses should be bought, and advised the use of slow plates rather than films. Composition was an important matter, and should be well studied before exposing Mr. Selfe asked when a plate is fixed, and he was advised to leave it for about ten minutes after opalescence has disappeared. Mr. Green asked if frilling occurred if developer was too strong. Mr. Dean recommended the use of alum bath. Mr. Roder thought pyro-developed negatives required clearing bath. Mr. Avent thought beginners should have exposure tables simplified as much as possible. The Hon. Secretary recommended a square camera with the focussing done from the back, as otherwise, when using a short focus lens, the baseboard would cut off part of view. Mr. Gosling thought beginners should not commence with a hand camera. Mr. R. Beckett recommended trimming prints before toning. The Hon. Secretary used thin mackintosh which took up less room and was more opaque than the usual material, and could, in cases of rain, be put on the end of the tripod and used as an umbrella.

East London Photographic Society.—June 13, Mr. Pasco in the chair.—Mr. Charles Tylee gave a demonstration upon the *Carbon Process*, which appeared to be thoroughly appreciated by the members present. Mr. C. M. Minns promised to read a paper at the next meeting upon *Subjects: Where and How to find them.*

Putney Photographic Society.—June 10, an Outing to Burnham Beeches was well attended.—A meal was served on the lawn at Macro's Cottage. The omnibus from Slough stops here, and it is wise to order food before commencing the day's work. The next outing will take place on Saturday, June 24, to Leatherhead, Dorking, and Shere, returning from Guildford on Sunday evening Leader, Mr. A. E. Smith.

Brixton and Clapham Camera Club.—Ordinary meeting, held on Tuesday, June 6, Mr. W. H. Harrison in the chair.—Mr. S. H. FRY gave a demonstration on the *Sandell Plate*. In describing the properties of the plates he stated that they were made in two brands, the "General," with two films, and the "Especial," with three. Each film was of a different rapidity, and possessed different physical and chemical characteristics which were not due to the thickness of the film or the extra amount of silver. The multiple film combined the opposite characteristics of the lantern plate and the snap-shot plate, which have different qualities. There are, said Mr. Fry, two exposures for these plates; one the normal exposure, and the other the abnormal exposure. By normal exposure is meant the correct exposure for the upper or instantaneous film. Anything beyond this is an abnormal exposure. For a normal exposure the plate should be developed in the ordinary way, *i.e.*, like an ordinary single-film plate. With an abnormal exposure, development should be conducted in a tentative manner, with a weak (*i.e.*, diluted) developer, which should be well restrained. The developer should be that with which the worker is best acquainted, no special developer being necessary. Pyro and ammonia, pyro and soda, hydroquinone, eikonogen, &c., give equally good results. The image on the lower film should be first developed, and, when sufficient density has been obtained, strengthen the developer for detail in the top film.

South London Photographic Society.—June 5.—Some work from samples of Lomberg plates were shown. The negatives given by these plates are of a very soft character, and are therefore particularly well suited for portrait work. In consequence of Mr. A. R. Dresser being taken suddenly ill, his paper on *Enlarging Hand-camera Negatives* was postponed. Some information on the use of metol as a developer was given. It was found to have excellent keeping qualities. A developing solution, left in a graduate for a week, was capable of producing an image with ease. It did not stain, and would develop several plates in succession. Less exposure was required than with pyro, over-exposure was readily dealt with, density was more readily obtained with it than amidol, and it does not stain the fingers. Very fine transparencies were obtained by its use. Specimens of the "Uno" and "Queen" hand cameras were shown and placed in the hands of members by the manufacturers for trial and report to the next meeting.

Tooting Camera Club.—June 8, Mr. Dollery in the chair.—Mr. L. E. Morgan and Mr. V. Robinson were elected members. A whole-day excursion to Byfleet *viâ* Woking and Basingstoke Canal was agreed upon, but the date was left open. Mr. Dollery gave a practical demonstration of the use of cresco-fylma, a preparation for stripping and expanding the gelatine film of a negative, transparency, or lantern slide. Two quarter-plate negatives were successfully operated on. Mr. Dollery works according to the instructions given on the bottle, with the exception that he advises the use of tepid in preference to cold water in the second bath, as the film expands quicker. A transparency on an Alpha plate was then immersed in the solution, but it immediately faded away. At the desire of those present, the process was carried out to ascertain the greatest amount of enlargement that could be obtained. Mr. Child, on examining the film, which was of a dirty yellow colour, drew attention to the fact that the image was still intact and perfect, presenting an appearance similar to that obtained by the bichloride of mercury bath. He recommended that a hydroquinone developer should be tried, with a view of reducing the compound that evidently had been formed. Mr. BERGER agreed with this view, and said that no details were wanting in the picture. The suggestion was acted upon, and with complete success, the image re-developing up slowly, but yielding a vigorous picture. The only difference was that before treatment the tone was of a greenish black, but afterwards a warm sepia. This change was no doubt due to a constituent of the cresco-fylma, as the film was unwashed. A vote of thanks was given to Mr. Dollery for his lecture.

Croydon Camera Club.—A thoroughly enjoyable whole-day ramble to Weybridge, conducted by the well-known landscape artist, Mr. H. Maurice Page, was held upon Wednesday, June 14. A *genre* study representing "Faggot Binding" having been attempted, several "wood and water" compositions kept members fully occupied until two o'clock, when, upon the invitation of Mr. Page, they dined together at the "Green Dragon," Byfleet. A busy afternoon was spent on the banks of the Wey, and, tea having been enjoyed on the breezy heights of St. George's Hill, photographic operations were concluded by taking a series of views of Dead Man's Lake. Saturday, 24, Excursion to Edenbridge, conducted by the President. Train from East Croydon, three minutes past two.

Birmingham Photographic Society.—May 30, Mr. Monsley in the chair.—Mr. Hendren read a paper on *Christian Architecture in England*, which was illustrated by sketches and diagrams on the blackboard. Mr. Hendren traced the evolution of architecture from the early Grecian times, through successive stages to the Norman, where he paused, intending to resume at an early date. A number of very fine photographs by the lecturer, which were shown in illustration of his remarks, were much appreciated.

JUNE 13, Mr. W. Jones in the chair.—Mr. W. J. Belton, representing the Paget Prize Plate Company, gave a demonstration of the firm's printing-out opals and lantern plates.

Leicester and Leicestershire Photographic Society.—The first outdoor excursion of this Society took place on the 9th inst., when about a dozen members and lady friends journeyed to Dovedale, and were favoured with beautiful weather, both as regards the quantity of light and absence of wind. The party met at the Midland Station and booked for Derby, and were joined at Loughboro, by some members of that Society, where, arriving about 9.30 a.m., they were met by Mr. Thos. Scotton and Dr. Highton, who joined the party. A break had already been chartered by the kindness of Mr. Scotton, and the party drove through most charming scenery, a distance of eighteen miles, to Dovedale, where the party soon entered the glorious dale, and operations soon commenced, the President, clambering down the precipitous side of the cliff, coming in for the first "snap." The difficulty was not so much what to take as how to avoid it, so many magnificent pictures presented themselves; and, drafting off in two's and three's, the excursionists wandered about in a paradise of pictures. Leaving the Dale at 4.30, the party re-embarked and drove back to Ashbourne, where a welcome cold collation was done ample justice to, under the presidency and vice-presidency of the President (Mr. Porritt) and Dr. Highton respectively. Altogether, about seventy-two plates were exposed, and it is confidently expected that they will yield some of the outdoor prize pictures for which the President has offered silver and bronze medals.

Rotherham Photographic Society.—June 6, Dr. Baldwin (President) in the chair.—It was announced that the Rotherham Corporation had offered the use of a room in the Clifton Park Museum for a representative display of the Society's work. Mr. Jerome Harrison's Warwickshire Survey paper was discussed, and afterwards a resolution was passed recommending the committee to consider the best means of conducting a photographic survey of the Rotherham district. Negatives and prints resulting from the Ingleton excursion were exhibited and criticised. Three new members were elected.

Sheffield Photographic Society.—June 6, Mr. B. J. Taylor in the chair.—A letter from the Secretary of the Photographic Convention of the United Kingdom asked whether they intended to send delegates to Plymouth. It was decided not to do so. Mr. Sparham Camp gave a demonstration on *Printing on Rough-surface Papers*, showing the process of sizing, sensitising, and fixing ordinary drawing-paper to produce a nice soft picture.

Edinburgh Photographic Society.—June 7, the Vice-President (Mr. L. C. Oliphant) in the chair.—The Secretary, Mr. T. Barclay, submitted his report of the business and work transacted during the preceding year, which was, on the whole, a satisfactory one, showing the continuing advancement and prosperity of the Society. It emphasised the advantages of the new premises, stated the additions to the library, together with the Council's desire that the benefits of it, and of the reading room, should be more fully made use of by the members, giving the number of the latter at nearly 400. Mr. James McGlashan, Treasurer, submitted the financial report, which showed that the ordinary income for the past year had amounted to 236*l.* 1*s.* 3*d.*, and, after meeting all items of current expenditure, there remained a balance of 98*l.* 2*s.* 6*d.* to be added to the Society's credit. The Chairman congratulated the members upon their sound financial condition, and moved the adoption of both reports, which was agreed to *nem. con.* Before proceeding to the election of office-bearers, the Chairman stated that, in consequence of the state of his health, their President, Mr. John Moffat, sen., desired to thank the Society for his appointment, and asked to be allowed to dimit his office, and, in the circumstances, the appointment of his successor was delayed. The names of several gentlemen were suggested whom the Council might interview before the resumption of business next session, and this was agreed to, thus leaving the office of President meantime in abeyance. The members of Council retiring by rotation were Messrs. H. Auld, J. C. H. Balmain, A. A. Inglis, and J. R. Roddick. Mr. W. T. Bashford having been appointed Vice-President in room of Mr. Alexander Ayton, the following gentlemen were appointed office-bearers and Council. *Vice-Presidents:* Messrs. J. C. Oliphant and W. T. Bashford.—*Council:* Messrs. H. W. Bibbs, Hippolyte J. Blanc, A. R. S. A., R. W. Hawks, J. Patrick, S. Keith, A. W. McGregor, T. Wardale, Alexander Ayton, jun., J. Anderson, A. H. Baird, G. Cleveland, and R. S. Webster.—*Librarian:* Mr. Charles Fraser.—*Treasurer:* Mr. James McGlashan.—*Secretary:* Mr. Thomas Barclay, 180, Old Dalkeith-road, Edinburgh.

Cape Town Photographic Club.—The monthly meeting of the Cape Town Photographic Club was held in the dining hall of the Y.M.C.A. on April 12. The subject for the evening was *Stereoscopic Photography*, which was very ably handled by Mr. A. J. Fuller, who also had a large number of stereoscopic

slides of Cape scenery on exhibition. At the conclusion, he exhibited the various advantages of Chadwick's stereoscopic camera, which had been used in taking the views. A public limelight exhibition was announced to take the place of the usual meeting on May 10. Lantern slides by several members were exhibited on a new Aptus opaque screen, amongst them being some by Mr. Fuller on the new Pagit print-out plates, and some very fine views of Ceres and the Pearl by Mr. Steer. The South African slides, which were exhibited here some time ago, previous to their despatch for the English Societies, have commenced their home tour, and glowing notices of their reception were quoted.

FORTHCOMING EXHIBITIONS.

1893.

July 3–8 ..... Photographic Convention of the United Kingdom, Plymouth. Hon. Secretary, F. P. Cembrano, jun. 10, Cambridge-gardens, Richmond, Surrey, S.W.

August ..... Welsh National Eisteddfod. The General Secretary Pontypridd.

Sept. 25–Nov. 15 ... Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.

October 1–31 ..... Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.

,, 9–Nov. ... Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.

December ..... Madras. The Hon. Secretary Amateur Photographic Society, Madras.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE DOUBLE ANASTIGMAT.

To the EDITOR.

SIR,—I notice in THE BRITISH JOURNAL OF PHOTOGRAPHY of June 16, 1893, pages 372 and 382, a report on Goerz's so-called "Double Anastigmat." Referring to those paragraphs, I hasten to state that the objective there alluded to is strictly coincident with the triple lens construction patented by Dr. P. Rudolph, of Jena (Patent No. 4692, April 22, 1893, *vide* BRITISH JOURNAL OF PHOTOGRAPHY, May 26, 1893). Mr. Goerz having communicated with several Berlin photographic societies on this subject, Messrs. Carl Zeiss, of Jena, informed the respective societies that already in March, 1892, they had made experimental lenses after the type of the double anastigmatic lens; that, however, owing to the clumsiness of the six-lens type they had preferred introducing the more important dissymmetrical types (Series I., II., and III.a). Should Messrs. Zeiss in the course of time issue this new type, they would do so for the special reason that the individual parts of their six-lens symmetrical doublet form exceedingly rapid landscape lenses.

To this general communication I appended a critique of the five photographic prints distributed by Herr Goerz which I believe to be sufficiently interesting for *verbatim* reprint.

Herr C. P. Goerz caused, on the occasion of a paper read by Herr von Hoegh on the properties of the double anastigmat *f*-7·7, comparison prints to be distributed in several Berlin photographic societies, which were intended to demonstrate the superiority of the Goerz double anastigmat and the lynkeioscope over the lenses of other makers. These prints, which have been circulated in large numbers beyond these societies, have not attached to them the name of an author who undertakes the responsibility of correctness and impartiality, and as they appear to be calculated to lead to misconceptions I believe that a few words of criticism may not be out of place.

The prints represent a test screen arranged after the manner of Zeiss's screen and serving in particular for testing the objectives with respect to astigmatism and curvature of Image.

In the article contained in the *Photographische Mittheilungen* of June, 1 1893, p. 76, a statement is made to the effect that the negative had been taken with the five best (German) objectives of the present day, and the pictures are arranged in such a manner as to produce at first sight the impression of the new double anastigmat being incomparably the most perfect objective in existence, as regards anastigmatism, and the lynkeioscope of Goerz is represented to be better than the "aplanats" of other makers, and also better that the "antiplanats." This impression will necessarily be permanent with those who have only an imperfect knowledge of the capabilities of the objectives produced by various makers, and who are satisfied with a superficial examination of the prints thus shown to them, without entering into critical examination.

I contend, in the first place, that some of the best lenses of the present time have been excluded from the comparative tests. Among these is the Zeiss anastigmat *f*-6·3 which, according to often-repeated statements contained in the publications of the Zeiss Optical Works, is emphatically the best representative of the rapid anastigmatic types as regards optical powers. The omission of this anastigmat from the tests loses nothing in its partiality by the fact that an *antiplanat* and *euryscope*, possessing similar relative aperture to that of *anastigmat* *f*-6·3 have been allowed to enter into competition. For the latter is substituted the Zeiss anastigmat *f*-7·2, the specific construction of which was governed by the postulate that lighter, cheaper, and purer glass were to be employed in its construction than is possible with the *Zeiss anastigmat* *f*-6·3, or the *Goerz double anastigmat*. Had this Zeiss anastigmat *f*-6·3 been made to form an element in the comparative tests, impartial examination would surely not have been capable of discovering marks of inferiority in this objective as compared with the double anastigmat. On the other hand, it can readily be proved that when working with wide angles the anastigmat *f*-6·3, which is half as rapid again, possesses better anastigmatism than the Goerz double anastigmat. This is, for instance, shown by negatives which were taken in the studio of the Zeiss Optical Works to obtain comparisons with a *double anastigmat* *f*-7·7 of 150 min. focus sent by Herr Goerz. When taking the negatives, the lenses were both stopped down to *f*-15, so as to obtain sufficiently uniform illumination with wide angles. The result showed that, with angles exceeding 71°, the double anastigmat rapidly diminished in definition, and exhibited considerable anastigmatic aberrations, whereas the Zeiss anastigmat within the angle of 82° employed in the experiments, exhibits a hardly perceptible amount of astigmatism, and still reproduces legibly the printing on the test screen.

Further, it is important to note that, excepting the *anastigmat* *f*-7·2, the objectives made by other firms, *i.e.*, the *antiplanat* and *euryscope* are more than half as rapid again as the Goerz objectives. Any one acquainted with the subject knows, however, that the difficulty of effecting anastigmatism increases with the rapidity of the lens.

It will thus be seen that, in the mere selection of the objectives for the purpose of making comparisons, the various types of the other firms have been placed at a disadvantage. Steinheil and Voigtlander are represented by more rapid objectives, and, in the case of Zeiss, the best of his rapid anastigmats has been ignored.

The conclusions to which a glance at these comparisons is apt to lead become under this aspect quite illusory; but, after examining the several prints more closely, the particularly surprising fact will find an explanation how it is that just the Goerz lynkeioscope compares apparently so favourably with the antiplanat, euryscope, and anastigmat *f*-7·2.

The pictures are all of the same size. Since, however, an antiplanat and euryscope of 144 and 138 mm. focus respectively are compared with a lynkeioscope and double anastigmat *f*-7·7 of a larger focal length, viz., 150 mm., the lenses of Steinheil and Voigtlaender are made to work at a considerably larger angle than the lenses of Goerz. The necessary mathematical consequence is that the antiplanat and the euryscope exhibit greater astigmatic aberrations than they would have done if employed with the smaller angle of the objectives of Goerz.

We further notice that with the antiplanat the centre is perfectly sharply defined, while at the edge the definition is normal. The euryscope shows nowhere perfect sharpness, neither in the middle nor at the edge. There is, therefore, the suspicion that the sensitive plate was placed in such a position as to cause the image to degenerate towards the edge more than would have been the case with an accurately focussed centre. The photograph taken with the lynkeioscope does not, however, show the same sharpness in the middle as in a zone, say, one and a half cm. away from the centre. This favours diminution of curvature of image and of astigmatism.

The anastigmat *f*-7·2 has, like the lenses of Steinheil and Voigtlaender, also been treated somewhat negligently. The axis of the objective was, in the experiment, not directed towards the centre of the object, but towards a point about 1·5 cm. to the left of that centre. The margin on the right corresponds, therefore, to a considerably wider angle than is the case with the lynkeioscope and the double anastigmat, with both of which the adjustments appear to have been made with due care.

Comparing these results, it must be admitted that the prints shown by Herr Goerz constitute no fair basis for comparison and for ascertaining the relative powers of the best objectives of the present day and, in particular, for determining the qualities of the antiplanats, euryscopes and Zeiss anastigmats, as compared with the double anastigmats and lynkeioscopes. I consider them, on the contrary, conducive to very one-sided and erroneous results.—I am, yours, &c., DR. PAUL RUDOLPH.

Jena, June, 1893.

TELE-PHOTO LENSES PAST AND PRESENT.

To the EDITOR.

SIR,—In your leading article of last week it would appear to ordinary readers that you yourself lay claim to the enunciation of the principle involved in the enlargement of primary images by the interposition of a negative lens.

This, of course, you must be aware, is not the case. The principle is as old as the science of optics itself. The *first application of the principle*

in a corrected and intelligent form was that of George Dollond *to the telescope* nearly sixty years ago in 1834, and described in the proceedings of the Royal Society of that year. The use of all kinds of telescopes for the production of enlarged images upon a screen, particularly of the sun, has been known and practised before and after the discovery of photography.

When lecturing at the Society of Arts this year on "Tele-photography" I took pains to be certain to whom the credit belonged for the *application* of the principle involved, to optical instruments.

Barlow's negative achromatic lens applied by Dollond in the astronomical telescope is the only record for direct enlarged primary images.

For obvious reasons telescopes, Gallilean or others, are unsuitable for photographic work, for in the latter central and excentrical pencils have to be considered.

You are good enough to mention your appreciation of the corrections of my lens before closing the leader, for which I thank you, but I write this letter as I think it is only fair that credit might be given to the *first* to turn his attention to an adequately appointed and corrected optical system for tele-photographic purposes.

Although you state that nineteen years ago "we spoke of it to one optician," it is remarkable that between a date (see former controversy) prior to your leader of October 16, 1891, and my first paper on the subject delivered before the Camera Club, in the latter part of the same year (December) you appeared to be as innocent of the suggestion as I was myself.

Advances in optical work, as in any other, are frequently brought about from suggestions as to the desirability of attaining a certain end. Photographers who would have welcomed tele-photographic lenses sooner have only to regret that your valuable and expressed "desideratum" of nineteen years ago has lain so long dormant.—I am, yours, &c.

25, *Newman-street, W., June* 19, 1893. THOMAS R. DALLMEYER.

AMATEURS *VERSUS* PROFESSIONALS.

To the EDITOR.

SIR,—Many references have been made in text-books and in our journals lately concerning amateurs, and to the professional mind it seems unfair for any one outside what is termed the profession to receive remuneration for their labour. I may at this point be allowed to remind the profession that, should the amateur be a working man whose means are very limited, but who possesses an intellectual and refined mind, and in many cases (my own included) whose every spare penny is required to obtain even a makeshift outfit, and handicapped by having to pay higher prices for most of his photographic materials than his brother of higher degree, can it be wondered at that the amateur should not be able to resist the temptation of trying to recover at least some of the wisdom-bought money that has been spent upon this expensive hobby?

It is all very well to talk about the *bonâ fide* amateurs. Who are they? I suppose, ladies and gentlemen who practise photography as a pastime. I, for one, Mr. Editor, cannot see wherein anything mean can exist in earning an honest penny.

The mysterious halo which has encircled the photographic art has, to a considerable extent, been reduced, thanks to the many manufacturers of photographic materials, who, by the way, seem to be as eager to supply the amateur with their goods as the professional, and it cannot be denied that with such advantages the intellectual and careful amateur, be he gentleman or mechanic, can make a fair show against many of the professors of the art.

If the profession perceive their craft to be in danger, let them form an Association, with power to receive such amateurs into their fold as may be deemed qualified. Then a distinction could be made between the worthless followers of photography and those who have, through careful study and dogged perseverance, attained to that perfection in the art worthy of the name of professional.

The distinguishing mark between the fit and unfit would then be the professional certificate from that body.

Of course the law of this organization would rule the profession to a certain extent, and some restraint upon its members regarding prices for work would be recognised, thereby producing less friction between local artists, whose elastic price lists and mode of securing orders in many cases are calculated to lower the dignity of the profession in the eyes of the public.—I am, yours, &c., SSENKRAK.

June 10, 1893.

TECHNICAL INSTRUCTION CLASSES.

To the EDITOR.

SIR,—The great success of the series of Instruction Evenings held by my Society which has just finished, and the keen appreciation shown by those gentlemen who attended them, has induced the Council to arrange another series for the ensuing half-year. The course is as follows:—

July 15.—Personally conducted outing.

July 19.—*Development Modified to Soften Harsh Contrasts or Brief Exposure.*

August 19.—Personally conducted outing.

August 23.—*Development Modified to Improve Flat Subjects or Over Exposure.*

September 20.—*Lantern Slides by Contact.*

October 18.—*Cold Bath Platinotype with Gelatine Development.*

December 20.—*Bromide Paper.*

There are no fees of any kind for attending these classes, and we throw our doors open to gentlemen who are not members of our Society so far as our space will permit.

If those gentlemen who are strangers to us who would like to take part in this series will kindly write me, I will send them fuller particulars than I dare trouble you with.

Trusting that you can afford me space for this announcement—I am, yours, &c., GEORGE GOSLING, *Hon. Secretary.*

North Middlesex Photographic Society, Jubilee House, Hornsey-road, N.

June 20, 1893.

LARGE CAMERAS FOR PHOTOGRAPHIC SOCIETIES.

To the EDITOR.

SIR,—Since writing my letter on the above subject, which appeared in your issue of the 9th instant, our Committee have decided to supplement the 12 × 10 outfit loaned to our members by purchasing a whole-plate camera, with rectilinear and wide-angle lenses, tripod, and shutter, for the benefit of such of our members who desire the use of a camera of that size.—I am, yours, &c., CHARLES H. OAKDEN, *Hon. Secretary.*

South London Photographic Society, 51, Melbourne-grove, East Dulwich, S.E., June 15, 1893.

DEPRESSION IN PHOTOGRAPHY.

To the EDITOR.

SIR,—I have read with much interest your leader on "The Causes of Depression in Professional Photography," also the letter signed "Hard-up Pro.," which on one hand is very amusing, but on the other a true picture of many another photographer. In my opinion, the amateurs are largely to blame for the present state of affairs, for with a few months practice they can turn out work which is not by any means first class, but it satisfies their friends because they get their pictures for nothing, or next door to it. There is a remedy, and only one, that I can see, other than was suggested in the correspondence column a few weeks ago, viz., that we have a society like the chemists, and examinations just as they have to pass before starting in business; this would clear out a vast number of pros. not worthy of the name, also a large number of amateurs who receive money for their work, because by so doing they at once become professionals. Trusting this matter will now be gone into thoroughly, and that all our professional brethren may make their opinions and suggestions known, as it is a question which needs an early settlement,—I am, yours, &c., ANOTHER PRO.

To the EDITOR.

SIR,—This is an urgent subject that the Convention might discuss one evening, or at least the professional members, and the N. A. P. P. which hardly as yet seems to have justified its existence; they might suggest some remedy although the outlook is very dark. There is, no doubt, photographers have made themselves too cheap in the past and are now reaping the fruits, also do so at present for that matter, though I cannot personally plead guilty, for I have always tried to uphold the status of my profession, to the detriment, I find, of my pocket. But it is no use bewailing the past, it is no use railing at the amateur; he is here and will stay more or less, although I could tell of some mean tricks done by so-called amateurs, but let that pass, we should get over all that sort of thing; it finds its level. Just now the two main factors in the depression are: first, the trade of the country generally is bad, very bad, so that those of us that live (or, rather try to live) in the industrial centres are the first to suffer from that cause; the other, and most serious one, is: photography seems going out of fashion, people are rather ashamed than otherwise of being photographed. That this is so, Mr. Groves's letter proves, and when the leisured classes cease to patronise any branch of the fine arts it's in a parlous case.

We have not had anything strikingly new of late years; what is wanted is a new photograph that can be produced with little expense and expeditiously, that will be likely to take the public fancy. Such a photograph I hope shortly to submit to the profession and the public; I must, however, patent it first, or it will not go, or send it to America and let it come back as a Yankee invention; then, oh, it will boom!

Another thing might rouse business a bit if we sold or exchanged studios, &c. I think three to five years is long enough for a photographer to stay in a town of 15,000 to 30,000 inhabitants, or even larger; the public like change and will often run after a new man or studio. I fear we

are something like actors, get a certain mannerism of which the public tire, which a change would do away with somewhat; but, then, what about good-wills? according to your correspondence, there is none; according to *Tit-Bits*, it is better to be a costermonger than a photographer, for costers get good-will for their pitches, so that, altogether, we seem in a bad case. "Pioneer's" suggestions are too late, we should want Acts of Parliament, and Pat's affairs stop the way and will do for many years to come; I fear there is no hope of help in that quarter. Perhaps some one else will give us some ideas or invent a new photograph; at any rate, it seems all we can do at present is to cudgel our brains for something new and wait with patience the revival of trade.—I am, yours, &c., T. S. Hicks.

373, *Glossop-road, Sheffield, June* 19, 1893.

To the Editor.

Sir,—I have read with some interest the discussion in your paper on the stagnation in the professional photographic business. It seems to me that the reason is not far to seek, and comes, firstly, from the supply exceeding the demand; or, in other words, the number of professional photographers being in excess of that required to supply the public demand; and, secondly, from the miserable work turned out by many of them. I know a country town where, with a population of 1500, there are no fewer than four photographic establishments, and I can only ask if there can be work for all of these.

Your correspondent sees fit to be down upon the amateur, and I should like to make a few remarks in reply. I know very well a very leading professional, one to whom the Judges at the chief exhibitions have awarded many gold medals. In conversation he has often told me that he considers the amateur the best friend he has, and is always pleased to have a chat with him, as he finds that there is always something interesting and instructive to be discussed and learnt about new processes, new makes of printing papers, &c. In a large town no one can help being struck with the photographs in the show-cases of all except perhaps about half-a-dozen of the best photographers. Prints from poor, under-exposed negatives, prints that a good amateur would consign to the waste-paper basket along with the negatives, are what he sees in the specimens there exhibited. People are now beginning to know good work from bad, and the end to which this tends must be that, more and more every year, the best photographers will get more and more work, while the ones that turn out bad work will get less and less, till they are driven to earn a livelihood in some other work that they are better suited for.

The paragraph in which "Pioneer" dismisses the amateurs to "the obscurity from which they came" is rather cruel, but I can tell him that no greater blow could be struck at the development and progress of photography than that his wishes should be realised. The amateur takes up photography at first, as a rule, as a pure amusement, but very soon finds so much to interest him in the chemistry, optics, and the composition and lighting of his pictures, that he reads up and studies his subject in a way that none of the legion of second-class professionals have either the time or the inclination to do. Professionals have not time to experiment with all the new things that are coming out, and it is only when the amateur has tested them, and seen that they are good, that the profession comes to adopt them. To take an example of this, how many professionals have ever tried glycerine, and different strengths of developers used with brushes, to bring out a platinotype print? The power of retarding portions of a print, or bringing on others, I think places the platinotype easily first among the printing processes, and makes the print what in etching would be called "an artist's proof."

The successful photographer will always be the one who to artistic and technical ability can add sound business capacity, power of organization, and methodical working in his establishment. In men of this stamp there is no jealousy of the amateur, but among those who do not possess these qualifications I am quite aware that the reverse is the case.

June 16, 1893. Amateur.

MR. IVES AND PHOTO-ENGRAVING.—A CORRECTION.

To the Editor.

Sir,—I notice that Mr. Ives, in his very interesting paper on "Composite Heliochromy," makes a claim which, for historical as well as personal reasons, I must traverse.

I yield to no one in admiration of the splendid work which Mr. Ives is doing in a most difficult branch of our art. I also acknowledge that in photo-engraving he has made his mark, and that it is specially to him that the net-work method has been so developed in America. Nevertheless, I must take exception to the following extract from his paper. He says: "As long ago as 1881, when I was *the only successful producer* (my italics) of half-tone process blocks for the type press, and had considerably improved upon the older methods of composite heliochromy without quite realising the true principle which I first published in 1888, *I made the first photographic reproduction of a coloured subject by three impressions from process blocks* (my italics). This three-colour print, a reproduction of a chromo-lithograph, was referred to in a leading article in the *Photographic News*, September 5, 1884, p. 561."

Now I claim, in opposition to the foregoing, that, as regards both line and half-tone photographic engraving for blocks to be printed at the type press, *Dallastype and Dallastint are the oldest processes which have been worked commercially in this or any other country.* I am quite willing to take a back seat in favour of Cousin Jonathan, John Chinaman, or even Thibetan Mahatma, if it is *proved* that any such ingenious persons have prior claims.

The first reference to Dallastype will be found in the *Photographic News* of July 27, 1866, p. 360, and the Dallastint half-tone block method in a letter of mine in the *Photographic News*, July 23, 1875. Further references to Dallastint, which I had been working commercially since July 1875, will be found in the *Photographic News* of June 15, 1877, and June 22, 1877. At the former date will be found, under the heading "Photography In and Out of the Studio," that special attention is drawn to the perfection of the gradation and detail in Dallastint blocks. Then, as to colour, I refer to a letter of mine in the *Photographic News*, June 22, 1877, p. 299, in which I mention that I had applied Dallastint to composite colour printing under the name of Chromo-Dallastint, and I drew attention to a specimen in four workings of a very difficult subject, viz., the reproduction of a sepia drawing, which I was to exhibit at the Caxton Exhibition.

I have been producing Dallastype blocks commercially since the beginning of 1869, and Dallastint blocks since 1875. During the whole period I have produced some thousands of photographically engraved blocks, not only for this country, but for America, Canada, and other places.

I claim for Dallastint blocks that they render more perfectly half-tone and detail than the net-work system. The reason why net-work is in such vogue for half-tone blocks is—egotistical as it may seem in me to say it—because Dallastint is a secret process, while the net-work method is open to all. If Dallastint were known, it would supersede net-work. The natural grain in Dallastint has a far more agreeable appearance to the eye. It can also do what is impossible to net-work, viz., render correctly the detail in photo-micrographs. Further, it is more easy to print, and requires very little "making ready." With net-work, on the contrary, it is only satisfactory when the mesh is extremely close, but then it is more easily blocked up by the ink.

A combination of Dallastint grain and net-work produces a better effect than the plain net. For best results, however, Dallastint natural grain is to be preferred.

Looking backward, it is interesting to note the evolution of the net-work system. The first use of a photographic screen or veil is in that classic patent of Mr. Fox Talbot, viz., No. 565, October 29, 1852. He employed folded gauze to obtain his grain.

Later on, viz., twenty years after the above, Walter Woodbury, that most ingenious and indefatigable worker, patented the use of "mosquito netting," and Brussels net (see Patent 3654, December 4, 1872); and again in Patent 1954, May 30, 1873, he claimed the use of "fine ruled lines." Lastly, Woodbury obtained a patent (No. 4735, October 5, 1883 for the use of "fine ruled lines, netting, gauze, dots, or a print from a grained stone." Nothing really good was done by any of these methods until Mr. Ives, in America, introduced his net-work system, which was altogether a new departure, as described in his two United States patents, viz., February 8, 1881, and August 9, 1881. The method consisted in using, not a screen, but an elastic-lined surface which was inked, and then impressed on a relief, which could be photographed. When I saw Mr. Ives some three years ago I understood that he had sold his rights to a firm which were still working his system. The next advance was made by Meisenbach, using a screen in some way of which I confess the patent did not give a clear idea. It, however, gave a great impetus to screen methods in Europe and America, and there are now several practitioners of the net-work style. I am bound to confess also that, given good printing conditions, very high-class work is produced, especially where copper is used instead of zinc for relief etching. Still, I do not hesitate to say that there will always be an artificial appearance, even with the finest net-work, and that in every respect the natural grain gives truer rendering and more agreeable effect. I can show examples of Dallastint, produced as far back as 1875 and recently, which, I think impartial critics will admit, bear out my contention. Duncan C. Dallas.

5, *Furnival-street, June* 7.

THE CONCENTRIC LENS.

To the Editor.

Sir,—A brief reply to Mr. F. H. Burton, and I will trouble you with no more words on the subject of his contentions. There seem to be too many things which have to be explained to him to make it worth while to keep up a discussion with him. Amongst these is the fact that, when one wants a negative for enlargement, he uses a stop which will bring all the planes of the subject into the sharpest definition possible, and neither the Concentric nor any other lens will bring the foreground and the distance into focus at the same time, for which reason we use, as a rule, a very small stop, that the loss by the process of enlargement may be as far as possible equalised all over the enlargement. For the same reason, when I make a negative for ordinary use in which the foreground is

important, I use the smallest, or nearly the smallest, stop, for, as a distance which does not give the most delicate definition possible is disagreeable to me, I secure that, and then do all for the foreground that is needed. If the foreground is unimportant, I work with the larger stops, only using anything smaller than *f*-16 when the light is so brilliant that over-exposure is certain, for I rarely use the mechanical shutters. *That* is what "he does stop down for."

Mr. Burton seems aggrieved that I had not paid attention to his hint to "read your very able article on the 'Focal Peculiarities of Wide-Angle Lenses,'" and had persisted in always focussing at *f*-16, as if he had not said a word! "Ye gods!" and especially Apollo! Having during the last thirty-five years used or tried all the forms of lens in the market, except the very latest Zeiss wide-angle, I think that the author of that very able article will admit that I know what a wide-angle lens is and how to use it, we having worked together not a little during that time.

Mr. Burton seems to think it discourteous to talk of "duffers" in his connexion. What does he think of his own suggestion that I do not know the difference between a negative taken through a crack in the front of my camera, pinhole fashion, and one taken through the lens?

As to sending my lens to Kew, Mr. Burton will excuse my not accepting his suggestion; but, if it would not give me what I want with *f*-16, I would send it back to Ross & Co. for correction. Its definition on the screen is so exquisite as to make it certain that when there is a falling off in the negative the fault is mine, and not that of the lens. As for others, whether duffers or experts, "they pays their money, and they has their choice."—I am, yours, &c., W. J. Stillman.

Rome, June 8.

P.S., June 11.—I have just seen the letter of Mr. Burton in The British Journal of Photography of the 9th. He is, of course, at perfect liberty to do what he thinks best to satisfy himself that he is right; it does not concern me in the least. "The proof of the pudding is in the eating," and of the lens in the photograph. But, now that the controversy is ended so far as I am concerned, I would counsel Mr. Burton, the next time he provokes a discussion, to maintain the courtesy in his letters that gentlemen are used to in personal intercourse if he expects the debate to be profitable or courteous. W. J. S.

REDUCING OVER-PRINTED GELATINE PROOFS.

To the Editor.

Sir,—I have to thank "Free Lance" for his allusion, in last week's issue, to my article on "Reducing Over-printed Gelatine Proofs," as it has called my attention to a stupid mistake in the formula given, which I wonder he did not also point out. Two ounces of alum dissolved in one ounce of water is so palpably an error that I can scarcely understand his passing it, but the formula should read as follows:—"A hot saturated solution of *alum* is made, and, when cold, to each *pint* of it two ounces of common salt and half an ounce of hydrochloric acid are added." I do not know how I managed to transpose the alum and salt, or use "ounce" instead of "pint;" but, as compositors are not, as a rule, chemists, I suppose I must he to blame for it. I learnt all about the solubility of salt in hot and cold water when I was commencing chemistry.—I am, yours, &c., W. Lindsay.

GLASS SCREENS.

To the Editor.

Sir,—In reference to patent No. 9721 (Lauder Brothers), the specification of which appears in your issue of the 12th inst., this idea has long ago been carried into practice. Apart from cases in which I have seen such screens in actual use, I may mention a large floral foreground upon glass which was some years ago in the stock rooms of Messrs. Percy Lund & Co., of Bradford.—I am, yours, &c., W. Ethelbert Henry.

Sarnia, Ontario, May 29, 1893.

Answers to Correspondents.

Photographs Registered:—

Charles Walker Clarke, Devizes.—*Photograph of Prince of Wales at Devizes.*

Herbert William Hughes, Dudley.—*Photographs of miners at work.*

William Ernest Parkin Haigh, Taunton.—*Photograph of a group of skeletons.*

Augustus Frederick Perron, Bath.—*Photograph of W. Clark Russell, Esq.*

James Thomson, Fermoy, co. Cork.—*Photograph of the Duke of Devonshire and guests at Lismore Castle.*

William Frederick Hollett, Canterbury.—*Photograph of the landing of the Huguenots, from a painting in the French Church, Canterbury.*

Tobias Kipling, Darlington.—*Photograph of "Lord" Thomas Williamson, the Darlington weather prophet, aged eighty-four; also a photograph of the "old Standards."*

Robert Millikin, Kirkcaldy.—*Two photographs of the late James Townsend Oswald, of Dunnikier, Provincial Grand Master of Fife and Kinross Lodge; two photographs of Dr. Andrew Wilson, F.R.S.E., Coombe Trust Lecturer, Edinburgh.*

Iron.—Iron phosphate is not used in photography.

J. H.—Apply to Messrs. Avery, 81, Great Portland-street, W.

T. S. H.—The address is Edward L. Wilson, 853, Broadway, New York.

C. Lesty.—Yes, as unfixed bromide enlargements contain unaltered silver salt, they are decidedly worth keeping for residue purposes.

C. Ward.—There is no Government department of photography, as such, consequently there are no competitive examinations, as in the case of Post Office and other *employés*.

Novice (Leeds) writes, asking how ammonio-nitrate of silver solution is made. Dissolve the nitrate of silver in water, then add liquor ammoniæ until the brown precipitate first thrown down is just redissolved.

P. O'Connell.—The probable cause of yellowness in the prints enclosed is that there was not sufficient gold in the toning bath. They have the appearance of having been toned by sulphur rather than by gold.

H. Glover.—If you are offered to be supplied with nitrate of silver at one shilling and eightpence per ounce, you may rely upon one of two things, namely, that it has not been come by honestly or it is not pure nitrate of silver.

W. W. G.—The examples are all fairly good as photographs, but in every case no care has been taken to have the camera level, hence most of the buildings look a long way out of the perpendicular. But for this the majority would be good pictures.

E. C.—The "sparkling, frosted" appearance of the lantern slide arises from imperfect washing, or, we might almost say, its not having been washed at all. So much hyposulphite of soda was left in the film that, with the few minutes heat of the lantern, it crystallised out.

R. Sedgwick.—Thanks for a sight of the prints. It is by no means an uncommon thing with some of the older prints that have been kept in a damp place to find that, although the mounts have become mildewed, the prints have remained intact. The pictures have been forwarded on as desired.

T. Sebbons.—The ferridcyanide and hypo reducer is a very good one, but it is obvious that, in your case, it was used much too strong. With all reducing agents it is better to use them weak and allow a longer time for their action. Particularly is this the case with any reducer with which the worker is not familiar.

T. Read.—We have had no experience with the lens in question; but, from what we know of the firm, we have no doubt it is good value for the money. You must not, however, expect to get for five pounds an instrument equal in quality to one by the best makers, whose price for the same size is about three times that amount.

T. R. J.—Although common glue is easier to mount photographs with than the best gelatine, it should never be employed on account of the acid and other impurities it usually contains. Nelson's "No. 2 Soluble," or Cox's soup gelatine, is almost as easy to use as common glue, and they, being pure articles, will have no injurious action on the pictures.

S. Cleevar.—It is quite a fallacy to imagine that good collodion for the wet process is not to be had at the present time. All the best brands are still in the market, and the consumption of them is large even now, though not, of course, for portraiture. The fact that Continental workers make their own collodion has possibly induced this idea in your mind. But foreign operators, for the most part, have always preferred to make their own collodion, more especially those making negatives for mechanical processes.

Carbonensis.—Don't be deterred from working the carbon process by the fear of the injurious action of bichromate of potash on the skin. This, so far as we know, never occurs unless by continual daily working. It is not at all likely that, working on an amateur scale, any inconvenience will be experienced. Nevertheless, it is well to be careful. Always thoroughly wash the hands to free them from the bichromate when the work is finished.

Tent.—The stuff will do very well for the operating tent, provided it is situated where it is not subjected to full sunshine when in use. If the tent is to be exposed to the rays of the sun, a more opaque material will be preferable. It will be better to purchase a waterproofed stuff in the first instance than to render it waterproof afterwards. "Willesden" canvas is very suitable. For the framework of the tent, nothing is better, or cheaper, than iron gas-pipe. It is sold under the name of "gas-barrel."

A. O. X. (Clonmel).—As the ink adheres evenly all over the paper after it has been soaked in tepid water and sponged, something is wrong. Possibly the gelatine paper, after sensitising with the bichromate of potash, was kept too long before use, or it may have been over-printed. It may be that the negative is not of the right character for photographic work. This is a very prolific failure with beginners. The negative should be very dense, while the lines are perfectly clear; indeed, as clear as the glass itself.

Young Beginner writes: "Will you kindly give me advice with regard to the following:—1. I am having a studio attached to the house; I am told it will be rateable, but how so? I am not a householder; unmarried, lodging with the tenants of the house; I am not going to have water laid on, as we have a meter. 2. The studio is being built for convenience upon wooden supports, which the landord is going to the expense of, but the studio is mine. Would the fact of the studio being on his posts give him any claim to it? and will it be necessary to have an agreement or guarantee? 3. The studio has met with the disapproval of the neighbours, inasmuch as it hinders the view, but does *not* stop the light. The house and ground are the landord's, who is quite in with it (or willing), they (the neighbours) have tried to frighten me by saying it will have to come down; have I anything to fear with respect to it?"—In reply: 1. If the value of any property is increased, as it will be by the addition of new buildings, so will the rate value be increased accordingly. 2. A definite agreement had better be made as to this point. 3. If the new building obstructs any "ancient lights," it will certainly have to come down if the neighbours object. As we do not know what bye-laws the local authorities may have, we cannot say whether the erection contravenes them. Our correspondent, to be on the safe side in the matter, had better consult a solicitor who is familiar with bye-laws of the local authorities. They vary in different towns.

H. WILKINSON.—Though the fact of your having photographed a royal prince no doubt permits you to use the words "Under Royal Patronage," the acceptance of a copy of the picture by the Queen does not entitle you to display the royal arms, by doing which you run the risk of a penalty. If you dissolve partnership, it seems to us that your partner, equally with yourself, may claim to have had royal patronage.

THORNHILL SQUARE asks: "If I send a negative to a profeasional printer to have a dozen prints made therefrom, and the negative breaks after a few prints are obtained, cannot I sue the printer for the value of the negative? In my case the negative is a valuable one, as I cannot retake it without making a journey to the West of England to do so. I have made a claim for five guineas, and this the man repudiates entirely."—The printer can be sued for the five guineas, or any other amount for that matter, but we expect that nothing will be recovered. It is a recognised custom of trade that printers and enlargers are not responsible for breakage of negatives while in use or in transit. This is usually stated on all prospectuses.

VERY PUZZLED writes: "I should feel much obliged if you will kindly explain the difficulty herein met with. The enclosed print is one of the interior of the parish church here, taken with a Ross lens, No. 3 stop, fifteen minutes exposnre. On the right-hand side of print appears an inverted image of the east window. Ilford Ordinary plate used, backed with lampblack and glycerine. The same phenomenon appears in every negative taken with this lens of the church. Camera carefully examined and covered with focussing cloth during exposure."—There is a minute hole in the camera, probably in the front, close to the lens flange, which produces another image after the manner of a "pinhole camera." This will easily be discovered by examining the interior of the camera in strong sunlight, with the head shielded with the focussing cloth.

SEVERAL correspondents in our next.

PHOTOGRAPHIC CLUB.—June 28, *Lenses up to Date.*

RECEIVED.—Glycin-Andresen, Arthur Schwarz & Co., *Photography Annual.* In our next. J. J. Moran, and others, thanks.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—June 24, Outing to Chingford. 29, Annual Meeting. July 6, No Meeting.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—June 27, Technical Meeting. A demonstration *of Carbon Printing* by Mr. W. E. Debenham.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.—June 24, Chester. Train, Exchange Station, five minutes past one. Leader, Mr. J. G. Jones.

OLDHAM PHOTOGRAPHIC SOCIETY.—June 24, Great Budworth. Depart, Central, thirty-eight minutes past twelve, for Lostock Gralam. Return fare, 3*s.* 2*d.* Leader, Mr. S. Ashton.

WE learn from Mr. Birt Acres that the firm of Messrs. Elliott & Son, Barnet, is about to manufacture plates of greater sensitiveness than they have hitherto done, the new emulsion to be prepared by Mr. J. B. B. Wellington, whose services they have secured.

MR. S. B. TURNEY, of 183, Union-street, Plymouth, writes: "I shall be glad if you will notify in your next issue that I have fitted up a convenient dark room which wil be at the *free* disposal of members of the Convention for plate-changing during the forthcoming Plymouth meeting."

CHEETHAM PHOTOGRAPHIC SOCIETY.—The studio and dark rooms of this Society are now at 4, Grosvenor-street, Cheetham Hill, Manchester. The following is a list of meetings for the immediate future:—July 4, *Bromide Printing*, by Mr. A. V. Wilkinson. 19, *Isochromatic Photography.* August 1, *Hand Cameras.* 15, *Wet Collodion Process.*

GREENWICH PHOTOGRAPHIC SOCIETY.—The first Field Day has been fixed for June 24 (Saturday), when it has been decided to visit Eynsford, Kent. Trains leave Greenwich (L. C. D. R.) at two o'clock; Nunhead, fifteen minutes past two; Brixton, fifty-four minutes past two; arrive Eynsford, twenty-seven minutes past three. Return fare, 2*s.* 10*d.* if under twenty travel; if more than twenty, fare is reduced about one-third.

LEYTONSTONE CAMERA CLUB.—June 24, Greensted Church and Ongar Leader, Mr. T. F. Sanderson. The Club will proceed by the train leaving Liverpool-street at ten minutes past two, calling at Leytonstone at thirty-nine minutes past two, arriving at Ongar at twenty-four minutes past three. 28, Second Annual General Meeting at headquarters for the purpose of receiving the balance-sheet and report, and for the election of Officers and Council for the year 1893–94. Chair taken at eight o'clock. It is hoped every member will attend.

IN reference to our paragraph of June 9, in which we expressed regret that one of our correspondents on April 29, 1892, had erroneously attributed the authorship of certain articles in a contemporary to a well-known optician, we have discovered that, by an oversight, the name of the paper was omitted, and in now giving it we accede to a request to correct our correspondent's statements implying that the *Optician* was at "the beck and call of one optician," and that "it was not the trade organ of opticians generally." These and the other statements in Cimabue Brown's letter were made, we are persuaded, under a misapprehension, and we are glad to hear that our correspondent was mistaken.

A CONGRESS of the Photographic Society of Great Britain and Affiliated Societies will be held at the time of the Exhibition of the Photographic Society. The Congress will be opened on Tuesday, October 10, with an evening meeting at the Gallery, Pall Mall, when the President will deliver his annual address and present the medals awarded in connexion with the Exhibition. On October 11, at three and eight p.m., and October 12, at three p.m., there will be a meeting at the Theatre of the Society of Arts for the reading and discussion of papers; and on October 12, at eight p.m., there will be a special lantern display in the Gallery at Pall Mall. Further particulars will be duly announced.

MANY of our wealthy readers who, in these days of bank failures, may find difficulty in investing their surplus cash, and who are tired of the uncertain and fluctuating bubble-company speculations, may be interested in knowing of an opportunity of profitably and securely investing. Freeholds of business premises in and about the city of London have surely and steadily increased in value; of late, thirty, and even thirty-three years' rental have been paid as purchase money for first-class property. This is suggested by the fact of the freehold of the premises, 99, Hatton-garden, at present occupied by Messrs. Perken, Son, & Rayment, being down in the lists of Messrs. Edwin Fox & Bousfield for sale on July 5, the estimated rental value being 500*l.* per annum.

EXPLOSION OF GUN-COTTON.—A somewhat alarming explosion occurred at the shop of Messrs. Doig & Son, chemists, High-street, Dundee, on Saturday, June 3. One of the assistants, Mr. Charles Duncan, was engaged making collodion on the shop counter, when a quantity of pyroxyline which he was handling suddenly exploded with considerable violence. He was knocked down and rendered unconscious for a short time, while he was rather severely cut about the face and hands by pieces of broken glass. Another of the assistants, Mr. Andrew Halliburton, who was standing near, also sustained some slight injuries from flying chips of glass. Medical aid was soon obtained, and the injuries were attended to. The damage done to the shop, although considered very serious at first, was found to be comparatively trifling, being confined to the breaking of two or three panels in the glass cases. It is difficult to account for such an explosion—the wax jet was not burning, and the ether bottle was not about—except that it may have been caused by some impurity—perhaps improper washing—of the gun-cotton, or that some of the more explosive trinitrocellulin may have been produced in the process of manufacture. Mr. Duncan's injuries are such that he will be confined to the house for a few days. Mr. Halliburton's are not serious.

THE CHICAGO EXHIBITION.—In reference to an article which appears in the *Chicago Tribune*, relative to the high-handed doings of the official photographer, we have received the following from a correspondent:—"Your sheet has been so outspoken in defending the rights of the public as opposed to the extortions and swindles perpetrated by the management of the Columbian Exposition, that I think you will be interested in the enclosed cutting from a Chicago paper in regard to the action of the photographic monopolists (one of whom, Mr. Higginbotham, is the son of one of the highest officials of the Exposition, as the cutting will demonstrate). The whole show is conducted on the most grasping principles—even drinking water is sold. There are huge piles of seats in an unfinished state, in which condition they have remained for weeks past, while the completion of thousands of 'chairs for hire' has been pushed to the utmost. The Fair, though it has been open for more than a month, is very incomplete still, and it probably will not be *fully* finished for a couple of months more. Many exhibits that were displayed some weeks ago are now closed up by reason of the lime and mortar dust which permeates all the cases, and injures delicate instruments. These will not be reopened until this nuisance abates. But the visitor need not fear the 'fleecing machinery' is incomplete. I cannot see how it could be carried nearer to perfection. This is the opinion of all the disinterested visitors I have talked with."

DARK ROOMS IN AUSTRIA, GERMANY, AND ITALY.—Herr E. Liesegang, Düsseldorf, has been good enough to refer us to his Almanac and Calendar for 1892, in which are given particulars of Austrian, German, and Italian dark rooms open to amateurs as asked for by a correspondent last week. This information may be of service to many of our friends who go abroad at this season of the year. *Germany and Austria:*—Baden-Baden: B. Bickel, Langestr. 20; G. Stumpf, Phot., Lichtenthalerstr. 53. Berlin: Romain Talbot, Kaiser-Wilhelmstr. 46. Dresden: C. F. Bernhardt, Palais Gutenberg; E. Kaders, Phot. Manufactur, Altst.; Otto Francke, Pragerstr. 28. Flensburg: J. A. Groth, Director der Schlesw.-Holst. Land-Industrie-Lotterie, Carsten-Nirsen-Weg 10. Frankfurt a. M.: Haake & Albers, Kirchnerstr. 4; Frankfurter Trockenplattenfabr., E. Vom Werth & Co., Friedenstr. 2. Hanover: S. Federlein, Luisenstr. 2. Kiel: M. Bensemer, Apoth., Brunswickerstr. 38. Markersdorf a. d. Böhm. Nordb. (Station Rabstein); Franz Eypert, Weinhaus, Prague: Adolf Fischl, Ferdinandstr. 23. Steinschönau: (Böhm. Nordbahn) Carl Hahuel; Rich. Helzel, Sonnenbergerstr. Stuttgart: Lud. Schaller, Marienstr. 14. Vienna: Oscar Kramer, Graben 7; R. Lechner, Graben 31. Wiesbaden: W. Hammer, Kirchgasse 2 a. *Italy:*—Allessandria: Castellani, Corso Roma. Bergamo: A. Tarramelli, Via Torquato Tasso 22. Bologna: Sargato & Belvedere, Via Farina 24. Casale Monferrato: A. Bertolio, Via Garibaldi 6. Florence: Pietro Sbisa, Piazza della Signoria 4; Società fotografica Italiana, Via della Scala 15. Genoa: A. Sotteri, Via Carlo Felice 10; A. Speiche, Solita S. Gerolamo 3; Badino, Portici Vittorio Emanoeli; Carlo Coppo, Via Guilia 43; F. Passadoro, Via Ponte Reale 242; Hôtel de la Ville (H. Engel). Leghorn: U. Bettini, Via Ricasoli 18. Mailand: Bathista Borghi, Via Angello 17; Pietro Piellavinci, Via Orefici. Naples: Guilio du Besse. Novaro: A. Zenoni, Via Ospedal. Rome: J. Juliana, Via Babuino 147; Pietro Sbisa, Via del Corso 149; Oreste Duechi, Piazza Nicosia 27. San Remo: J. Scotto, Rue Victor Emanuel 16. Turin: A. Berry, Via Roma 1. Venedig: Gerolamo Mankovain, Optiker.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1730. Vol. XL.—JUNE 30, 1893.

THE EQUIVALENT FOCUS OF A COMBINATION OF LENSES.

The letter of Mr. L. V. Drew, of Cape Colony, on another page, is only a type of similar inquiries we are receiving more or less constantly, especially from those who have taken up photography of late years. Few years only have elapsed since the catalogues of some lens-makers did not recognise the real focus of their productions, but only the "back" focus of a combination, a term which conveys no definite information. But, since the times referred to, photographers are being educated up to know something more about the tools with which they work than can be gleaned from "back focus" references, and we are glad to perceive in more recent catalogues a marked improvement in this respect. What has been said of the lack of information conveyed by the term back focus applies equally to front focus—a term, however, we hear but seldom employed.

It is the equivalent or solar focus that concerns photographers, although the back or the flange focus may prove useful to the camera-maker in affording some idea as to his measurements when making a camera. The equivalent focus may be defined as the focus measured from the optical centre of the combination when such centre has been determined for a distant object.

If there is one blunder that has more frequently been made than another in trying to determine the equivalent focus of a combination, it is the recommendation, so frequently met with, to focus upon an object situated at such a distance from the lens as to make the image upon the ground glass of the camera of precisely the same dimensions as the object, which we may assume to be an engraving or a photograph that has to be copied its own size, and then divide the distance between the object and the image by four, which, it is alleged, will give as the quotient the precise equivalent focus of the objective. But this method is incorrect for a combination of lenses separated from each other by being mounted apart in a tube, and the amount of their separation not admitted as a factor in this calculation. We mention this method first on account of the widespread belief in its accuracy, which, as we have shown, is incorrect. The method is only correct in the case of a single biconvex lens of infinite thinness, could such a lens be made, or even conceived of, in connexion with the optics of photography.

A simple method, and one which is within the powers of every one, by which to ascertain the focus of a lens, consists in directing the camera to any subject situated at a distance, and focussing it by aid of a magnifier, so as to ensure sharpness. Have the subject so arranged that a well-marked object, *e.g.*, a lamp-post, or the trunk of a tree, shall occupy positions at opposite margins of the ground glass. Now, having marked on the focussing screen the exact positions occupied by these two respective objects, unscrew the lenses from the mount and insert anywhere—by preference, and for convenience in the slit for the diaphragm—a thin piece of metal punctured with a pinhole, and, having thrown a focussing cloth over the camera, examine the image and rack the camera in or out until the pinhole image on the ground glass exactly coincides with that produced by the lens, the two marks to which we have referred aiding in this. This coincidence of images having been obtained, measure with accuracy the distance between the thin metallic plate pierced with the pinhole and the ground-glass focussing screen, and this represents the equivalent focus of the lens.

The only drawback to this method lies in the difficulty of projecting an image on the screen with such a degree of sharpness and luminosity as is necessary, for if the pinhole be too large the sharpness is defective, and if too small there may not be light enough to see the image. We have, however, by making use of lighted gas lamps as test objects, been able to employ a very small pinhole, and thus to secure a very high degree of accuracy in the measurement.

There is no method of ascertaining the true focus of a lens more beautiful and accurate than that of making the camera itself do duty as a theodolite—a method that will always be associated with the name of the late Mr. Thomas Grubb. In adopting this system, a table, on which is spread a large sheet of white paper, is brought up to a window, and the camera is placed thereon. The only preparation of the camera necessary is to draw a pencil line at each end, and from top to bottom of the ground glass, say, one inch from the edge, although any definite distance is quite immaterial so long as both sides are alike. Now, having selected any object at a distance, such as a church spire, a tree, or a chimney of a house, focus this sharply upon one of the lines drawn on the ground glass, and then with a pencil draw a straight line on the sheet of paper on the table, using the edge of the baseboard of the camera as a ruler. Without altering the focus of the lens, rotate the camera until the same selected object falls upon the second of the vertical pencilled lines, and draw another straight line on the sheet of paper, using the same side of the camera, as before, as a ruler.

The camera may now be lifted down, as the measurement is to be deduced from the paper, which contains as yet only two lines. These are to be prolonged until they meet at a point; and by a pair of compasses opened out to the distance between

the two marks on the focussing screen, these two lines are connected by a cross line like that in the letter A, that is to say, the cross line must equal the distance between these marks. The true equivalent focus of the lens by which the experiment was conducted is equal to the distance between the centre of the cross line and the junction of the two side lines.

PHOTOGRAPHY AND SCIENTIFIC RECORDING.

We are pleased to find in the Smithsonian Report for the year ending 1892 a sentence echoing a recommendation we have frequently made as to the use of photography in scientific recording, and we can only hope that it will be another strike against the neglect of photographic processes in the reduplication of phenomena or records produced by photographic means. No one more than ourselves is more willing to express estimation of the value of past illustrations of such phenomena done by the hands of skilled and careful engravers who have been able to translate through the medium of their gravers, wielded by deft fingers, the very best of sketches into valuable pictures and plans of the utmost service to scientific men. But the time is past for the bulk of that class of work, and it is but seemly that photography should repeat to any required extent by one of its many methods those results and memoranda obtained by photography. We want now not pretty, nay, beautiful engravings, but *facsimiles* of the spectral lines, the cometary pictures, the maps of stars, the hills and craters of the moon, and that multitude of results now daily obtained by the aid of lens and dry plate. Doubtless such reproductions are gradually gaining ground, but we would see all but sun-made pictures banished.

The words of the particular paragraph of the Report quoted, referring to matters of great interest, we will further allude, to are as follows: The Institution is already in communication with some of the leading observatories of the world, and they hope for "a series of photographic representations of hitherto unequalled size and definition, which shall represent the moon's surface as far as possible on a definite scale, and entirely without the intervention of the draughtsman." Of course, there are, nowadays, many draughtsmen and engravers with a knowledge of the subject they are set to work at; but they are not always available, and not always obtainable for a particular class of work. We well remember, now many years ago, the late Mr. Philip Carpenter telling us that, in getting together a set of illustrations of a particular series of shells for a conchological list he was making, he obtained the services of some skilled students from South Kensington, who, owing to their want of acquaintance with the subject, made pretty sketches, but useless science memoranda. He was forced, though little skilled in drawing, to do the work himself. What a boon photography and dry plates would have been to him!

Astronomy gives the lion's share of work at present, and its future is opening out. Take, for example, the Smithsonian Institution, the branch of astronomy to which the resources of the Observatory will be devoted will be that of exploring the great unknown region in the infra-red end of the spectrum by the method recently improved by Mr. Langley himself. We need scarcely say that this region has been investigated both by photographic and electric methods.

Every one knows what the Lick telescope has done and will do with photographic processes of recording, but a lens a yard in diameter means much more than those unfamiliar with observatory work have any conception of.

The Royal Observatory at Copenhagen follows the same course, and is to have a telescope on the lines of that of Upsala. It will be double, and the optical photographic tubes will be mounted on the same stand.

We have frequently alluded to plans and speculations about new instruments of gigantic size, their probabilities and capabilities, but at last it is possible to speak more definitely. *Astronomy and Astrophysics* for the current month is responsible for very complete details. The new instrument now to be made is the Yerkes telescope, and it will be of interest to our readers to give a brief description of the proposed monster erection.

The great tube pier is being built by the same firm who made the Lick instrument. The column will be in five sections, each weighing five and a half tons, excepting the base, which will weigh about eighteen. It rises about ten and a half yards from the base. The pier-head weighs five and a half tons, the total being thus about forty-five tons. The polar axis is steel, and fifteen inches in diameter, and thirteen feet long, the declination axis being not much smaller. The telescope tube itself is of sheet steel, and, exclusive of the arrangements at the observing end, is over sixty-two feet long, weighs six tons, and is about fifty-two inches in diameter. All the quick and slow motions and clamps can be operated from the balcony, eye-end, or floor, and either by hand or electricity, as needed.

Our readers will join us in the hope that this big camera, as long as several railway cars joined together, fixed on a camera-stand weighing as much almost as a thousand men, and as tall as a good-sized house, will do worthy photographic work, worthily recorded by photographic means alone.

TONING GELATINO-CHLORIDE PRINTS WITHOUT GOLD.

In a variety of ways the question of the possibility of toning printing-out papers without the use of gold, and the uncertainty of colour that, to some extent, attaches to that method of toning, is one that is constantly being presented to us. There is no possibility of denying the fact that the neutral black and cool grey tones obtained with developed bromide prints, so closely resembling as they do platinotypes, are growing in favour; and, though these may be imitated very closely with the ordinary printing-out papers under favourable circumstances, the result is by no means a matter of certainty. On the other hand, a good many users of those papers prefer brown tones, and meet with the same difficulty in stopping the action of the toning bath at just the right moment to secure the precise tone wanted.

In the course of last year an article appeared in these columns on the subject of the restoration of faded prints by means of a process of bleaching and subsequent redevelopment, and several correspondents have during the past few weeks suggested the possibility of systematically applying this method in preference to the ordinary gold toning bath used with printing-out papers, either gelatine or albumen. We have before us, as we write, a set of prints forwarded to us that are stated to have been made upon gelatino-chloride paper, and which yet so closely resembled platinotype that we have been induced to inquire as to the details of their production, and also to try to imitate them.

At first sight it may seem that the easiest way to obtain the tones required would be to use the bromide papers and development, but this is precisely what most of our corre-

spondents do not wish to do. It is pointed out, as the chief advantage of the printing-out papers, that the result can be watched in the printing frame, and that any subsequent change, so far as loss of strength is concerned, can be much more easily estimated and allowed for than in the case of contact printing with development papers. The development is nowadays easy enough, and, even with the suggested modified treatment of printing-out paper, has to be performed, though it is with this difference, that the formation of the image can be watched in the printing frame, and the after-treatment is little more than mechanical, the redevelopment after bleaching being only a process of reduction of the material already constituting the image, and therefore only capable of altering the colour without adding anything to it in the way of detail.

In the course of the article already referred to it was pointed out as a curious fact that, after bleaching and redeveloping an ordinary print, faded or otherwise, the original tone is in most cases reproduced with singular persistency. This observation was made in connexion with gold-toned prints, both on albumen and gelatine paper, and it applies with equal force to those that have not been previously toned. Obviously there can be nothing gained by applying the bleaching process to prints that have already been toned with gold, unless they happen to be so bad that any method of improving them is welcome, so we start with the idea of treating prints that have been passed through the hypo bath without gold toning.

Most of our readers will have met, at some time, with the so-called "magic photographs," which make their appearance upon an apparently clean piece of paper upon immersion in water in contact with another piece equally clean, or which may be developed by the smoke of a cigar or cigarette. But many are, perhaps, not aware that these are simply untoned albumen prints, bleached with bichloride of mercury, the invisible image being reproduced by the action of very weak hypo, ammonia, or any of the reagents employed under similar circumstances for the intensification of a gelatine negative.

The tones produced by weak hypo, following bleaching by mercury, are of a most pleasing sepia tint, and for albumen paper, where brown tones are desired, this treatment answers well. But for gelatine papers, in consequence of the hardening action of the bichloride and the persistency with which it clings to the gelatine, it is not to be recommended; although, given thorough washing between the different operations, it will answer as well as with albumen. Sulphite of soda, in place of hypo, is, however, better, as it gives, perhaps, a better colour, with less risk of staining.

A preferable bleaching solution is found in chloride of copper, or, better still, in bromide of copper. These salts may not be found in the ordinary photographic dark room or laboratory, but are easily extemporised out of readily obtainable materials. Sulphate of copper is obtainable at any village chemist's, and if half a drachm of that salt be dissolved in two ounces of water, and the same quantity of bromide of potassium or twenty grains of common salt be added, a solution will be formed containing bromide, or chloride of copper, as the case may be, either of which will rapidly bleach the positive image, and convert it into bromide or chloride of silver.

With either the mercury or copper salts there will, of course, be other metallic products formed in the bleaching process, though these do not appear to materially affect the final result, provided a sufficient washing be given. A better solution consists, perhaps, in a weak mixture of bichromate of potash and hydrochloric acid, ten grains of the former and twenty minims of the latter to the ounce of water. This bleaches the image with great rapidity, and, if the print be washed until the yellow tint of the bichromate is removed, it will be free from any foreign matter in the shape of metallic salts other than those of silver.

The bleaching is a merely mechanical operation, and the result does not greatly vary whatever may be the agent employed. The reduction or redevelopment is, perhaps, equally a mechanical process since the solution employed cannot possibly go beyond a certain point—that is, the complete reduction of the silver haloid present. But a great difference may be made in the colour produced. If the image is converted into chloride, it will behave much in the same way as ordinary chloride paper under development—that is to say, it will with every developer we have tried, unless very powerful, produce a yellowish-brown colour that requires toning with gold or platinum in order to make it acceptable.

If, however, a strong, fresh ferrous-oxalate developer be used, fairly good black and grey tones may be obtained if the paper be not exposed to a strong light before treatment. By exposure to light and treatment with a weak solution the result is precisely the same as with Alpha or other chloride paper.

With a bromide-bleached image, amidol or metol, if employed of the usual negative strength, will give good black tones, but if reduced in strength, as for ordinary development of bromide papers, the colour shows a strong tendency to return to the yellow-brown of the fixed untoned print. Ferrous oxalate exhibits the same tendency, though not to the full extent of the two first named; but in every case the strength of the reducing solution must be much greater than for ordinary bromide paper, more nearly that usually employed for negatives.

The fixing, bleaching, and redevelopment of prints, instead of toning with gold, may seem a round-about way of arriving at a result; but, as a matter of test, we have found it more rapid and less trouble than the ordinary process of gold-toning.

The Japan Exhibition.—The recent exhibition of photographs in Japan was chiefly composed of contributions of well-known pictures by English photographers, including a collection from the Camera Club. The credit of organizing the Exhibition belongs to Mr. W. K. Burton, who, according to opinions expressed in the native press, should be pleased at the result of his labours. About 300 pictures were hung, and the catalogue of them is a tasteful and artistic production. It was printed on tinted crape, with decorative designs on each page.

Auxiliary Lighting.—Every now and again the advantage, or otherwise, of a supplementary lighting of the plate in shortening exposures crops up. It did only last week amongst a few photographic friends, when an animated discussion was carried on for an hour or more. Now, although it was denied by some that any extra detail could be obtained by secondary lighting, the effect being to cause fogging, contrary to the opinion of others all were agreed that in the case of some under-exposed plates, such as "snapshots," a little judicious fogging of the shadows would often be an advantage, particularly when the negatives were to be used for stereoscopic transparencies or lantern slides.

The Patent Office.—The Comptroller-General of Patents has just issued a new series of abridged classes relating to agricultural and horticultural appliances. These abridgments are exceedingly useful as guides to the various specifications. They are, or rather used to be, issued on almost every subject, but unfortunately they are now in a very backward state. The latest issued relating to photography

only brings us to the end of 1883, though it bears the date of a couple of years later. The number of patents taken in connexion with photography during the past ten years is very large, and an abridgment of them would be of service to would-be patentees. Considering the profit realised by the Patent Office, it might be surmised that the compilation of the various abridgments would not have been allowed to fall so much in arrear as they are at present.

"Our Climate."—The moderated temperature of the past week or so has been a great relief to the majority of photographers, and certainly to all workers of processes dependent upon gelatine in conjunction with the alkaline bichromates. At elevated temperatures, such as have recently been experienced, some of them, such as collotype, Woodburytype, and the carbon process, are only worked with difficulty, even when the ordinary conditions of working are considerably modified. With the thermometer at 88° in the shade, Woodbury printing becomes almost, if not quite, impracticable, and collotype only workable when the plates are specially prepared to meet the exigencies of the case, which, by the way, may be changed in a few hours, and then the plates are no longer suitable. Few countries but ours can boast of a climate that can show a difference in the mid-day temperature of 27° in twenty-four hours, and, we might add, so far as gelatine photography is concerned, would desire it.

Photographing the Voice. — Professor Hermann has recently succeeded in photographing the vowel sounds. The method employed was speaking them into a phonograph that reproduced them slowly. The vibrations were recorded by a micro-telephone, in the vibrating drum of which was a smaller mirror, a ray of light from which recorded its vibrations on a travelling strip of sensitive paper. The idea of photographing sounds, however, is not new, for, when the phonograph first came out years ago, the late Professor Jenkin, of Edinburgh, together with Professor Ewin, made similar experiments to those of Professor Hermann. The phonograph, however, used by these gentlemen was the original tinfoil instrument, and the sounds reproduced were somewhat crude. Notwithstanding this, some very interesting results were arrived at, and were published at the time. What would have been thought, prior to the invention of the phonograph, of any one who might have suggested that sounds could be photographed?

Colour Blindness.—The latest suggestion as to the cause of defective colour sense is that of Messrs. Blake and Franklin, of Kansas, who have recently investigated the subject, and who attribute it to a product of civilisation, with the use of tobacco as a possible factor. It is said that colour blindness has been found to occur in about four per cent. of civilieed European and American males, and with the Finlanders and Norwegians it is said to rise to five per cent., while the Dutch go down to 1·43 per cent. According to these authorities, only seven-tenths of one per cent. of the full-blooded Indians of the Haskel Institute at Lawrence are colour-blind. It is not stated whether these Indians abstain from tobacco or not, but it is certain that the Dutch, who have a very low average assigned to them, do not. Colour blindness is suffered by many who really are not cognisant of the fact. Some photographers cannot possibly tone a batch of prints to anything like a uniform colour. One gentleman we know, who is an artist in every way, so far as photography and monochrome goes, occasionally colours a picture, and the result is little short of ridiculous. Although the execution is excellent, blues predominate to such an extent that the picture is completely spoilt.

Use of Dark Rooms.—A few days ago we received a letter from a correspondent, an amateur touring with a camera in the West of England, complaining of the churlishness of some professional photographers in refusing the use of their dark room for the changing of plates or the development of a trial plate. Curiously enough, within a few hours we had letters from two photographers in the provinces complaining, in the one case, of the "impertinence," and in the other of the "nuisance" of amateurs with regard to the use of a dark room. Both of these gentlemen say that a large proportion of amateurs seem to demand the use of a dark room as a right rather than ask it as a favour, and invariably they will not tell their business to the reception-room attendant, but insist on seeing the principal, however busy he may be, to state their requirements. One also complains of the mess made when a plate is developed, and the litter left behind when plates are simply changed, the tourist often departing without even expressing thanks. Each year we receive similar complaints to these, on both sides. Amateurs *en route* should remember, and we believe the majority do, that in asking the use of a dark room they are asking a favour, and at the same time to bear in mind that they may be causing inconvenience to one whose time during business hours is money.

A NEW DEVELOPER FOR GELATINE DRY PLATES.*

The best experimental results were obtained with the tartrate and the metabisulphite of silver. Sulphite of silver, produced by precipitating nitrate of silver by its equivalent weight of sulphite of soda, is but little soluble in water, and is easily washed. The precipitate readily dissolved in a strong solution of sulphite of soda, but when combined with gelatine is less sensitive to electrolytic action than the tartrate. An impure double sulphite of silver and soda can be readily prepared by the addition of a solution of nitrate of silver to a saturated solution of sulphite of soda, as long as the precipitate formed dissolves on stirring. The nitrate of soda produced by this reaction, if not removed, seems to have a restraining action when the developer is prepared with hydroquinone. As pyro is not as strongly influenced by the presence of nitrates, it may be found practicable to prepare the silver salt in this manner in developers in which pyrogallic acid is the reducing agent.

In like manner ammonia may be used in argentic emulsions with pyro, though the addition of ammonia to a hydroquinone developer instantly arrests all reducing action.

Developer No. 1.

Formulæ.

A.

Argentic emulsion (prepared with silver tartrate)	5 ounces.
Metabisulphite of soda	120 grains.

B.

Eikonogen	200 grains.
Hydroquinone	100 „
Metabisulphite of soda	120 „
Distilled water (hot)	4 ounces.
Pure glycerine	1 ounce.

C.

Carbonate of potash	144 grains.

D.

Caustic potash	270 to 300 grains.
Distilled water (hot)	¾ ounce.

E.

Bromide of potash	72 grains.

Solution A is prepared by warming the argentic emulsion gently on a water bath in a glass or porcelain vessel of a capacity of about sixteen ounces. The metabisulphite of soda is stirred in dry immediately before incorporation with B.

The eikonogen, hydroquinone, and metabisulphite (B) are mixed together dry, the water, heated nearly to the boiling point, is mingled with the glycerine and poured over the mass, which immediately dissolves if rapidly stirred, forming a clear golden yellow solution.

The incorporation of A and B requires careful manipulation to avoid the precipitation of the gelatine or the reduction of the silver salt. These solutions are mixed at a temperature of 110° to 140° Fahr., a few drops of B are added to A, with rapid stirring continued for several minutes, until the emulsion, which at first darkened, becomes of a lighter shade. The remainder of B is then poured gradually, a little at a time, into solution A, stirring constantly.

The emulsion should show but little change in colour; it is at once neutralised by C, mixed dry. Carbonic acid is evolved, the emulsion

* Concluded from page 375.

changes to a dark drab colour, and some gelatine separates as a dark-coloured precipitate. D is then added in successive portions, the colour of the emulsion changes to yellowish olive, and the precipitated gelatine redissolves. The amount of caustic potash required varies with the purity of the chemicals, and with any change in the formula. It is best to add to each ounce of the developer from two to four grains of caustic potash in excess of the quantity required to dissolve the precipitate.

Care should be taken to determine the least amount that will form a permanent emulsion. If the proportion of potassium hydrate is too great, the combined silver and gelatine are precipitated.

E is dissolved in the emulsion, and produces no apparent change in its appearance. Water is added sufficient to make the volume twelve ounces. The developer is bottled and cooled in a stream of water, with frequent shaking.

Thus prepared, this developer is permanent, and but little affected by a moderate exposure to daylight. It is kept in bottles of dark-coloured glass wrapped in paper.

The density and colour of the resulting negatives are much affected by the relative proportion of eikonogen and hydroquinone in the above formula. In the proportions given, of two parts eikonogen to one part hydroquinone, the negatives produced are brilliant black in the high lights and of extreme density. With 240 grains of eikonogen and 80 grains hydroquinone, a ratio of three to one, the negatives are grey black, with relatively less density, but with extreme detail.

Composition per Ounce of Developer No. 1.

Eikonogen	16·7	grains.
Hydroquinone	8·3	„
Gelatine	3·5	„
Sulphites of soda	48·	„
Carbonate of potash	12·	„
Caustic potash	25·	„
Bromide of potassium	6·	„
Tartrate of silver	4·8	„ = 1 per cent.
Glycerine	1·5	drachms=19 per cent.

It should be noted that the object of using metabisulphite of soda in the above formula is to make the solutions A and B acid when incorporated, in order to diminish the reducing action of the eikonogen and hydroquinone upon the silver salt. It is more difficult to combine these solutions when alkaline; not infrequently metallic silver is precipitated. By careful manipulation, however, an equivalent quantity of neutral sulphite of soda may be substituted for the metabisulphite.

Carbonate of potash is employed to neutralise the metabisulphite of soda; it also greatly diminishes the action of potassium hydrate upon the gelatine film, preventing, at a temperature not exceeding 60° Fahr., the frilling or cutting of the edges of the film by the caustic alkali.

Bromide of potash, in the presence of the great excess of alkaline salts in this developer, keeps the shadows clear and transparent, even with prolonged development. It has no restraining action, but, in the proportion of five to eight grains per ounce of developer, appears to act rather as an accelerator.

This developer is adjusted by a trial development upon an extreme under-timed plate. The picture should appear in twenty-five to thirty seconds; if longer, two to three grains of caustic potash and one to two grains of bromide of potassium are added to each ounce, to accelerate the action.

There are evidences that this emulsion undergoes ripening if kept in a warm place, or if heated to a temperature of 130° to 160° Fahr. for some hours; the effect of this ripening remains to be investigated; in some experiments a grey precipitate of silver bromide formed, and the electrolytic sensitiveness of the developer was increased.

The objections to the above developer are the complicated formula and the large amount of the caustic alkali used, necessitating development at a low temperature, not exceeding 60° Fahr., to avoid cutting the film. It also requires, to form a permanent emulsion, careful manipulation in compounding, and is much affected by any change in the purity of the chemicals used.

Development.

If the preparation is complicated, the development is correspondingly simple, and it is practicable, with a little experience in its use, to obtain results that are unapproachable in density, and can only be equalled in detail by skilful manipulation with pyro.

For instantaneous and under-timed exposures the developer is used without dilution; if desired, the action may be restrained by the addition of water. A somewhat larger quantity of the developer is required to properly cover the plate, owing to the viscidity of the emulsion. Two trays are used in development, the larger filled with cold water, in which the smaller tray containing the developer partly floats. The negative is placed in the developer, and disappears from view beneath the opaque emulsion; the tray is rocked until the picture comes up. It is only necessary, during the development, to occasionally rock the trays, the viscidity of the developer preventing unequal chemical action or the settling in spots upon the film of any sediment.

The progress of the development is judged by the colour and appearance of the plate when viewed by transmitted light; the low lights and shadows are indicated by white spots in the film, which become yellow-brown as the action proceeds; the development is stopped when the plate is opaque and a walnut-brown colour throughout.

The negative is thoroughly washed, and the surface of the film is rubbed with the hand under a stream of cold water to remove the adhering emulsion; it is then fixed as usual.

When working with plates that have received nearly equal exposure, the time of development furnishes the best guide in obtaining the desired detail and density. There is a wide margin in time when instantaneous views and extreme under-exposures are developed. A good negative may be obtained in six to twelve minutes; if the development be prolonged to half or three quarters of an hour, no harm is done, save that the negative, from increased density, will print very slowly. When desired, the development may be prolonged for one or two hours by changing the water in the outer tray, so that the developer is kept cool and the film uninjured.

This developer may be used repeatedly without exhausting its power or staining the film.

Intensification.

Negatives that have undergone development may be intensified before fixing. For the primary development there is probably nothing better than pyro and soda; no bromide is used, and the development is conducted so as to bring out all the detail possible, keeping back density in the high lights, in order that all parts of the image may be nearly uniformly dense. When no more detail can be obtained, the negative is thoroughly rinsed in a stream of cold water and the secondary development conducted with any of the argentic developers, preferably with No. 1. The action is quite rapid and should be carefully watched, lest the negative be over-intensified. The time required for secondary development is from three to fifteen minutes. The best guide is the appearance of the plate when viewed by transmitted light; the development is finished when the negative becomes brown and opaque, without any light spots in the film. It is then immersed in cold water, the surface of the film is gently rubbed beneath the water with the hand or with absorbent cotton, to remove any adhering emulsion, and the negative is fixed with hypo in the usual manner.

In this secondary development the action of the argentic emulsion appears to be an electrolytic building up of the image in metallic silver. This view is confirmed by the fact that a negative after fixing and washing may be slightly intensified by immersion in the argentic developer. In this case the electrolytic action is very slow, and could probably be made more energetic by increasing the sensitiveness of the emulsion, and indicates that it would be possible to make an argentic intensifier for negatives after fixing, by employing a very sensitive emulsion with ferrous sulphate as a reducing agent.

Developer No. 2.

Formula (apothecaries' weight).

A.

Argentic emulsion (prepared with silver tartrate)	6 ounces.

B.

Sulphite of soda crystals (pure and neutral)	2 ounces.
Water (hot)	8 „

C.

Amidol	120 grains.

D.

Bromide of potassium	8 grains.

The argentic emulsion is gently warmed and the sulphite of soda solution B gradually mixed with it. If a precipitate of gelatine forms from too concentrated a solution, warm the emulsion on a water bath and add gradually hot water until it dissolves. The emulsion, which is of a light olive colour, is allowed to cool; C and D

are added dry and quickly dissolve; the volume is made up to sixteen ounces by water, and the developer is immediately bottled to avoid absorption of oxygen. Tested with litmus paper, it should show a faint alkaline reaction.

Composition per Ounce of Developer No. 2.

Amidol	7·5 grains.
Gelatine	3·1 „
Sulphite soda (free)	60· „
Sulphite soda (combined with silver salt)	25· „
Bromide of potassium	0·5 „
Silver tartrate	4·4 „
Glycerine	¾ drachm = 8 °/₀

This formula is less complicated and more easily prepared than No. I. Only a minute quantity of alkali is required, the sulphite of soda acting as the accelerator, and in consequence, in prolonged development, there is little danger that the film will be attacked. It is also practicable to use a more sensitive argentic emulsion, prepared with the least proportion of gelatine that will restrain the silver tartrate, in order to increase the electrolytic action. This developer has been but little investigated; it is probable that metol, or a mixture of metol and hydroquinone can be substituted for the amidol in the above formula, and other alkalies employed, such as caustic lime, lithia, or baryta.

Development.

In hot weather, or when the development is greatly prolonged, it is advisable to keep the developer cool by an outer tray containing ice water, as heretofore described. Usually, with formula No. 2, this is not necessary, and the development is carried out much in the same manner as with pyro. The action is started with one ounce of the developer mixed with three to five ounces of water, two or three drops of a solution of

Carbonate of potash	120 grains,
Water	1 ounce,

are added to each ounce of the mixed developer to accelerate the development.

The strength is increased by the addition of fresh developer as the operation proceeds. It is only necessary to occasionally rock the tray. The action is less energetic than developer No. 1, and the negative does not so rapidly become opaque. The point at which to terminate the development is judged in the same manner as with pyro, save that, as there is no danger of fogging, it may be prolonged until the negative is dark and opaque. The plate is rinsed in water and fixed as usual. The negatives developed with amidol emulsion much resemble in appearance those produced by pyro.

With a developer of this class it would be practicable, when many negatives were developed, to employ a grooved rubber bath (such as are used for hypo) filled with the developer, and immersed in a vessel of cold water. The vertical position of the plates would prevent any sediment in the developer settling upon the films.

Conclusion.

The formulæ here given are selected from nearly fifty experimental developers, prepared with various emulsified silver salts, combined with different developing agents. They illustrate the preparation of argentic emulsions and the combination, in a chemically passive condition, of such emulsions with reducing agents, in photographic developers.

Much experimental work remains yet to be done to determine the formulæ best adapted for use. The gelatine and the silver salts have a tendency to slow the action in development. It is desirable that the time of development should be shortened, and the electrolytic action of the silver salt made more energetic. W. P. Jenney.

ON THE USE OF TIN-FOIL AS A SUPPORT FOR PHOTO-LITHOGRAPHIC TRANSFERS.

[Photographic Society of Great Britain.]

In the execution of photo-lithographic work, considerable difficulty is sometimes caused by the fact that a transfer prepared in the usual way on paper expands when damped, and also is stretched when pulled through the press in the process of transferring. The image on stone or zinc is therefore distorted, and, in cases in which it is important that the reproduction should be to scale, elaborate precautions must be taken to ensure this. This difficulty is frequently met with in the Lithographic School of the School of Military Engineering, Chatham, which is in my charge. A considerable number of plans and drawings are there reproduced, and in all cases it is desirable that distortion should be avoided. In some cases this is of special importance.

It has recently occurred to Mr. Husband, who is employed in the school as lithographic printer, that tin-foil might be used instead of paper in the preparation of transfers, so as to prevent distortion, and he, together with some of the military lithographers, have been working out the idea.

Incidentally various other advantages in the use of tin-foil (besides that of non-distortion) have come to light, as will be seen presently. Mr. Husband was for many years in charge of the Lithographic School while he was a non-commissioned officer and warrant officer in the Royal Engineers, and his name is known in connexion with his "papyrotint" process for photo-lithography in half-tone. He therefore brings a very large amount of experience to bear on the question. It should be said at once that there is no new principle involved in the process. For line work it is merely a modification of the "papyrotype" process, introduced at the School of Military Engineering by Captain Abney when he held my present appointment, while for half-tone work it is a modification of Mr. Husband's own "papyrotint" process. It is, in fact, quite possible that this identical tin-foil process is in use in other establishments, but I believe that no account of it has ever been published.

The method of procedure is as follows:—

(A) Papyrotype Transfers (for Line Subjects).

A zinc plate, such as is used for zincography, is damped with a dilute solution of gum arabic (say one part in sixty parts water). A sheet of smooth tin-foil of the size of the transfer required is laid on the zinc plate, and the two are pulled through a lithographic press together. The tin-foil adheres to the zinc plate, which thus enables it to be conveniently held during the process of coating with gelatine.

A solution of chromated gelatine is prepared as follows:—

Gelatine, common flake	1 ounce.
Glycerine	2 drachms.
Bichromate of potash	40 grains.
Water (measured independently of the other constituents)	8 ounces.

The gelatine is soaked in the water for half an hour (the water being cold); it is then dissolved by heat. When it is thoroughly dissolved, the glycerine and bichromate are added, and the whole stirred up together; in three or four minutes the bichromate is dissolved, and the mixture is ready for use.

The above quantity is sufficient to coat about eight sheets of the size of half a sheet of foolscap.

The surface of the tin-foil is then cleaned with a solution of caustic potash (strength about one part to forty parts water) to remove all grease, and the chromated gelatine solution, while still hot, is poured over it in the same way as collodion is used to coat a glass plate in wet-plate photography. The beaker containing the solution is covered with a piece of muslin, so that the liquid may be strained while it is poured out. The zinc must be slightly warmed to prevent the solution setting too quickly. The excess of solution is drained off, and as soon as the gelatine has set the plate is stood up to dry in a dark room. The process of drying takes about four hours at the ordinary temperature. If the room is warmed, it requires, of course, a much shorter time, but the results are inferior, as the transfer does not roll up so clean.

The tin-foil is then peeled off the zinc plate by lifting one corner of it with a knife. It may be kept in this condition about twelve days, or it may be used as soon as it is dry. It is placed in a photographic printing frame, and printed in the daylight behind a line negative in the ordinary way until the image is visible in all its details. After printing it is placed in water for three minutes, and then rolled in as usual with a rather soft lithographic ink of the following composition:—

White virgin wax	1 ounce.
Stearine	1 „
Common resin	1 „
Palm oil	½ „
Chalk litho printing ink	4 ounces.

The transfer is immersed for three minutes in a solution of bichromate of potash (strength five grains to one ounce of water) and dried in a dark room. It is then exposed to daylight for a period of three minutes or upwards, according to the strength of the light, so as to harden the gelatine all over. This action should not, however, be carried too far.

Before transferring, the transfer is damped for about three minutes in a "damping book" (using water only), and it is then pulled through the press on a prepared stone or zinc plate. The after-processes are the same as when a transfer on paper has been used.

With care, each sheet of tin-foil can be used a dozen or more times.

Various examples are shown of subjects which have been photo-lithographed or photo-zincographed under identical conditions, except that tin-foil has in some cases been used for the transfers, and in other cases paper. The stones or plates are quite untouched, and it will be seen that the results given by the metal transfers are sharper and cleaner than those obtained by paper. There is also decidedly less distortion in the former case.

In the case of these prints, the images on stone or zinc obtained from the foil transfers are absolutely the same size as the negatives. The images obtained from paper transfers are all stretched to the extent of $\frac{1}{20}$ to $\frac{1}{10}$ of an inch each way, *i.e.*, $\frac{1}{20}$ to $\frac{1}{10}$ of an inch in a length of four to eight inches.

The prints could, of course, be greatly improved by cleaning up and working on the stone or zinc, but it has been thought better to show the results obtained without any retouching or cleaning whatever.

The cost of the work is practically the same in both methods of transfer.

The *advantages* of the new method of preparing the transfers (as compared with paper transfers) are:—

(1) The image on stone or zinc is not distorted. The print, therefore, only has the distortion due to the stretching of the print itself in the press, and this can be eliminated by using a sufficiently stout paper and pulling the print dry.

(2) The work is finer.

(3) The work is cleaner, as specks, &c., can be more easily removed from the transfer.

(4) The transfer does not buckle in the printing frame even when it takes a long time to print and the weather is damp.

(5) Less solution is required to be made for coating a transfer of any given size.

(6) The transfer dries in about half the time.

There is the slight *disadvantage* that, in the case of zinc work, it is rather difficult to get broad lines to transfer solid; they are apt to require retouching.

It is thought that with more experience this difficulty will be overcome, especially if a softer ink is used in rolling up the transfer.

(B) Papynotint Transfers (for Half-tone Subjects).

The tin-foil is laid on a zinc plate and prepared as if for a line subject; it is coated with a solution made up of:—

Gelatine, common flake	2 ounces.
Bichromate of potash	40 grains.
Common salt	70 „
Calcium chloride	70 „
Ferricyanide of potassium	30 „
Chrome alum	8 „
Water (measured independently of other constituents)	8 ounces.

The gelatine is dissolved in the water as in the previous case, and the other ingredients are then added; the foil is dried at a temperature of 70° to 80° Fahr.

The coated tin-foil keeps in good condition for about twelve days.

The transfer is printed under a half-tone negative, rolled in as for a line subject, and then dried. It is not necessary to immerse in a second bichromate bath.

The transfer is damped in a "damping book," using dilute nitric acid (one part to sixty or eighty parts water); this tends to prevent the work becoming blurred through spreading.

The transfer is then pulled through the press on a prepared zinc plate or stone, and the after-processes are carried out as usual.

Examples are passed round showing how the tinfoil transfers compare with paper transfers.

The cost is practically the same in both cases.

The *advantages* of the use of tin-foil as compared with paper are:—

(1) The image on stone or zinc is not distorted.
(2) The transfer can be cleaned more easily.
(3) The transfer does not buckle in printing.
(4) Less gelatine solution is required.
(5) The transfer dries in about half the time.

There is one very slight *disadvantage*, viz., that, if there are any inequalities in the roller used for rolling in the transfer, the marks produced by them show up more than in the case of paper transfers.

Tin-foil transfers give more contrast in the prints, and this is an advantage as compared with the papyrotint process previously used at the School of Military Engineering, which very often produces too flat a print.

(C) Retransfers.

Tin-foil may also with advantage be used for retransfer work, by coating it with the composition ordinarily used for retransfer paper.

The distortion, which with paper is unavoidable, can in this way be prevented, and this might be a matter of considerable importance.

The results are somewhat better than those obtained with ordinary composition paper; but the foil, when coated with composition, has the disadvantage, that it is not quite so easy to store without risk of damage.

(D) Obtaining Several Retransfers of One Subject.

If a reversed negative is used, and a tin-foil transfer is prepared as described above, and, if this transfer is inked in as usual with transfer ink, a print can be taken from it on transfer paper as in the process of collotype printing. The paper print becomes, of course, a retransfer, and can be transferred to stone or zinc.

From the same original tin-foil transfer a number of paper retransfers can similarly be obtained. If these are all transferred to stone or zinc, the various stones or plates can, of course, be printed from at the same time.

For line subjects this method has no advantage as regards the final result over the ordinary method of transferring the tin-foil transfer to a stone or plate; but for half-tone subjects it seems to give much sharper and better results than the ordinary method. Also, in any case the retransfer method takes much less time, as the foil can be printed from while still wet, otherwise it has to be dried.

The experiments are not sufficiently advanced to speak positively as to the retransfer method, because up to the present time there has been a difficulty as regards getting a suitable transfer paper. It is believed, however, that this difficulty has now been surmounted.

(E) Process Work.

One other use of the tin-foil transfer suggested by Mr. Husband is, as a means of preparing a half-tone process block. If the method is a practical one, it certainly might be of very great importance. I am not able to form an opinion as to whether it could be worked, and we have no facilities at the School of Military Engineering for testing the method. In any case, as process work does not appear to be of any use from a purely military point of view, we should not be able to expend time or money on such experiments.

If a sheet of tin-foil is coated with a gelatine solution as described above for the half-tone process, a much thicker layer of solution being left on it than is required for lithographic work, the transfer obtained from such a sheet will have a much coarser grain. If such a transfer were transferred to zinc, and the metal etched with an acid, it seems possible that a half-tone process block could be obtained. Assuming that this would give satisfactory results, the method appears to be decidedly simpler than those ordinarily used.

A coarse-grained transfer when printed from zinc gives a print such as that now passed round for your inspection. Those who have a practical acquaintance with process work will be able to judge whether Mr. Husband is right in suggesting that such transfers could be utilised in this way.

Kind of Foil to be Used.

The most suitable kind of foil yet found for this work is the "4 B foil," supplied by Messrs. Betts & Co., 1, Wharf-road, City-road, N., price 10*d.* per lb. Three and one-half sheets of size 25 × 18 inches weigh 1 lb. The foil can be obtained up to 3 feet by 2 feet 6 inches in size, and no doubt still larger sheets could be got if required.

The foil contains a considerable quantity of lead. Foil made of pure tin has been tried, and has failed entirely, owing to its being too springy to be manageable. Several samples of pure lead foil have been tried, but without success. In contact with the lead, the chromated gelatine becomes of a greenish colour, and loses its sensitiveness almost entirely.

In the process above described, an immense number of variations are, of course, possible. The formulæ and method here given are those which have been found to give the best results, and they may possibly be of interest to some of our members. It is in the hope that this will be the case that I have obtained permission from the military authorities to read this short paper before the Society.

[Captain Mantell remarked that the degree of fineness of grain

might be regulated by the thickness of the gelatine solution employed, and he exhibited proofs showing the fine grain obtained by using a thin coat of chromated gelatine, and the coarser grain resulting from employment of a thicker coating. Referring to the end of paragraph D of the paper, he said it sometimes happened that the transfer paper adhered to the tin-foil, but he believed that difficulty had now been surmounted. He explained that the present communication was adapted from an official report which he recently had occasion to make to the military authorities on the subject of the experiments, which were being continued for certain military purposes.]

CAPTAIN A. M. MANTELL, R.E.

A RAPID TONING BATH FOR GELATINO-CHLORIDE PAPER.

London and Provincial Photographic Association.

LAST year I had the pleasure of bringing before your notice an exceedingly rapid and simple method of toning gelatino-chloride prints, by using a much more concentrated solution than usual. At the time I was seeking rapidity of action merely, and, as the means necessary proved to be of the utmost simplicity, that point was added also. Upon the question of the resulting tone, I also claimed an approach to platinotype, and, though my results then fully bore out the claim, I think it would be wiser now to describe the tone as of a neutral nature, neither too warm nor too cold, but ranging between the warmth of a silver print and the coldness of a platinum or bromide.

But the matter of tone altogether is so much a matter of taste, that it would be better to merely put the one obtained by my experiments as the result, without claiming anything for it. Complaints were made that the workers could not get warm, brown, and red tones with it, which caused me to wax wroth at the idiots who used a bath specially devised for cold tones, with the idea of getting warm, and then thought the bath no use in consequence. Therefore, for the present, I claim the following points as the features of my method of toning:—

1, Great speed of action; 2, absolute simplicity; 3, no trouble to work.

The idea has often occurred to me that we are sometimes too hasty in accusing a man of being old-fashioned and stick-in-the-mud, because he prefers old methods and won't change, as we, perhaps, have done, to newer ones. The point is often overlooked that the new method, however excellent in many directions, may yet lack any improvement in the particular one appreciated by the older worker.

The above bath is an illustration, and one no doubt applicable to many workers. If rapid work and simplicity be to them no attraction, then it cannot be expected that they will forsake an old friend which perchance gives them a tone they like better.

To make a personal application of this thought, I should hardly be attracted by any toning bath that was no improvement upon mine as regards speed and simplicity. Our pet ideas govern our thoughts and wishes to a greater degree than we imagine or would be willing to allow. It therefore matters but little how vast the improvement be; if it is not in our own direction, we perhaps prefer to stick in the old groove.

All my experiments have been made with the direct object of obtaining speed in toning. This I have decidedly accomplished, as I shall prove to you later on. But only those who have left the beaten track of toning baths for that of experiment know the great variety of tones obtainable—or, rather, obtained—for they are not always obtainable; at least, it is difficult to ensure the same tone again, and I have settled down into the conviction that batches of paper must vary considerably. With exactly the same bath, and under precisely similar conditions, different tones are obtained. I have practically tested this by using four pieces six months, four months, and two months old, and a piece bought the day before. These, when toned *together* in the same bath, have not resulted in the same tone. It may be that some gradual chemical action takes place in the emulsion upon the paper in the course of storage. I am convinced that it is not atmospheric influence at all, because I have carefully stored pieces nine months, and then exposed to air for a week in a dark corner pieces of absolutely new paper. The result was that the new paper did show traces of the treatment, but the old did not. It is therefore either a difference in the emulsion or a chemical action during storage.

The range of tones obtainable upon gelatino-chloride paper is simply marvellous. The fact strikes the experimenter most powerfully. Upon many occasions the results have caused me to use language which was quite warranted by the exigencies of the case, and was good English, but quite unfit for publication. The density of the negative, its colour, the length of time printing, and even the degree of washing before toning, all had a hand in the tone. However, as tone is to me at present a secondary matter, we will dip at once into actual experiment.

I fully intended last year, during the autumn, making a complete attack upon the question of rapid toning, but business did not permit, nor, for various reasons, have I been able to do much till lately. Even now, living in chambers, the opportunities and conveniences of work are most limited. Still I have convinced myself of several points. When I first introduced the bath, the extremely rapid action seemed likely to be a boon; but, when scant attention to it followed, it not being even thought worthy of insertion in the annals of progress published at the end of the year, it struck me that perhaps there wasn't very much in it, after all, and for months, though using it exclusively myself, the subject did not bother my head. Recently, however, occasion arose, after three or four months' complete absence from any printing work at all, that batches of 100 to 150 prints every night were necessary. The same bath was used, and the fact that it was a good thing came most forcibly to my mind. I determined to experiment further, and the present paper is the result.

The experiments were all made with two main objects—rapidity of toning and finality of result, leaving the resulting tone to be the unknown factor. The principles laid down were:—

1. Each print must tone completely in two minutes as a maximum.
2. There must be a definite tone (finality) which no reasonable amount of after-immersion can alter.

The reason of the first is obvious. By the second, I wanted to get the power of what may be termed "careless work," that is, that, if the print be unevenly toned, it can be put right afterwards. As a matter of fact, my first point in starting a batch is to see that they will readily tone unequally.

Two kinds of paper, "Solio" and "P. O. P.," the former in white and pink tints only, owing to inability to obtain the mauve; and the latter in all three. Prints from the same negative were toned in the four following baths:—

Bicarbonate Bath.

Gold	1 grain.
Bicarbonate of soda	25 grains.
Water	1½ ounce.

Acetate Bath.

Gold	1 grain.
Acetate soda	20 grains.
Water	1½ ounce.

Phosphate Bath.

Gold	1 grain.
Phosphate soda	25 grains.
Water	1½ ounce.

Borax Bath.

Gold chloride	1 grain.
Borax	40 grains.
Water	1½ ounce.

All these baths worked rapidly enough, but the acetate one requires mixing at least an hour before use, whereas the others can be made up immediately.

The first result arrived at is, that the tint of the paper governed the tone more than any differences in the bath. I will detail the actual results:—

Pink paper (P.O.P.)	No difference in tone at all.
White „ „	The acetate bath gave a slightly redder tone; the rest, alike.
Mauve „ „	No difference.
Pink „ (Solio)	No difference.
White „ „	Bicarbonate, grey black; phosphate, a warmer tint; borax, warmer still; and acetate, quite a purplish pink.

Upon the whole, the best results were obtained upon white Solio, mauve P.O.P., and white P.O.P. The latter, with the bicarbonate and borax baths, gives a tone very closely approaching that often obtained in platinum toning, viz., a very warm sepia. As a general rule, white paper should always be used if a grey black tone be desired.

Leaving, now, the question of tone altogether, to deal with rapidity of action, there is not much to choose between bicarbonate, phosphate, and acetate. But I certainly prefer the bicarbonate bath as the best of these four at all events. Mixtures I did not try, as I was aiming at simplicity. The less mixtures in photographic formulæ the

better is my maxim; and, certainly, in toning baths for gelatino-chloride papers we can do with a little more simplicity. Some of the concoctions put forward are a credit to the ingenuity of the chemist, viz., the number of ingredients possible to be put in without injury. They are simply preposterous.

You will see later on that my assertions as to the speed of toning will be borne out by the demonstration. I noted down the other night the time occupied by a batch. A whole-plate tray was used, and the following bath:—

Bicarbonate of soda	1½ drachms.
Chloride of gold	4 grains.
Water	6 ounces.

The prints were merely laid in the tray and kept under the solution by touching with the fingers; the tray itself was never moved. Until the last few prints it took all my time to get them in and out fast enough. Even then I lost time by having to light my pipe.

Total toned	105 quarter plates.
Full time	28 minutes.
First print	23 seconds.
Last print	70 „

One that occupied about forty seconds to tone was left for nearly an hour in the bath, and the resulting tone was no different. If we say fifty minutes, that means a period of time which may be roughly stated as twenty-five to one. The print was certainly flattened or bleached a little, but the tone was not different. This proves that my claim to a finality of tone is quite within reason.

By this means the power of what I have termed "careless" toning is acquired. A print can be half toned, the other half not touching the solution at all, laid aside for a time, and then finished. There will be no mark apparent. Or spots and streaks can be dealt with in the same way.

Of course, I in no way advocate such treatment, nor that prints should be toned for fifty minutes when forty seconds will suffice. These are merely extreme experiments, but they serve to show how easy this method of work renders the toning of gelatino-chloride paper, which it must be admitted in some toning baths is certainly not the case.

There is one point worth reference, which is that the actual amount of bicarbonate of soda in the bath is not, within limits of course, a matter of much importance. At least experiments with three-quarter drachm to two and a half drachm, the gold and water remaining the same have not produced any different results. The only thing I can fancy to have noticed is that the more bicarbonate the slower the toning and the greater tendency towards warmth of tone. But one and a half drachms is a fair workable proportion.

The mere relation of the advantages of the bath impresses no one. Every one fails to grasp its advantages to a considerable extent; but, when shown it in actual work, it is altogether different. For that reason I shall proceed to demonstrate it before you to-night, and in doing so will work completely in my usual fashion.

I claim for the bath that it is the most rapid in action and most simple in working of any one ever introduced, and the resulting tone is to me and to many others a pleasing one. W. D. Welford.

DODGES.

[North Middlesex Photographic Society.]

The subject of "Dodges" is one that should be of great interest to the amateur photographer; in fact, it goes a long way to complete his photographic education. To the profession I presume it is impossible to mention anything under this head that is not in their every-day practice; but the beginner in the art regards anything outside the elementary instructions of procedure as dodges—at least, I do. That the best workers among us indulge in dodging is admitted. One will tell you he is obliged to dodge all his negatives, another that good negatives are the exception with him rather than the rule, or another that he has no good negatives, mostly failures, and so on. Of course, a good deal of this is modesty; but it leads one to the conclusion that the production of superior work is, as of course it must be, the result of careful manipulation at every stage of the process, and knowing the means by which to avoid or overcome defects of every description as they arise, and to many of us they arise often enough. It is my intention, therefore, with your permission, to refer to a few rough-and-ready dodges that in my own limited practice of photography have been found useful, and I will also offer you a suggestion or two which I trust will be worthy of your consideration; but I would add, that my remarks (coming as they do from rather a raw recruit) are intended for the less-advanced workers chiefly.

The most interesting part of dodging refers, no doubt, to work on the negative; but before we come to that I purpose mentioning a few other items, and will commence with development, and thence of a brush. I first saw a brush used in this room for the purpose, as I understood, of preventing air-bells and keeping the developer in motion. I tried it for the latter purpose, and soon accustomed myself to use it in literally painting out under-exposed parts (after pouring off the developer), and by this method worked up detail in the weak parts without causing undue density in the high lights—to me a most important point. With usual development, when a plate was any way under-exposed, or the contrasts great, I was always liable to get the high lights developed right through to the back of the plates (when they begin to spread and cause halation) before sufficient detail was obtained in the shadows. On the other hand, with a brush, when I find the high lights progressing favourably, I pour off the developer and work out all detail, then pour on the whole of developer again, rocking the dish until sufficient density is obtained, and stopping development when the high lights are quite through the plate and before they have time to spread. The negative I pass round for your inspection was produced in this way. The white garments of the cricketers and tent came up at once, and were fully out when the lower part of the plate was bare; the black coat in central figure was also bare glass without detail; but by pouring off developer except a small quantity, and tilting the tray so that the developer only covered the bottom part, with the brush I was enabled to get out all detail of grass and black coat without losing detail in the high lights. With the ordinary mode of development I think the result would have been far different. As a curiosity, I also show you another negative of the same subject, worked up in the same way, but over-exposed, the exposure being in the proportion of three to seven; the developer was, of course, very different. You will notice there is a difference in colour of the film, but the printing quality is the same, and in this case I think the developer has modified the action of exposure, for I doubt if you can tell which is the over-exposed plate. I also pass round two other negatives, exposed and developed with the idea that development with the brush will go a long way to prevent halation. In the first the distance came up at once, but the near buildings were certainly under-exposed, being in heavy shadow. It took twenty minutes to get out detail; but the distance or central part was only a minute or so under the developer, irregularity being avoided by occasionally sweeping the wet brush over the whole of the plate. The other negative was an instantaneous exposure, treated in the same way; but you may observe that the edges of the trees are perfectly sharp, and the negative with a little other dodging gives a fair print.

Another advantage of the brush and local development is that clouds can be saved in the negative if there are any in the landscape; or, in other cases, it may be desirable to keep the sky thin, and work clouds on the back in the manner to be presently described, and I feel confident, after twelve months' trial, that the brush gives great power over the quality of the negative, and I mention it to you as a most useful dodge.

Before I leave development, I would also mention the use of the warm finger in more energetically bringing out particular parts. In lantern slides this is very useful, but it can be easily overdone. Gently move the second finger over the part you wish to bring out stronger. When the second finger gets cold, use the third finger on the place, and, by the time the third is cold, the second will be again warm enough to continue the operation, and so on until the desired effect is obtained.

Intensification is, I think, almost outside our subject, especially as the matter has been so ably dealt with on other occasions. I am tempted, however, to say my own opinion is that, if thin negatives are cases of vexation, intensification, unless performed with great judgment, is, nine times out of ten, quite as bad; but there is a dodge or two in connexion with it worth mentioning. The first is, dry your negatives quickly and in a strong light; it gives (or prevents them losing) density. You will be surprised at the difference in a negative dried in a strong light, or even in the sun, if the negative has previously passed through the alum bath, and one dried in the dark in a cold situation. The first will be of a rich brown colour, the other of a greyish tone, and of less printing density. Another dodge is slight intensification by the clearing bath, but it must be a clearing bath containing iron. The iron immediately changes the colour of the film, darkens the high lights, and at the same time clears the shadows, and so gives a crispness not possessed by the negatives before. A weak solution of plain iron, or the usual iron developer, will also intensify by changing the colour of the film.

In some instances it becomes a necessity to reduce parts of a negative. a strong light through the branches of trees, or a bright ray of light through a window, or an archway, generally causes halation, to the detriment of the negative. In most of these cases it is possible to con-

siderably modify the evil, or even entirely overcome it, by chemical or mechanical means. I recommend methylated spirit (it must be neat, not spirit and water), and must be used, after the negative is dry, by applying a little to the part to be treated until it softens (don't be in a hurry about it); then, with a piece of chamois leather, rub the part until it comes off on the leather, changing the leather when it gets black, and continue until the desired effect is obtained. I only recommend this treatment for small patches, say, not exceeding the size of a sixpence. For larger surfaces the remedy is often worse than the disease, as the result often appears unpleasantly smeary. It is effective on faces when too dense, also to bring details out in the folds of a white dress; but, like all remedies of this description, it must be used with caution and patience. Another method I have tried, rubbing down with brickdust, and find it effective on thick films. The way to use it is to rub your finger on a piece of bath brick until the ribs on the skin are worn down, and the finger quite smooth. The finger will then have adhering to it sufficient of the fine dust to reduce density on the face, &c. This will not do for thin films.

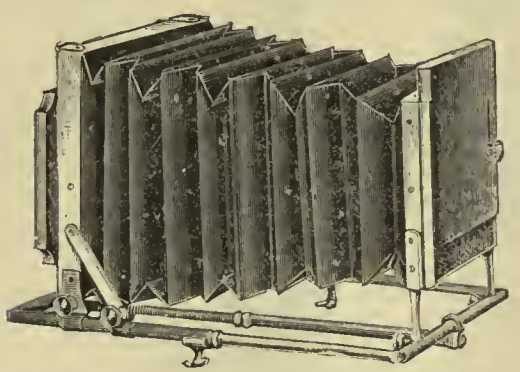
It is sometimes desirable to use quarter-plates in a half-plate dark slide, but it is a nuisance bothering with quarter-plate carriers in addition to being obliged to get a separate box of plates. Both of these troubles can be avoided by cutting a half-plate in half with one of the cheap glass cutters. Place one half in centre of dark slide, filling up the side spaces with cardboard the same thickness as plate. In this way two quarter-plates can be used back to back, or one quarter-plate and one half-plate.

(*To be continued.*) C. O. Gregory.

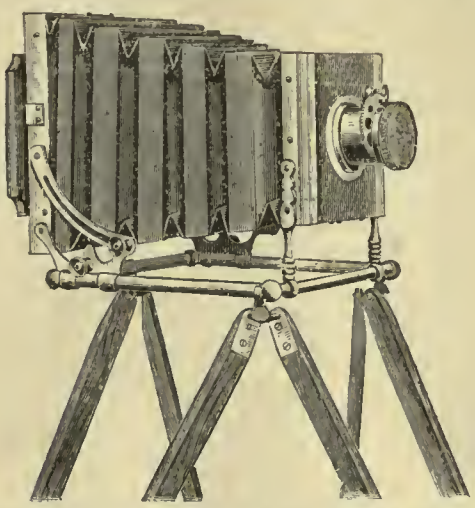
SUMMER NOVELTIES IN APPARATUS, &c.

Walter Griffiths & Co., Union-passage, Birmingham.

In the Zodiac camera of Messrs. Walter Griffiths & Co., which, they say, signalises their entry into the manufacture of general photographic apparatus, the substitution of metal, and that in a tubular form, for



several parts usually made of wood, is not only calculated to make the camera of peculiar service in trying climates, but does so without adding



to the average weight—indeed, it is claimed that it actually reduces it. The first cut shows a front view of the camera, with rising front and extending base. The camera has either a leather or a cloth bellows, and all the usual movements, long extension being obtained by means of the screw which, it will be observed, runs the whole length of the base. There is no woodwork where the joints can open, the few wooden parts that are retained being bound with brass. The double slides are entirely of metal, and, besides being only an eighth of an inch larger than the plate, are only three-eighths of an inch thick. They carry films as well as plates. Placed in the camera, they drop into the recess from the back, and are held in position by spring clips. The construction of the slide is of the simplest, it consisting, in brief, of a species of double sheath, with two shutters.

The second illustration shows the method of fixing the camera to the stand; head, screw, and loose parts thus being obviated. The camera, when folded up, is very compact. A stereo camera of the Zodiac type is also supplied by Messrs. Griffiths. Especially in such climates where wood is liable to be affected, the substitution of tubular metal will probably be found an advantage.

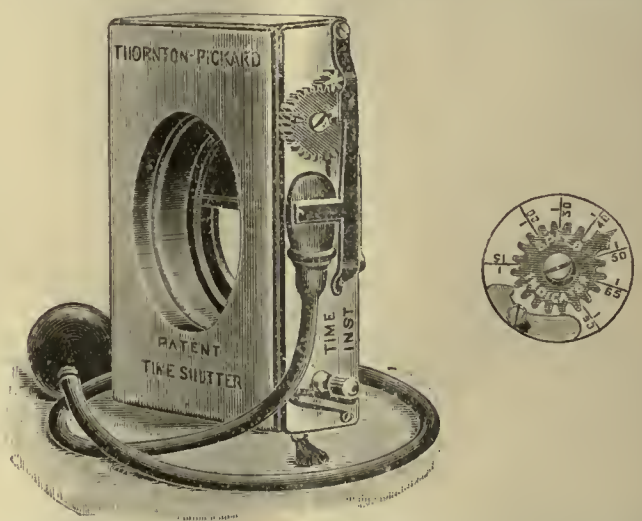
Upon their premises in Union-passage Messrs. Griffiths place a studio, dark room, and reading room at the disposal of amateurs.

Miller's new Adelphi hand camera, which was shown us by Mr. F. V. Lloyd, of South John-street, Liverpool, has now a simple but ingenious attachment in the shape of a movement which both releases the shutter and elevates the flap that intervenes between the sensitive plate and the lens. This is a very happy idea.

The Thornton-Pickard Manufacturing Company, Altrincham.

The recently erected works of the Thornton-Pickard Company at Altrincham, near Manchester, which are chiefly devoted to the manufacture of the famous shutters with which the name of the firm is identified, are in all senses interesting, not only from their extent and completeness, but as showing the great amount of ingenuity and skill which has to be specialised and concentrated upon the production of the firm's specialities. The workshops, as indeed the premises generally, are situated entirely on the ground floor, and in the first-named, which radiate, as it were, from the office as a base, it is instructive to follow the growth of a shutter in the various hands through which it has to pass. Under the guidance of Mr. Edgar Pickard, such an opportunity was recently given us.

The preparation of the mahogany boxes in which the mechanism and blind of the shutter are contained is first noticed. The parts are glued up under pressure, and the boxes as made are double, and are therefore split into two. A sand-papering machine imparts the necessary finish to them, the particles of mahogany dust created by the revolving stones being carried off by fans. For the wood in the rough a planing machine working at 5000 revolutions a minute is used. Passing by several circular saws for light and heavy work, we stop to watch a workman pressing the



little indicator wheels out of sheets of brass; an upright moulding machine for rounding off the corners of the boxes, and a cutting machine for turning out the small connexions for connecting tubing to the shutters. Other machines are devoted to polishing the pins of the shutter, turning holes in the shutter cases, &c., the machinery being driven by a seven horse-power Otto gas engine. In one corner a lad is at work at a sewing-machine preparing the blinds.

One side of the workshop is practically devoted to lacquering and blacking the various parts and the fitting together of the shutter. The spring of each shutter is tested by a weight before it leaves the shop for the testing department. A separate shop is devoted to the polishing; and in the stock-room, behind a series of carefully "blinded" divisions, stock

of the numerous parts is kept. Taking a line by the enormous numbers of each individual part—such as the indicators—which we saw in preparation, one is driven to the conclusion that the output of the Thornton-Pickard shutters is very large. This rapid and imperfect sketch of the firm's workshops does not in any way do justice to one of the completest and most interesting installations in connexion with photographic industry which we have recently inspected.

Since its first introduction, the well-known Time and Instantaneous shutter has undergone some slight modifications, although its action and principles remain the same. Among recent additions is a speed indicator, which consists of a dial, marked in fractions of a second, attached to the side of the shutter, and a pointer on the end of the spring-roller spindle. The speed is indicated on the dial in fractions of a second by the pointer, which can be set to the speed desired by means of the nob.

A similar type of shutter, the "Snap Shot," is very popular for hand cameras. The Focal Plane shutter is designed for use where the maximum degree of rapidity is required.

It is made upon the roller-blind principle. It fits into the back of the camera in the place otherwise occupied by the dark slide, the dark slide itself being placed in the back of the shutter. The shutter blind, therefore, works just in front of the plate, and has a narrow slit in it the full width of the plate, which gives the exposure as it passes rapidly across. The speed is regulated by the small knob. The shutter is set for exposure by winding the large knob at the top, and to show how far to wind there is a winding indicator at the opposite side, not shown in the engraving.

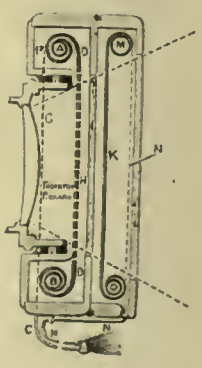
In the bottom end of the blind there is an opening the full size of the plate, by means of which the picture may be focussed on the ground glass if the blind is wound to the top.

A new patent adjustable slit is now added to the focal plane shutters in addition to the adjustable spring roller. This improvement adds greatly to the range of speed of the shutter, which now extends from one-twentieth of a second to one one-thousandth of a second. The speed is varied by means of a chain at each end of the slit, which can be lengthened and shortened at will, making the sides of the slit perfectly parallel without skill, the directions for use being as follows:—

After removing the focussing screen, take hold of the two struts which form the parallel sides of the slit in the blind, and turn them askew, at the same time drawing them forwards out of the shutter. The chains at the ends of the slit can then be manipulated. One end of the chain is fixed permanently to one strut, while the other part of the chain is linked on to the extreme end of the other strut, the end of it passing inwards along the length of the strut. This part may be pulled out and linked on to the end of the strut to make the slit wider, or allowed to spring back into the strut which makes the slit narrower. All that is necessary is to see that the same number of links are used at each end of the slit.

The speed of the shutter is found by dividing the speed given on the indicator by the number of links in use at each end. That is to say, with only one whole link the speed is that given on the indicator; with ten links (which is the extremity) it is one-tenth of the same.

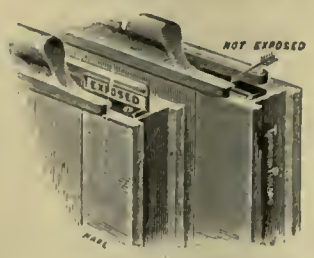
The safety blind which Messrs. Thornton-Pickard fit either to the Time and Instantaneous, or the snap-shot shutters, when fitted to the shutter, will automatically cover the opening during the act of resetting the shutter for the next exposure, so that the sensitive plate may always remain uncovered in the camera. It only adds five-eighths of an inch to the thickness of the shutter, and does not increase the dimensions otherwise.



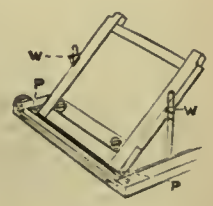
The illustration shows a section of safety blind attached to an ordinary shutter, either Time and Instantaneous or snap-shot pattern.

In action, when the tassel is pulled, the exposing blind D is wound on to the top roller A, by means of the cord C, and at the same time the safety blind K is pulled up over the top roller M by the cord N. It will be seen from the illustration that the safety blind K, and the opening H in the exposing blind, both pass across the aperture in the shutter together, so that no light can pass through. When the tassel is released, after pulling the cords as far as possible, the safety blind immediately rewinds on to the spring roller Q, leaving the exposing blind set ready for exposure.

The annexed illustration shows a small and useful device for enabling one to see at a glance which plates have been exposed, thus preventing the possibility of two pictures being taken on one plate. It consists of a small hinged plate or lid, which lies down flat before exposure, but, as soon as the shutter of the slide is withdrawn to expose the plate, the lid flies open and discloses the word "Exposed," and remains in this position until the slide is again charged with a fresh plate in the dark room. The "Recorder" may then be set ready for the next exposure by simply closing down the lid with the forefinger, at the same time closing the shutter of the dark slide. Whenever the shutter of the slide is withdrawn without exposing the plate, the "Recorder" lid may be closed again at the same time the shutter is pushed home.

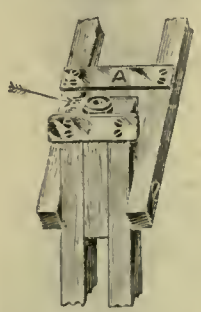


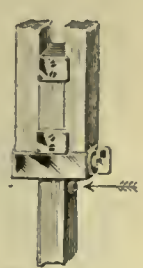
The "Ruby" camera is an exceedingly light, rigid, and portable instrument, fitted with a turntable, the centre of the latter being cut away so that the lens and shutter fold up with the camera. The front can be quickly erected, and is rigid and firm when in position. The cut shows how to fix it. After opening the camera, place the front in the position shown, leaning backwards, so that the bottom corner hooks of



the front are over the pivots marked P. Press the front down between the pivots, and then place it in the vertical position, as shown in the figure. Fasten in position by turning the winged clamping screws marked W. The camera has double pinion for focussing; it allows of the use of very wide-angle lenses, rising and sliding front, and all the other usual movements, obtainable with a minimum of trouble.

In the way of tripods the firm have very recently brought out a stand having automatically locking joints, which, while being perfectly rigid, is easily set up, and is adjustable to various heights. The lower section slides so as to be adjustable in height. On pulling out this section as far as possible the spring bolt marked by the arrow in the engraving



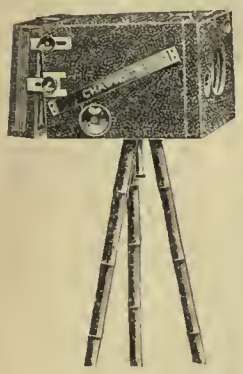


springs out and instantly locks the joint. To close again, the spring bolt is pressed with the thumb, which allows it to slide back again. A thumbscrew is provided at this joint, so that the section may be adjusted to any height, as above mentioned, and may be used in addition to the spring bolt to give extra rigidity if desired.

The upper joint is locked on exactly the same principle, but it folds instead of slides; the spring bolt is larger and stronger, and snaps into position as soon as the upper section is unfolded. The two sections are

therefore wedged together in a very practical manner, and the utmost rigidity is secured.

The rapidly increasing specialities of the firm show that a great deal of mechanical thought and application have been expended on them. All have a degree of finish and carefulness of construction which stamp them as the products of great skill, while of the practical efficiency of the series of shutters, and their adaptability to the needs of varions classes of photography and shutter-users, there can be no doubt.



THE CHADWICK IMPROVED HAND CAMERA.

The annexed cut was omitted from our notice of the Chadwick hand camera last week. It shows the camera on a stand, and the swing back in use. As may be observed, the back swings from its centre, which, in theory, it should do.

Our Editorial Table.

DR. ANDRESEN'S GLYCIN.

Arthur Schwartz & Co., Dashwood House, E.C.

THE directions for using Dr. Andresen's glycin are as follows:—

1. For soft development:

Solution A (warm slightly).

Glycin	4	parts.
Carbonate of potash	1½	„
Sulphite of soda (cryst.)	12	„
Water	100	„

Solution B.

Carbonate of potash	10	„
Water	100	„

For use, mix one part of *A* with two parts of *B*.

II. For hard development:

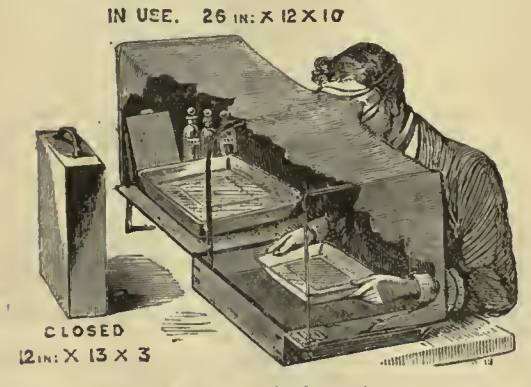
Glycin	5	parts.
Carbonate of potash	25	„
Sulphite of soda (cryst.)	25	„
Water	100	„

For use to be diluted three times its volume.

Employing the developer in accordance with the first-named formula, we find that, although it is rather slow and deliberative in action, yet it yields negatives of great harmony and softness, and of a charming colour. It is an elegant developer, likely to be of service in special cases.

BAKER'S TOURISTS' DEVELOPING TENT.

MR. C. BAKER, of Wallington, Surrey, has modified the developing tent he brought out some time since. The illustration shows its construction and general appearance. The tent when open is about



twenty-four inches long by ten inches wide and ten inches high without the sink, which is two and a half inches deep. When closed, it forms a box twelve inches square by three and a quarter inches, in which there is room for several small articles. The sides of the tent are composed of perfectly opaque material, and as the light can only enter by the red window, which is guarded by a blind, its amount can be regulated as desired. The tent is simple and efficacious in use, and should be popular.

"PHOTOGRAPHY" ANNUAL.

London: Iliffe & Son.

MR. HENRY STURMEY, the editor of this ponderous annual, may congratulate himself upon having this year issued a volume exceeding both in quantity and quality any of his two former annuals. It opens with a section devoted to reference tables, a feature that is always useful. Tips for tyros follow. Mr. C. H. Bothamley discourses on "Progress in Photographic Chemistry during 1892," and Mr. A. Taylor similarly on "Progress of Astronomical Photography." There are other articles on various phases of photographic practice, and quite a number of illustrations both of a pictorial and diagrammatic nature.

RECEIVED:—Sixtieth Annual Report of the Royal Cornwall Polytechnic Society; *The Illustrated Archæologist*, No. 1, edited by J. Romilly Allen (Chas. J. Clark, 4, Lincoln's-inn-fields, W.C.).

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,008.—"An Improved Plate Rest for Supporting Negative or Positive Photographic Plates in a Fixing or other Bath." J. BARNES.—*Dated June* 19, 1893.

No. 12,287.—"Improvements in Photographic Apparatus." Communicated by P. Meyer. A. J. BOULT.—*Dated June* 22, 1893.

No. 12,296.—"Improvements in the Manufacture of Half-tone Gelatine Reliefs for Process Blocks." Complete specification. J. HUSNIK.—*Dated June* 22, 1893.

No. 12,304.—"An Improvement in the Manufacture of Sensitive Plates or Films for Photographic Purposes." Complete specification. F. W. EDWARDS and H. RANSOM.—*Dated June* 22, 1893.

No. 12,443.—"Improvements in Photographic Apparatus." W. J. GREATOREX.—*Dated June* 24, 1893.

SPECIFICATION PUBLISHED.

1892.

No. 13,857.—"Photographic Changing Boxes." NEWMAN & GUARDIA.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 3	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
„ 3	Peterborough	Museum, Minster Precincts.
„ 3	Putney	High-street, Putney.
„ 3	Richmond	Greyhound Hotel.
„ 3	South London	Hanover Hall, Hanover-park, S.E.
„ 3	Stereoscopic Club	Brooklands Hotel, Brooklands.
„ 4	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 4	Brixton and Clapham	376, Coldharbour-lane, Brixton.
„ 4	Exeter	City Chambers, Gandy-st., Exeter.
„ 4	Hackney	206, Mare-street, Hackney.
„ 4	Herefordshire	Mansion House, Hereford.
„ 4	Lewes	Fitzroy Library, High-st., Lewes.
„ 4	North London	Canonbury Tower, Islington, N.
„ 4	Oxford Photo. Society	Society's Rooms, 136, High-street.
„ 4	Paisley	9, Gauze-street, Paisley.
„ 4	Rochester	Mathematical School, Rochester.
„ 4	Rotherham	5, Frederick-street, Rotherham.
„ 4	Sheffield Photo. Society	Masonic Hall, Surrey-street.
„ 4	York	Victoria Hall, Goodramgate, York.
„ 5	Leytonstone	The Assembly Rooms, High-road.
„ 5	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 5	Southport	The Studio, 15, Cambridge-arcade.
„ 5	Southsea	3, King's-road, Southsea.
„ 5	Wallasey	Egremont Institute, Egremont.
„ 6	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 6	Glossop Dale	
„ 6	Hull	71, Prospect-street, Hull.
„ 6	Leeds Photo. Society	Mechanics' Institute, Leeds.
„ 6	London and Provincial	Champion Hotel, 15, Aldersgate-st.
„ 6	Oldham	The Lyceum, Union-st., Oldham.
„ 6	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
„ 7	Cardiff	
„ 7	Croydon Microscopical	Public Hall, George-street, Croydon
„ 7	Holborn	
„ 7	Leamington	Trinity Church Room, Morton-st.
„ 7	Maidstone	"The Palace," Maidstone.
„ 8	Hull	71 Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

JUNE 27,—Mr. G. Scamell in the chair.

Mr. W. E. DEBENHAM gave a demonstration of *The Carbon Process*, prefacing it with a brief description of its essential principles. Speaking of the sensitising of the tissue, he said he preferred to use the bichromate in the proportion of one ounce to a quart of water. He found no advantage in the addition of ammonia, except when an excess of chromic acid is present. In drying, he recommended squeegeeing the sensitised tissue on to the glass, and leaving it thereon until it is wanted, as if dried by hanging the tendency to curl was objectionable. Having dealt with the uses of the safe edge, and demonstrated both single and double transfer, he said that for exposure he preferred the actinometer he himself devised some years ago, and which was adopted by the late Mr. Sawyer. He, however, used a portion of a portrait negative, various tints from which were made on gelatine or albumen paper, and could be matched in printing. In development, if the print was too dark, hotter water could be used.

A brief discussion followed on the continuating action of light.

Mr. H. J. BURTON remarked that, in the print developed, which was said to have been over-printed, the continuating action had taken place. There was plenty of time since the afternoon, when Mr. Debenham had made the print.

Mr. T. BOLAS agreed with Mr. Burton, and said that, if a trace of damp was present in the tissue, the effect of keeping the exposed tissue a little while in a hot place was easily recognisable.

Mr. H. CHAPMAN JONES, when exposing tissue to be kept a day, would only give it a quarter of the time as against the full time when exposing and developing the same day.

After other discussion, a vote of thanks was passed to Mr. Debenham, and the meeting closed.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 22,—Mr. W. E. Debenham in the chair.

Mr. W. D. Welford passed round the catalogue of the exhibition of photographs recently held in Japan, also two books of pictures by Mr. W. K. Burton of snapshots and enlargements in collotype.

THE UNIVERSAL HAND CAMERA.

Mr. H. B. Sharp (Messrs. Sharp & Hitchmough, Liverpool) exhibited and explained the Universal hand camera. This is a quarter-plate camera contained in a box, the back and front of which let down, or the camera may be entirely removed from it. Focussing is effected by means of a rack and pinion attached to the body, thus rendering the camera useful for copying and lantern-slide making where it is desired not to move the lens. The camera has swing back and rising front, time and instantaneous shutter.

AN IMPROVED RETOUCHING DESK.

Mr. Sharp also showed a retouching desk having a spring, attached to which was a diaphragm, with inner diaphragms, for placing round the head or any part of a negative, and thus concentrating the light upon it. Chamois leather on the diaphragms protects the negative. At the side of the frame a small glass is let in, which is illuminated by the same light as the negative, and is used for matching tints.

"WELFORD'S TONING BATH FOR GELATINE PRINTS."

Mr. W. D. WELFORD read a paper on this subject [see p. 408], afterwards toning several prints by the bath. Toning was completed in less than a minute. Prints the halves of which were toned at intervals gave no indication of "joins." Untoned patches subsequently toned were indistinguishable from the parts first toned.

In the discussion which followed, Mr. T. BOLAS observed that he preferred a more thorough washing between the fixing and the alum solution than Mr. Welford gave.

Mr. J. S. Teape tried the bath last year, and found that, after toning a dozen prints, the others had a certain tendency to mealiness, and finally they lost quality altogether. He used the same batch of paper throughout, and noticed that many of the prints had a tendency to pinkiness.

Mr. T. E. Freshwater had succeeded well with an acetate bath for gelatine paper. The latter seemed to require much more careful washing than albumenised paper. The bath, which was supposed to be kept twenty-four hours after being made, and which he had used at once, was as follows:—

Acetate soda	1 ounce.
Gold chloride	15 grains.
Water	20 ounces.

Of this stock solution he had used two ounces in eight ounces water.

Mr. P. Everitt thought the rapidity of action of Mr. Welford's bath might be a disadvantage to many; he himself would not care to use a bath that toned so quickly. If one wanted a variety of tone, there would be a considerable difficulty in obtaining it with a very quick toning bath. He himself used one and a half grains of gold chloride in twelve ounces of water, to which a pinch of borax was added.

Mr. A. HADDON asked if Mr. Welford had noticed any difference of result between carbonate and bicarbonate of soda.

Mr. J. Weir Brown pointed out that the tones of some experimental prints shown were not the same as those of some prints which Mr. Welford had made with the bath last year.

Mr. S. Herbert Fry thought it a misfortune that Mr. Welford should advocate such a process, as the double colour in the prints was most detestable. It appeared to him that the bath had no other advantage but rapidity, and the fact that it toned so quickly proved that one had no control over it. The colours that one saw with the gelatino-chloride process were very nice, but he was inclined to think there were other processes which yielded better blacks. His (Mr. Fry's) main objection to Mr. Welford's bath was that the prints were not half so good as could be got from the negatives. The double colour was a technical defect of the worst order. This was the weakest point of gelatino-chloride printing; the sulphocyanide bath had a tendency to give it. He had found a combined bath the most convenient.

Mr. BOLAS inquired whether the tendency to pinkiness in the lights was greater when the washing had been short or imperfect?

Mr. EVERITT also asked whether the pinkiness was not more sensible when a large quantity of soda was used?

Mr. A. MACKIE suggested that the pinkiness was caused by the prints being very much over-toned. The pinkiness was more apparent at night.

After other remarks, the CHAIRMAN said Mr. Welford had claimed for the bath a power over careless toning, but it went beyond that. If we left the print in the toning bath very much longer without producing a considerable effect upon it, he thought we might take it that it had got much more gold than usual, and that might point to an advantage in the way of greater permanence, by the greater deposit of gold. It had been said that baths other than sulphocyanide were more economical of gold, a fact that had been quoted against sulphocyanide. He thought it an argument in its favour that it did put so much gold in the print. As to the tone of the prints, if we can get a tone which is consistent with a large deposit of gold and probable permanency, so much the better. In regard to prints toning differently when the paper had been kept some time, he had noticed, with some plates coated with gelatino-chloride emulsion that had been kept for some time, that they printed out a purplish colour, looking, in fact, as if they had been toned.

Mr. WELFORD, in reply, said that many of those who had spoken were answered in the paper he had just read. In reference to Mr. Teape's complaint of mealiness and pinkiness with the bath, he (Mr. Welford) found it work better with P.O.P. than with Solio. As to Mr. Fry's remarks about the double colour in gelatino-chloride, he would remind him that double colours were sometimes obtained on bromide paper. Replying to other remarks, Mr. Welford said the slight pinkiness complained of occasionally disappeared, but he was at a loss to discover the why or wherefore. In conclusion, he said he thought rapid toning tended to permanency.

A vote of thanks was passed to Mr. Welford for his paper and demonstration.

North Middlesex Photographic Society.—June 26.—Mr. Barnard showed the results of his attempt to copy a Daguerreotype, and appeared at last to be entirely successful. Mr. SMITH related a curious experience he had had, at the outing to Cassiobury Park, of two dark spots on the focussing screen, which he could not account for; he exposed, however, and, on developing, they came up black, and consequently print white, but, being in the sky space, blocking out the sky hides them. Mr. AVERY was of opinion that light must have been somehow reflected through the lens, forming the spots. Mr. MARCHANT had been troubled and puzzled by a number of flies inside the camera, and suggested this as a solution. In the end, everybody said it was curious, but no satisfactory explanation was forthcoming. A long discussion on films and their defects took place. A large number of members had found insensitive spots. One had a film strip completely from the support on taking it out of the box. Mr. MATTHEWS said that, in case of a celluloid film partly stripping, it could be made to adhere by licking with the tongue. Mr. GILL had found a great tendency of plates to frill badly lately, and inquired whether the temperature of the developer would be the cause. It was thought to be very probable. One member suggested that the fact of being coated during the hot weather might have prevented perfect adhesion to the glass. Seven new members were elected. The outings resulted as follows:—Kew: Mr. Beadle, first; Mr. Smith, second. St. Albans: Mr. Marchant, first; Mr. Smith, second. Cassiobury Park: Mr. Marchant, both first and second.

Hackney Photographic Society.—June 20. Mr. W. Fenton-Jones in the chair.—The Chairman sketched his method of taking portraits outside, which was to have a very large clothes-horse, and so make a sort of outdoor studio, placing a kind of blind over to regulate the top light. Mr. T. H. Smith showed some pictures he had taken on the Barnet plate by gaslight. One had five minutes and the other forty minutes. Both were under-exposed. Mr. AVENT had taken portraits using six Welsbach incandescent lights, and found that five or ten minutes would be about the right exposure. The CHAIRMAN then showed and explained a Wynne's exposure meter. It appeared to him to be a very good and cheap article, and he said he would try and report further on it. Mr. Penny showed two negatives. One had been enlarged by the cresco-fylma method, and the other by using hydrochloric acid two drachms to four ounces of water. The result was precisely the same. Owing to the unavoidable absence of Mr. Hensler, Mr. GOSLING started a discussion on *Toning*. He was in favour of plenty of gold, and the use of the sulphocyanide bath, for P. O. P. Mr. NUNN said he had obtained yellow tones when using borax. Mr. BARNES used a lead toning bath, but the colour was too slaty. The CHAIRMAN said he had read that chloride of aluminium was recommended in place of alum to harden the gelatine in the prints, the great recommendation being that they could be the more readily handled without injury.

Brixton and Clapham Camera Club.—June 20.—Mr. C. Goodwin Norton gave a demonstration on *Photography by Artificial Light*. He advocated the use of five or six blow-through jets arranged in a cluster, and enclosed in a box, in front of which a tissue or prepared calico screen should be stretched. The exposure averages from eight to twelve seconds, and the results are very good. The average cost per sitter is about threepence for the limes and compressed oxygen. Reflectors of some white material will be necessary in order to lighten the shadows a little. The light should be suspended from the ceiling of the room by a cord, and it should be about six feet from the ground. Better results are claimed for this light than from the magnesium flashlight. The electric light would, of course, be better, but it is beyond the reach of the majority of professional photographers at present. The whole cost of the outfit is only about 5*l.* complete. Specimen photographs taken with this light were passed round, and at the conclusion of the demonstration a discussion took place.

Croydon Camera Club.—The President (Mr. H. Maclean) conducted a party of members on Saturday, June 24, through the Edenbridge district.

The chief points of interest centered upon the banks of the Eden, which offers several attractive little bits. The neighbourhood of Lake Deadeye is both photographically and paintably good. Those present took full advantage of the somewhat trite attractiveness of this lonesome sheet of water. Rambling on towards Lingfield, several secluded scenes were come upon, and, although not in all cases taken, none the less enjoyed.

Gosport Photographic Society.—June 20.—Mr. S. HERBERT FRY, of R. W. Thomas & Co., Limited, gave a highly successful demonstration on *The Sandell Plate*. The lecturer explained the mode in which the plates were coated, and said that the great advantage of the multiple films was the extended scale of correct representation. Some specimen prints from Sandell negatives showed that a good foreground could be obtained without spoiling the background. Mr. Fry said it was best to expose for the shadows and leave the high lights to take care of themselves. He recommended development with a weak solution to commence with in cases where the exposure is known to be more than normal. Two plates of a sitting-room, with the sun shining in the window, fulfilling all the conditions of a difficult exposure, were developed. In both instances the negatives were clear and good. Another plate exposed by a member yielded good results.

Birmingham Photographic Society.—June 20, Mr. F. S. Goode in the chair.—Mr. HENDREN continued his lecture on *Christian Architecture in England*. Mr. Hendren, in the course of his very interesting remarks, showed by diagrams the various forms of arches, pointed and round, and the evolution of one from the other, also the various kinds of decorations commonly in use both on arches and pillars. Several of our well-known cathedrals and other public buildings served to illustrate this or that style of work, a large number of photographs being shown.

FORTHCOMING EXHIBITIONS.

1893.	
July 3–8	Photographic Convention of the United Kingdom, Plymouth. Hon. Secretary, F. P. Cembrano, jun., 10, Cambridge-gardens, Richmond, Surrey, S.W.
August	Welsh National Eisteddfod. The General Secretary, Pontypridd.
Sept. 25–Nov. 15 ...	Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1–31	Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 9–Nov. ...	Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
December	Madras. The Hon. Secretary Amateur Photographic Society, Madras.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE FOCUS OF A COMBINATION.

To the EDITOR.

SIR,—I have a Dallmeyer 2 C Baby lens, advertised as four and a half inch focus and two and a half inch aperture. I find that, when the direct rays from the sun pass through the lens into a dark room, the dust of the room renders those rays visible, and that they converge in a cone to a point exactly five inches from the front surface of the lens and then cross and diverge; I wish to know whether this five inches may be taken as the focal length when calculating for enlargements.

The above is the question, but perhaps I may add that I have previously tried to obtain the focal length by the means suggested by Mr. Bothamley, viz., to place the lens on a rule at one end of which is a white card and to focus the image of the sun sharply upon the card, the distance from the card to the *diaphragm* will then be the focal length; by this means I made the focal length about four and three quarter inches, but in the experiment above you will notice that the distance was five inches from the nearest surface of the lens; that the rays from the sun were brought to a fine focus is, I think, proved by my having lit my pipe by this means at the point indicated.—I am, yours, &c. L. V. DREW.

Mount Ayliff, East Griqualand, Cape Colony, June 2, 1893.

[See Leader.—ED.]

DEPRESSION IN PHOTOGRAPHY.

To the EDITOR.

SIR,—I am really sorry to see you printing so many letters on depression in photographic business, such as those written by Messrs. T. S. Hicks, Another Pro., and many others, losing in so doing such valuable space in your independent BRITISH JOURNAL OF PHOTOGRAPHY, specially since "Amateur," page 398, answers so well all points. He gives the remedy in a few words, a kind of universal panacea, and without recourse to law or N.A.P.P., or any convention. All that is needed is to enlarge the amateur agglomeration, and then reduce all the professionals in larger cities to six or less first-class ones, these to be selected, of course, by a committee of amateurs. Any of these will do for that purpose, they being all superior beings, to which (as is well known now) ALL that is known in photography up to date is due.

Mr. Editor, in your modesty you have never given us a list of what we owe to the amateur. Allow me, therefore, to quote a few of the improvements they have made, or, more modestly, brought about, and to quote in rotation let me refer to page 280, over Mr. W. D. Welford's signature: 1. Increasing speed of plates (never thought of before the amateur came with his hand camera). 2. Improving apparatus generally (same remark as above). 3. Causing greater attention to small work (ditto). 4. Increasing the number of photographers (amateur wants them, singularly, reduced). 5. Naturalness of posing (ditto as above No. 1). 6. Aiding journalism and study of life (this is true). 7 Improving mental (?) and physical action (certainly around the chin, especially, to brag about all amateur achievements). Then Mr. Amateur comes in by stating that this particular class takes up chemistry, composition, and lighting, and, what is a new addition, optics, which I think was left up to date to specialists, only. What next?

Mr. Amateur must have an exceptional lot of first-class amateur acquaintances who throw away all poor negatives and prints. My experience so far has been that, if amateurs were to act in such a radical way, they are not likely to find glass too heavy and bulky to store away and want films instead. Oh dear, no!

To return to the poor professional, I would say that the amateur does him more harm by his talk than by actual work. The amateur tells how much one plate costs him and the paper to print on, and maybe the small outlay for a piece of cardboard. From this the uninitiated counts up the difference asked by the professional without adding anything for work, failures, chemicals, rent, taxes, retouching, living, help, dull times, instruments, repairs, &c., all things Mr. Amateur knows very little about, and never speaks of to others. He has one outfit and one lens, generally one that does for all work, good or bad, principally the latter. He takes views and portraits, interiors and churches, buildings, and reproductions of engravings, all with one lens, and instantaneous too. If it is bad, the plate or chemicals are at fault. If it turns out good, believe me, it is nine times out of ten a mere chance. Exceptions, Mr. Amateur, prove the rule. There are better and worse photographers the same as in any trade, whichever you take, linen, cloth, machinery, tailors, milliners, &c., photography is no exception. THE BRITISH JOURNAL OF PHOTOGRAPHY tries hard to improve the standard; but, if there are only six good ones in larger towns, the others may have some good reasons to complain, even if they are a little inferior. Remember, please, Mr. Amateur, that superiority is only possible among amateurs, and be more generous towards the poor professional that only wants to make a living.

One word more and I am through. I know of a great many amateurs whose only library consists of a sheet of paper with a formula on it and a few circulars of cheap outfits and plates, and, maybe, paper and cardboard, but no books or journals.—I am, yours, &c., A. LEVY.

Asnières, June 24, 1893.

To the EDITOR.

SIR,—There has been a good deal written lately about amateur *v.* professional photographers, but a letter in yesterday's issue of THE BRITISH JOURNAL OF PHOTOGRAPHY really requires an answer. "Ssenkrak" does not seem to understand what "an amateur" is, and writes a lot of irrelevant stuff, apparently to throw people off the line. The definition of an amateur as given by the A.A.A. is as good as it can well be, and has, I believe, been adopted by others.

"An amateur" is, as the name implies, one who does a certain thing for love of it and not for money (this is *not* the A.A.A. definition). What does it matter if he (or she) be poor? they need not make money by it.

"Ssenkrak's" second paragraph is delightful humbug. Yes, "it is all very well to talk about the *bonâ-fide* amateurs; who are they?" They are scores of people who (like myself) have practised photography from love of it, and who have never received, *either directly or indirectly*, anything beyond thanks for their gifts of pictures.

I agree with "Ssenkrak" in being unable to see wherein anything "mean can exist," &c. I don't know how any one could. It is not "mean" to be a professional pure and simple, but it *is* "mean" being a professional, earning money by the art, to pose, or try to pose, as an amateur. Be one or the other, no one can be *both*, and whichever you are don't be ashamed of it, as there is nothing in being a professional, or amateur, photographer to be ashamed of; but it is "mean" and something to be ashamed of being one thing, say a professional photographer, to try to deceive people, and make them believe that you are another, say an amateur photographer.—I am, yours, &c.,

Westward Ho! June 24. J. E. GUBBINS, *Lieut.-Col., late R.A.*

To the EDITOR.

SIR,—Your contributor, "Pioneer," under the heading of "In Darkest Photography—and the Way Out," in your issue of June 16, makes some remarks which I think are rather likely to do more harm than good.

As a shopkeeper I feel rather insulted by the manner in which he

refers to my class in the following paragraph:—"There is too great a tendency at present among professional photographers to add the sale of apparatus, chemicals, &c., to the ordinary branches of their business. It is a system to be deprecated, and tends to *lower the status of the profession, causing those who follow such a practice to descend to the level of a shopkeeper.*" The italics are mine.

Now, I would be glad if "Pioneer" would point out wherein consists the degradation of a shopkeeper as compared with any other member of society, not excepting even the aristocratic professors of photography.

I take it that, whatever occupation a man follows, if he does his duty and conducts himself in a becoming manner, he is worthy of our respect and admiration, and I fail to see what there is in the business of photography to make a photographer such a very superior person, so far above the level of a shopkeeper.

"Pioneer" should have lived in the middle ages, when wealth and power, class and lineage, were the chief factors in giving a man a status amongst his contemporaries; but in the nineteenth century people are a little more enlightened, and honour a man for what he is, and for what he makes himself by his conduct and abilities.

I would be the last to cast a slur on the business—call it profession if you like it better—of photography, and I consider I do it no dishonour if I place it on the same level as shopkeeping.

There is far too much nonsense talked of the status of the profession of photography, and it is time the "low shopkeepers" had an innings.

It is also entire nonsense to talk of Excise licenses or Acts of Parliament helping to give a status to photography, and limiting the number of photographers. An ordinary hawker has to have a license, but that does not make him a superior or inferior person more that he was before. It is character that tells.

Photography in these days is easily acquired by one year's careful study and practice, and those who are so contemptuously referred to as shopkeepers often beat, by their amateur productions, the work of a lot of professional photographers. So long as professional photographers can turn out superior work, they have no need to fear amateur competition, and "Pioneer" should remember that in this world everything is governed by natural laws, and when artificial law clashes with natural law its efforts are useless.

I have a large amount of sympathy for those professional photographers who cannot make their business pay. Here natural law comes in—the supply exceeds the demand. They must, therefore, turn their hands to some other work. And we must remember that if the amateur does injury to the professional, he does a large amount of good to photographic manufacturers and dealers; therefore, those who cannot make a living as professional photographers should take heed of the signs of the times, and make a living by catering for the increasing army of amateurs. It is merely diverting trade into another channel. No honest work or business can possibly be degrading to any man, but idleness is most reprehensible, and so is pride of class.—I am, yours, &c.,

WILLIAM JAMES FARMER.

68, *Blackburn-street, London-road, Blackburn, June* 20, 1893.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

To the EDITOR.

SIR,—It may interest those of your readers who intend attending the Convention to know that the Great Western Railway issue third-class excursion return tickets to Plymouth for 21s. by the trains leaving Paddington on Saturday, July 1st, at 7.55 a.m. and 1.55 p.m. Passengers can return on the following Saturday, Monday week, Saturday week, or Monday fortnight. Times of return trains on Saturdays and Mondays, 8 a.m. and 12.30 p.m.—I am, yours, &c.,

10, *Cambridge-gardens, Richmond, S.W.* F. P. CEMBRANO, JUN., *Hon. Sec.*

DEVELOPMENT OF OVER-EXPOSED PLATES.

To the EDITOR.

SIR,—Many readers of THE BRITISH JOURNAL OF PHOTOGRAPHY for June 2, 1893, p. 251, and those of *Photographic Scraps* for this month, must have been greatly interested in the record there given of Prof. W. K. Burton's experiments respecting the successful development of greatly over-exposed gelatine plates, and will be looking forward to the time when full details of his system of treating such long exposures are published in the photographic journals. I understand that he will read, or send to be read, a paper on this subject to the Photographic Convention for 1893, which will give full details of his method, no doubt, which will greatly assist any one who is interested in this important matter, for the speed of the gelatine dry plates is being increased by some maker or another almost every week, which, of course, will tend to favour over-exposure greatly; therefore a reliable method of overcoming it will, or should, be welcome to all photographers.

Judging from a description I read a short time ago, the new developing agent known as "Glycin-Hauff" appears specially adapted for the successful development of greatly over-exposed gelatine plates. It may also interest many readers to know that a successful method of developing both *under-exposed and over-exposed gelatine plates* was published in THE BRITISH JOURNAL OF PHOTOGRAPHY for May 29, 1885, pp. 342 and 343, also in the ALMANAC of the same JOURNAL for 1887, pp. 197 to 199; in the latter, additional details were given. The developer used was pyro, bromide, and ammonia. I have tried the formula given there for under-exposure, and found it work well, and have no doubt but what those recommended by the writer of the article referred to, Mr. F. T. Leon, would be found equally satisfactory. He said the formulæ he gave suited all the gelatine plates then upon the market, therefore it is very probable that they would be equally successful if tried at the present day; indeed, I intend to do so at the earliest possible moment, and may send you a report of my success, or otherwise, for publication, should you be able to spare space for it.—I am, yours, &c., J. T. HACKETT.

Fleet, Hants.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange 12s. 6d. set of Nameit (new) for *Photography*, by A. Brothers.—Address JOHN WEIR, photographer, Moffat, N.B.

Wanted, changing bag; will give Lancaster's patent folding lamp in exchange.—Address, H. WARD, the Stratford Studio, the Delph, Brierley Hill.

Will exchange embossing press and four dies for cabinets and C.D.V.'s, by Marion, cost 5l. 5s., for other photographic apparatus.—Address, W. WALKER, 155, Noel-street, Nottingham.

Wanted, whole-plate modern camera and three double slides, in good condition, in exchange for tricycle in good condition. Can be seen any day.—Address, A. L. SMITH, 233, Uxbridge-road, W.

Will exchange quarter-plate camera (by Talbot & Farmer), three double hook slides three-fold tripod, also silver Geneva watch, for half-plate camera, three doubl slides, and tripod.—Address, J. K. SMITH, Little London, Rawdon, Leeds, Yorks.

Will exchange a Robinson's quarter-plate single landscape lens and a enrryscope, *f*-6 quarter-plate rapid rectilinear lens, and 5s., for a really decent whole-plate lens.—Address, CHARLES J. HARRIS, 3, Pentyre-terrace, Sea-view, Plymouth.

Will exchange Moss & Mitton's twelve-inch enameller, nickelled roller, perfect as new for 12×10 outdoor camera, with all movements, three double slides, tripod, &c., posing chair, or first-class backgrounds.—Address, THOMPSON, 72, Market-street, Bradford.

Will exchange a rigid brown waterproof camera case, nine and a half inches in height, eight and a half inches wide, and fourteen and a half inches long, never used, also changing bag and half-plate sliding mahogany tripod, for English and foreign stamps, envelopes, and post-cards.—Address, Dr. WATERS, 21, Westbourne-park-road, Bayswater, W.

Will exchange a Cox quarter-plate portrait lens (*f*-5) and a wide-angle quarter-plate Lancaster lens (*f*-16) for a Wray special rapid rectilinear hand-camera lens of six-inch equivalent focus, working at *f*-8; or, for a portable half-plate square-bellows camera, double extension, with rack work, double swing back, rising and cross front, and three or more double or single dark slides.—Address, J. T. HACKETT, 191, Albert-street, Fleet, near Winchfield, Hants.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

HUGH BLACKWOOD.—In our next.

E. EDWARDS.—On such a purely legal point we cannot hazard an opinion. Better consult a soliciter.

J. T. SIMINS.—If you will refer to our rules, &c., for exchanges, you will see that we make it a condition that the name of the advertiser must be given.

READER.—We cannot trace the number of the patent. A visit to the Patent Office, where you can refer to the alphabetical list of patentees, will give you the desired information.

OTHELLO.—1. So far as we are aware, no explanation has been forthcoming as to why, upon applying a drop of water to a dried negative, a reduction of density takes place. 2. It would be better to fix out the silver salt in the usual way, and recover by means of liver of sulphur.

THROGMORTON.—Photography is largely practised in an amateur way by members of the Stock Exchange who are also members of different photographic societies, but we have no knowledge of a "Stock Exchange Photographic Society," nor do we think that any such Society exists.

F. GOLDBY.—Each formula, as given in the ALMANAC, is complete in itself, and should be adhered to. If additions of one formula to the other be made, unless the various chemical equivalents be taken into consideration and compensated, failure will probably result. Why wish to add acid to the washing water?

A. B.—If the copyright is not registered, no proceedings can be taken against pirates. It was a pity, when such an event would never occur again, and the negative was obtained under such extreme difficulties, that registration, as its cost is so little, should have been neglected. The only thing now is to "grin and bear it."

W. H. CROUCHER.—This correspondent, in the course of a letter on "Depression in Photography," dubs the amateur an "eyesore to the professional," and suggests that both professionals and amateurs should be licensed—the latter to the extent of ten or twelve guineas a year, "which would soon wipe out the amateurs" who are "a curse to the professional."

A. X. L.—If the two rival inventions have been patented abroad prior to their being patented in England, the first application here need not be the most valid patent in this country. Consult an established patent agent, giving him fuller particulars as to what has been done in foreign patent offices than is given in the communication, and get his opinion on the subject.

T. STOKES.—The two negatives received. If they are fair examples of your general work, we are by no means surprised that you fail with the platinum process. No one could obtain vigorous prints in platinotype from such thin or veiled negatives. For platinum printing, to obtain the best results, tolerably vigorous negatives are an essential. Plates returned as requested.

W. G. HONEY.—A method of printing resembling that about which you write was introduced several years ago by the late Oliver Sarony; nay, if we are not mistaken, he obtained a patent for it, but it has long since been lost sight of. However, it is a good method, and we shall be pleased to see it reintroduced with such modifications as are suggested by knowledge and experience.

CICI writes: "Will you oblige me by letting me know if there is any silver in the hypo solution after the plates have been fixed? Why I ask you is because I found that, after a week, some thick dark matter settles on the bottom of the jars. Is it worth while to keep it on? What would throw the silver down quickly?—Of course there is silver in the fixing solution, and it is certainly worth saving in a large business. Sulphide of potassium is the best precipitant.

J. SMITH.—1. The best varnish for your purpose is one that is now being extensively used as a lacquer for silver goods by jewellers and others. It emanated originally from the Frederick Crane Company of America, and is obtainable from several firms in this country, among these being J. R. Gotz, Buckingham-street, London, W.C. It is a solution of celluloid in acetate of amyl, modified by the presence of other matter. 2. The mirrors next to the eye may be 2×3 inches each.

W. H. C.—1. No such work is published. Better get a few practical hints from a professional photographer. 2. The articles that have recently appeared on studio-building give all that is necessary. Supply any builder with plans according to your requirements and the space at disposal, and he will do the rest. 3. Dark blue or light green for the roof, of such materials as is usually supplied for window blinds. Unbleached sheeting or pale blue will answer well for the side blinds. 4. See Leader on another page. 5. A reflecting screen or two is always useful in a studio. A frame covered with pale blue calico answers every purpose. Any blind-maker will supply one.

S. E. SLADE says: "I have some very old stereoscopic transparencies bearing the name of Ferrier that in the stereoscope are very different from any of the modern ones I possess, and they are infinitely superior. On looking at them in the stereoscope, the towns and villages seem like models, and not as those of the present day do—pictures with a certain degree of relief. Why is this, and why do not modern workers aim to obtain the same effects as described?"—The effect described is obtained by placing the lenses or the cameras very wide apart, sometimes many feet, and not, as at present, about the distance, or a little more, than the eyes are apart. The pictures alluded to are untrue to nature as the eyes see it.

ROBERT BRUCE asks: "What lighting would you advise me to have for a studio which is to be constructed for reproduction exclusively? I mean to reproduce all classes of work, engravings, maps, photographs, &c., for photo-mechanical processes. I simply want to know what you consider the best lighting for this class of work, as the studio can be constructed to get the light from any point."—For general work of this kind a ridge-roof studio running north and south, with light on both sides, and the north end also glass, with a complete set of blinds, will be the most useful: then light may be obtained on the subject in any direction that may be required. Sometimes the "tunnel" form of studio is adopted; but, on the whole, the form referred to is more useful.

STEREO asks: "What lenses are best for stereoscopic work and lantern-slide negatives?"—For general work lenses of from four and a half to five and a half inches focus are the most useful. As lantern pictures are required, we should recommend a pair of lenses of the rapid type of about four and a half inches focus for architectural and instantaneous work, and a pair of single lenses of something like five and a half inches focus for other purposes. As for the distance apart, from three to three and a half inches will be best for most subjects.

ANS-LONGA writes: "The light of my studio is situated on my neighbour's side. She has had some door and window cases from some old building brought to her house, and has placed them in front of my side light, which will very much affect my work. Does the law permit her to take such a course, or can I compel her to remove them?"—The neighbour has the right to place anything she likes on her own property, even to the extent of stopping out the whole of the light from the side of the overlooking studio, unless that enjoys the privilege of "ancient lights"—that is to say, it has had an unobstructed light for not less than twenty years. Unless the studio has enjoyed this, law will give no remedy. Perhaps, however, a polite request for the removal of the thing will accomplish what legal proceedings will not.

HACKNEY PHOTOGRAPHIC SOCIETY.—July 4, Open Night.

NORTHERN PHOTOGRAPHIC AND SCIENTIFIC ASSOCIATION.—July 1, South Kensington Museum.

GOSPORT PHOTOGRAPHIC SOCIETY.—July 6, Winchester. Leaves Gosport thirty-five minutes past ten a.m.

MR. WILLIAM ENGLAND has been awarded a silver medal for his Alpine studies at the Lille Photographic Exhibition, recently opened.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.—July 1, Healey Dell, Leader, Mr. E. Ashman. Train leaves Victoria (No. 5) at one p.m.

ERRATUM.—In Mr. Gosling's letter published last week, the word "gelatine," as applied to the cold-bath platinotype developer, should read "glycerine."

FROM Mr. John Rowden, St. Leonards, we have received a sample of his sensitised albumenised paper of the "Incomparable" brand. It is claimed to be very rich in silver and free from blistering.

MR. WILFRED EMERY (South-street, Baker-street, W.) sends us specimens of his work as a retoucher and printer. They are in platinum and silver. The retouching is effective, and the work is good in every way.

A CORRESPONDENT writes: "*Re* the amateur difficulty, I suggest that, to end the matter satisfactorily to professionals, each professional should invite an amateur acquaintance to dinner, and then attack him with a club. *Hic jacet* amateur!"

DINNER AND TESTIMONIAL.—On the termination of the three years engagement of Mr. J. B. B. Wellington with the Eastman Company as the Manager of their factory in Wealdstone, Harrow, he was entertained at dinner by a number of the *employés*, who, upon his leaving, desired to testify their esteem for him both as a manager and as a personal friend. The chairman after dinner in the name of those present presented Mr. Wellington with a handsome marble clock.

"DRY PLATES" for June says: "In accordance with the promise made in the last number of our magazine, we have made a series of experiments to determine the alteration in speed due to using our developing formulæ instead of the standard formula for speed testing. The result is that the speed number should be multiplied by two with our developer at 65° Fahr. It may be asked why we do not give speed numbers with our own developer. This would not leave our numbers comparable with those of other makers using the Hurter & Driffield system; we therefore use the formula up to the present used by two makers for this testing purpose. Our minimum lightning speed is now fixed at 80° H. & D. = 160° if our developers are used."

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1731. Vol. XL.—JULY 7, 1893.

METAL *VERSUS* PAPER FOR PHOTO-LITHOGRAPHIC TRANSFERS.

The paper read by Captain Mantell at a recent meeting of the Photographic Society of Great Britain, which we were enabled to give in our last issue, on a method of producing photo-lithographic and photo-zincographic transfers, as worked out by Mr. Husband at the School of Military Engineering, Chatham, is one of more than passing interest to experimentalists in photo-mechanical processes generally. From the paper it will be seen that the sensitive film is, as usual, bichromated gelatine. But the novelty is the material upon which it is formed, namely, tin-foil instead of paper, the material generally employed for the purpose.

After all, however, this system is by no means new; but that does not detract from any merits it may possess. Tin-foil, if we mistake not, was first used for photo-litho transfers by Senor Rodriguez, of Lisbon, now some dozen or more years ago, and with success too. Why the method has lain dormant so long it is a little difficult to conceive, unless it be that the foil then used *was* tin-foil, and also very thin. It was said at the time that the thinner it was the better it was for the purpose, provided it was perfectly free from holes, a condition difficult to secure in exceedingly thin foil. Now, as will be seen by reference to the paper, a thicker foil is used, and, instead of its being tin, an alloy, probably of tin and lead, is employed. It will readily be understood that the inking up, and handling generally, of even a moderate-sized sheet of extremely thin tin foil, coated with bichromated gelatine, without stretching or distorting it, was by no means an easy operation.

Let us now compare the advantages claimed for metal over those of paper for transfers. Photo-lithography, which, by the way, is perhaps worked by a larger number of persons than any other photo-mechanical process, is principally employed for line subjects; and in the majority of instances, as with maps and plans, the work has to be done strictly to scale. It is in such cases as this that the inconvenience of paper is most experienced. The image on the bichromated gelatine has to be printed from the negative while the paper is in a dry state, and it has to be transferred to the stone or zinc plate, as the case may be, when it is in a moist condition. Now, paper, it is well known to most persons, expands more or less when it is wetted; consequently the image, as printed from the negative, becomes of a different size from what it was at first by the time it is ready for transferring. But that is not all. Machine-made papers, and they are the ones used, expand more in one direction than they do in another. The expansion is greatest in the width of the paper, that is, the width of the web as it leaves the machine. This, of course, need not be represented by the width of the sheets; that will necessarily depend upon whether they are cut transversely or longitudinally from the roll. Lengthwise, the expansion with some papers is next to *nil*, while crosswise it may be considerable. Furthermore, even with the same make of paper, the degree of expansion is not always the same, for the age of the material appears to be a factor in the case. Hence it will be seen that, when extreme accuracy is a necessary condition, paper transfers may, and frequently do, give considerable trouble to photo-lithographers and photo-zincographers.

It is just the above difficulty that the process, worked by Mr. Husband to a successful issue, is intended to meet. The metal foil retains its original dimensions alike when it is wet and when it is dry. The only thing that is likely to cause any variation is temperature, and that, in the case of the metal recommended, will be under ordinary conditions so trifling that it may be quite disregarded in actual practice. Another advantage of the metal over paper is that, in contact with the negative, the print is not liable to buckle or cockle in damp weather with a long exposure to the same extent as is the latter. We also anticipate another advantage from the use of metal foil over paper. It is that the bichromated film upon it will be retained for a longer time in good working condition than would be a similar one on paper, as the latter material often contains aluminous and other matters that exert an insolubilising action on the sensitive gelatine, while the metal may be expected to be perfectly inert.

It might well be asked why this system of making photographic transfers, which was published so long ago and working details given which, by the way, do not differ materially from those published by Captain Mantell, has not been taken up by those who practise photo-lithography commercially. It may be that, as is tolerably well known, lithographic and other printers are usually very conservative, and seem to have an aversion to any innovation, or indeed anything that will necessitate any deviation from the tract with which they are already familiar. It is quite possible, however, that the system may be in actual use, for it is tolerably well known that those who work photo-mechanical processes commercially keep their methods as profound trade secrets.

Now, however, that the system has been prominently brought before the photographic world, it will probably receive more attention than it hitherto has from experimentalists in photo-mechanical work, as it is obvious that the use of metallic transfers is not confined to photo-lithography and photo-zincography alone. In the foregoing remarks no attempt has been

made to indicate the various directions in which metal transfers may prove more convenient than paper ones, or how the methods of preparing them may be modified. The object of the present article is to emphasise the advantage in some ways of metal over paper for photographic transfers in fatty ink.

TONING GELATINO-CHLORIDE PRINTS WITHOUT GOLD.

When we wrote on this subject last week, we were under the impression that the general principles of the bleaching and redevelopment method were sufficiently well known to most of our readers to warrant us in treating the subject in a general way, without going very minutely into detail. But it now appears that there is room for a few additional remarks, in order to make clear certain points on which some of our correspondents are in doubt.

We would, in the first place, protest mildly against the careless manner in which some readers follow the instructions given, and also against the way in which others modify those instructions to suit their own ideas, and then complain because they do not succeed. For instance, in spite of the warning we gave in connexion with the use of bichloride of mercury on the score of the extremely careful washing required afterwards, we find that more than one correspondent has used that salt, probably because it was ready to hand, and then, according to the descriptions of what followed, has neglected the necessary washing, and so failed to get results as satisfactory as anticipated. Another states that, having used a solution composed of bichromate of potash and chloride of sodium, "which is practically the same" as that given by us, he failed, in some cases, to get any image at all on redevelopment, while, at the best, he could only develop a mere shadow. We shall show presently that the two solutions are certainly not either practically or theoretically similar in action.

With regard to the use of bichloride of mercury, we can only repeat what was said last week, namely, that it should only be used in conjunction with very thorough and careful washing, and even then, for various reasons, the solution of chloride or bromide of copper is to be preferred. For one reason the cuprous salt formed along with the silver chloride in bleaching the image appears to interfere less with the subsequent action of the developer than does the corresponding mercurous salt, and the films, both before and after treatment, require less washing than is the case with mercury.

Our reason for expressing a preference for cupric bromide over chloride was that the image is thereby converted into silver bromide, which exhibits a far less tendency to revert under development to the old colour of the untoned but fixed print. Bromide of silver, too, gives with greater readiness than chloride the rich blacks and neutral greys that are now so popular; and, as one method is as easy as the other, we give the preference to bromide on the ground stated, more especially as it requires the exercise of no precautions that are not necessary with the chloride.

With regard to the employment of the improvised solutions described by us, formed by the double decomposition of sulphate of copper and chloride of sodium, or bromide of potassium, and recommended, on the score not only of economy but also of convenience, our correspondent appears to think it unwise on our part to recommend an "impure solution" in preference to the real thing when the latter is so easily obtained. In reply, we can only say that, if he is in a position so easily to obtain cupric chloride and bromide, by all means let him use whichever he prefers; but all our readers, especially those residing in small provincial towns, will not find it so easy to obtain the salts named, especially the bromide, whereas the ingredients of the solutions mentioned by us can be obtained wherever a chemist's shop exists, or even where there is a veterinary or other surgeon within reach.

Again, so far from the "impure solution" being a disadvantage, it is, in fact, if anything a benefit, since the sulphate of soda or potash formed in the solution along with the copper salt will tend to prevent the softening of the gelatine film, and thus facilitate the manipulations. It is perhaps worth our careful correspondent's while to go to the little extra trouble of preparing the "impure solution" instead of the easier but more expensive plan of using the pure salts.

Turning next to the solution of bichromate of potash and hydrochloric acid, which for all-round purposes we prefer to those already mentioned, because, if properly applied, it leaves a bleached image consisting of pure silver chloride, we can assure our other correspondent that his failure is entirely due to his own eagerness to improve the formula given. Hydrochloric acid, with the aid of the loose atom of chromic acid in the bichromate, converts the image into chloride of silver; so also does chloride of sodium under the same conditions, but the latter goes further, and, if in excess, dissolves the silver chloride so formed. Our correspondent has evidently employed a solution of salt of sufficient strength to *fix* the image—or rather to remove it; after bleaching it so, it is little wonder that little or nothing remained for redevelopment. Perhaps he will recognise that his solution is *not* practically identical with ours.

We may add to our remarks of last week that where hydrobromic acid is available it is to be preferred to hydrochloric, for precisely the same reason as that given in the case of bromide of copper. In fact, the image bleached with bichromate and hydrochloric acid, if properly washed and treated throughout, behaves precisely as any of the slow bromide papers. If hydrobromic acid is not obtainable, a substitute is found by adding sulphuric acid to a strong solution of bromide of potassium, or by cautiously pouring a few drops of the strong acid on to some crystals, and then adding sufficient water to remove the red-brown colour. It is not necessary to adhere to any strict equivalent proportion; the potassium salt may be in excess, and, if the compound solution be employed in a sufficiently dilute state to ensure that the silver bromide is not dissolved by any excess of soluble bromide present, that will be all that is needful.

We may perhaps lay some further stress than we did last week on the importance of employing the solution of bichromate and acid in as dilute a condition as possible, on account of its physical action on the gelatine. So far as the chromium salt itself is concerned, its strength would be quite immaterial if it were not for the risk of staining that a strong solution entails. It is the halogen that does the bleaching, and so long as there is sufficient present to convert the whole of the silver in the image it cannot be employed too sparingly, that is to say, in too dilute a solution. The best plan is to use a solution of bichromate of fixed strength—say, ten ounces, five grains to the ounce—and to add the halogen solution in small quantities sufficient to bleach the print with moderate rapidity.

If from prolonged contact with the bichromate solution a

permanent or persistent yellow or brown stain should remain in spite of washing, it may be removed by means of very dilute sulphuric or aqueous sulphurous acid; but this operation is better left until after redevelopment.

Some of our correspondents inquire whether it is necessary to expose the prints to light before redevelopment, to which we can only reply that, in the case of bleaching with mercury or copper, the redevelopment would most probably take place under any circumstances without exposure to light; and, also, when hydrochloric acid is used with bichromate, if a sufficiently strong developer were afterwards employed; but, working as we have done by lamplight or diffused daylight, more or less exposure does not appear to exercise any influence on the result. If a strong light be allowed to act, especially on an image bleached with bichromate, then, no doubt, the conditions are identical with those existing in the case of ordinary emulsion paper, but the minute traces of chromic salt left behind render the bleached images very insensitive to light.

The mercury-bleached image is probably quite insensitive to light, as witness specimens of the old "alabastine" pictures, which retain their pristine whiteness in spite of light. The image bleached with copper is also practically insensitive, perhaps quite so, though it does change in time, but possibly from other causes than light.

So far as the redevelopment of the image is concerned, we cannot, in the space at our command, add anything useful to what we have already said. The circumstances are so variable, and the choice of developers so great, that we must leave individual experimenters to select their own particular course, assuring them, however, that they will experience little difficulty if they work on the lines we have indicated.

Reducing Action of Sulphite of Soda.—The question of the ability of sulphite of soda, in conjunction with pyro, to develop a dry plate without any addition of alkali, has often been raised, and it has been assumed occasionally that the development obtained by such means was due to the presence of a small quantity of carbonate of soda in the sulphite employed. But that sulphite alone may act as a reducing agent is known to chemists, and quite recently we may note in this connexion an important chemical process has been founded on that property. Messrs. Augustus Lumière and A. Seyewetz have succeeded in isolating several amido-phenols in a pure state by utilising for the decomposition of their salts neutral sulphite of soda, which, in consequence of its reducing properties, prevents the oxidation of the base formed. When this reducing action is thoroughly understood, it is capable of explaining many of the little-understood properties of sulphite, which is now a chemical absolutely necessary in many photographic processes. Yet it seems only the other day that the late Mr. Herbert Berkeley called attention to its value, and this he had to do repeatedly before its use became at all general.

Metallic Spots in Paper.—One of the first properties needful to be possessed by a paper for photographic purposes is that it should be free from contamination by metallic particles. It is difficult, even with a microscope, to detect such spots, and in last week's *Chemical News* Mr. Clayton Beadle has given a very simple and excellent method of testing paper for the presence of these deleterious matters. Strips of the suspected paper are floated in a one per cent. solution of ferrocyanide of potassium acidified with a few drops of nitric acid. After three hours' treatment, particles of iron will be rendered evident by the production of deep blue spots, and brass by chocolate-coloured spots. The former are of a very marked and certain character, but the latter may easily be mistaken for other foreign matter contained in the paper. To confirm the presence of brass particles, Mr. Beadle places a bead of nitrate of silver solution on the suspected spots and examines them by reflected light under the microscope. If any brass is present, clusters of crystals of metallic silver will soon be seen forming themselves on the surface of the paper. After the solution has nearly dried into the paper a drop of the ferrocyanide solution is placed close to the margin. On diffusion it produces a chocolate colouration about the margin. Other metallic particles, he states, are rarely met with.

Microscope Projection.—At a recent meeting of the Royal Microscopic Society, Sir David L. Salomons gave an exhibition of his projection microscope, which was spoken of in very high terms by the President of the Society, who remarked upon the unusual flatness of the field. We have, however, some difficulty in following the meaning of the brief account which appeared in *Nature* of the course of the succeeding discussion. The President said there was one point on which he should like to ask for information: "It sometimes happened that great concentrations of light produced also a great concentration of heat, and that, consequently, objects in balsam, if exposed for too long a time, were apt to get spoilt through the softening of the medium. Was this difficulty got over in the present instance by using the electric arc light as an illuminant?" Sir David Salomons said he obviated it very much by using lenses cemented with balsam. The customary alum and water he found to be rather a trouble, so he used simple distilled water, and found that it answered all the necessities of the case. It is difficult to see how the action of the balsam cement comes in, but there can be little doubt that plain water will answer as well as the time-honoured alum solution. It is not very long ago we published the result of an exhaustive scientific investigation of the relative diathermancy of several liquids, one of the results of which was to show the uselessness of adding alum.

A New Disinfectant.—Substances for preventing the decomposition of gelatines, paste, &c., are of perennial interest in photographic technics, hence an account of the latest introduction of the kind will be of interest to most of our readers, especially as the new chemical possesses most remarkable qualities. Mr. Worrell, chemist to the Thorncliffe Collieries, while investigating the nature of some bye-products, has discovered a hitherto unknown oil, intermediate in properties between the benzine series and its derivatives, on the one hand, and the paraffin series on the other. From this oil he extracted a body which he found to possess greater antiseptic properties than even pure crystallised carbolic acid. It is insoluble in water, though readily made into a permanent emulsion with it. Further, it has a high boiling point, which gives it a persistency of antiseptic action. A great advantage the new substance, which has been named "Izal," exhibits is its absolutely non-poisonous character. It produces no detrimental effect when taken internally or applied externally, in striking contrast to carbolic acid, as those who have inadvertently spilled it on their hands know too well, while the poisonous quality of "carbolic" is painfully and frequently shown by newspaper reports. It is no part of our work to show its wonderful effects on the pathological forms; but a substance such as Izal is described to be should be simply invaluable in all gelatines and pastes when used under circumstances likely to induce decomposition.

A New Photometer.—Before the Physical Society, on June 9, Mr. A. P. Trotter read a paper on "A New Photometer." The author has modified his "illumination photometer," described *Proc. I. C. E.*, vol. cx., paper No. 2619, so as to adapt it to the measurement of candle power. The principle employed is to view a screen illuminated by one source through an aperture in a second screen illuminated by the other light, the aperture becoming invisible when the illuminations are equal. After using perforations of various patterns, a series of narrow slots cut in thin paper were found to give the best results. The plain screen is mounted behind the slotted one in a box sliding on the photometer bench, and they are arranged so that the light falls on them at equal angles. The screens are viewed from a distance of six or seven feet through an opening in the front of the box, cords being provided for producing the transversing

motion. Two "sights," set respectively at the middle of the length of the plain screen and on the lower edge of the front opening, serve to show when the middle of the band of equal illumination is vertically above the pointer on the carriage. The photometer is found to be particularly valuable when it is desired to determine the maximum power of a variable source. When lights of different colour are being compared—say, a gas flame and an arc—one end of the screen shows blue strips on a yellow ground, and the other end yellow strips on a blue ground; at the centre the colours seem to blend. To facilitate the comparison of such lights, Mr. Crompton, who has been working at the subject simultaneously with the author, uses one screen tinted pale yellow and the other pale blue. Details of construction of the new photometer are given in the paper, and the accuracy attainable when comparing two equal lights of about eight candles is stated to be about one per cent.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

PLYMOUTH MEETING.

The seventh annual Photographic Convention of the United Kingdom was inaugurated at Plymouth on Monday evening, when the Mayor (Mr. W. Law) held a reception in the Athenæum, and the President (Mr. George Mason, of Glasgow) delivered his address. The attendance is not so large as at Edinburgh last year, owing to Plymouth's great distance from Scotland and the Midlands, and to the Royal wedding festivities falling in the same week. Still, there is a fairly large gathering, which not inadequately represents the scientific, artistic, and commercial aspects of photography. Among those present were Messrs. George Mason (President), Andrew Pringle, F. P. Cembrano (Hon. Sec.), F. York, J. Traill Taylor, A. Haddon, F. W. Hindley, J. Guardia, C. H. Bothamley, H. M. Smith, Phipps Lucas, Cornthwaite, W. D. Welford, Seaman, R. L. Kidd, Major Lysaght (Cork), H. Sturmey, R. Keene, W. Scorer, E. A. Leblanc, J. Birtles, Col. Barrington Baker, R. Hansford Worth (Local Hon. Sec.), W. G. Tweedy, R. F. Yeo, R. Rugg Monk, S. Weekes, Lethbridge, G. F. Treleaven, and others. Many ladies also graced the proceedings with their presence.

The Mayor, who wore his gown of office, tendered a hearty welcome to the Convention, and congratulated the members on the prospect of fine weather. They would, he was sure, find an abundance to delight them in the district, with its wealth and variety of foliage and flowers, hills and dales, woods and moors, tors and rivers, and a sea-coast of great beauty. They would, he was sure, feel amply repaid for the long journeys they had undertaken. Of the historic associations of Plymouth and its famous Hoe all had heard, and, with Dartmoor at its back, they would find much to interest and to admire, and especially in the neighhourhood of Tavistock and Ivybridge, both of which the Local Committee, he was glad to see, had included in the week's programme. Again, he would say he felt it an honour to receive the Convention in such numbers, and would add the hope that they would be so impressed with the beauty of the place and the heartiness of the people that it would not be long before they came again.

Mr. Bothamley said, in the absence of Mr. George Davison, last year's President, he had two duties to perform. The first was to acknowledge the Mayor's most hearty welcome. Plymouth they all associated with those great sailors who had made England what it is to-day; and they recollected that in Penzance, still further west, was born one of the greatest chemists that ever lived—Sir Humphry Davy—who was associated with Wedgwood in some of the very earliest photographic experiments ever made. It was, however, the feeling of good fellowship so characteristic of photographers that had brought them so far west to enjoy and make pictures from some of the finest scenery the United Kingdom could boast of; and he was sure the Local Committee would do its best to make their visit pleasant and profitable. His second duty was to introduce to them, as President, Mr. George Mason, a good photographer, an active supporter of the Convention from the very beginning, and a very good fellow. The President then delivered his annual address as follows:—

PRESIDENT'S ADDRESS.

At the Bath Photographic Convention meeting, Mr. Traill Taylor said that, up to that point in the history of the Convention, the presidential chair had been filled consecutively by representatives of the following departments of the art science, viz., the literary, the scientific, the chemical, the professional, and last year the chair was most ably filled by Mr. Davison, who might, with every confidence, be termed the artistic. And now come we this year to what is known as the commercial element, for you all know that the commerce of photography is what fills up the most of my time and study, and in this phase of the art-science I am most at home. The commerce of photography may seem at first sight the most commonplace and least attractive of all its various branches; but this is not so, for more or less it embraces all, and it will be found to be the most essential element in the whole, it is the leaven that leaveneth the whole lump. Only in so far as any profession is found to be for the general good, so is it essential, and by its claims proving good or bad so will it succeed or fail. All our introductions, experiments, discoveries, and inventions—and their name is legion—are but means to an end, and the end is commercial.

I fancy I can hear the enthusiast exclaim, "Oh, no, that is not so. The glory of discovery is the reward. The love of the work is ample repayment." That's all very well, and I believe that he who says so has perfect confidence in his statement. Yet, "What is it worth?" is really the point to be solved on the introduction of any new thing. It may seem a very poor platform on which to place the work of the enthusiast and the investigator, embracing as it does years of experiment and labour that on which is marked "What is it worth?" but I fear that with but few exceptions it comes down to that at last.

There are exceptions to every rule, and all of us have met the enthusiast who, for the love of the thing only, goes on working untiringly in one groove or another, using both time and money for the advancement of the art-science, anticipating no profit from his labour, the pleasure of overcoming difficulties and the joy of "finding out" being his end and aim. But, even in such a case, what has been discovered, if to spread and flow, it must come to the river of commerce. If one happen to have income enough so as to render his position independent of any thought of repayment, he may sneer at the position herein taken up; but, nevertheless, it is a fact that commerce is the stream into which all the tributaries flow. Looking back to the beginning, we find Niepce straying along the country roads trying to gather stones suitable for his photo-lithographic experiments; his correspondence with the Paris lithographer and his partnership with Daguerre all have a commercial leaning. We also find his brother, who, in his own time, was as great a scientific enthusiast as himself, determine to leave his home, and resolve to come to England, feeling sure that it was a better field for the success of his inventions. And have we not the notable cases of Daguerre and of Mr. Fox Talbot protecting their inventions? What for? For a profit, of course!

Whether we agree regarding the position I take up, that the end and aim of all our work tends to commerce, I have no doubt we will be at one on the various items that I intend to touch upon to-night, for they are in their very essence the work of the business. And, first, I would make a few remarks upon the Convention itself and its membership.

Last year was the most successful of all our meetings; but the Convention meetings, since the very start, whether large or small, have ever shown great vitality. Still, the professional has not given it either the attention or the support that I feel it was his duty to do, and that the institution deserves.

The greater part of the success of our meetings is due to the support and enthusiasm of the amateur element, and why should this be? Surely there ought to be some equality of representation. The profession, as a body, is large enough and influential enough to at least treble its present representation; but I fear that it is the spirit that lacks energy and enterprise. At first there was a considerable outcry about the time the meeting was held being unsuitable for many in the profession. To meet this objection, the date has been changed two or three times, I think; this with some little advantage perhaps, but not much.

Taking professional photographers collectively, I feel that if they tried they could make this meeting for themselves the most pleasant and profitable outing of the year. Every one that has been with us knows that this is an honest statement, and, if they would only gather round in numbers, they would find it a gain both in health and business. The lines on which our Convention is run commend themselves, and are better, in my opinion, than those adopted by our American friends. To a great extent the American Convention is a dealers' show, a good enough thing in its way, but the platform upon which we meet is more inde-

pendent, and the principal business of our gathering is educational and social, the dealers' part being a mere detail, and never interfering with the more salient points for which we meet.

The professional who joins us in this week's outing, by personal contact and general interchange of ideas and experiences alone, is bound to learn more than he would in very much more time spent in less congenial and less favourable circumstances, so that, even as a paying speculation, I look upon the Convention as a profitable investment to any member with his eyes and his ears open. Hence I would that the professionals bestir themselves, and make a fairly representative turn out. If they but did this, the institution would be, beyond doubt, an assured success for all the coming years, a centre where the representatives of all the various societies might meet in a broad union once a year.

The National Association of Professional Photographers should find the time and places of the Convention a fitting opportunity for their meetings. There they could be in numbers, and could easily arrange to hold their own special meetings during the week, to suit themselves without in any way interfering with the general arrangements of the Convention.

All being in one town at one time, more meetings could be held, larger audiences could be got, and they would be far more likely to command attendance than where they have to travel, in many cases, long distances for single meetings.

Last year Messrs. Fall, Whitlock, and O'Neill made a move in this direction, and I have no doubt that their endeavours then tended to the growth and influence of the Society. This Association, worked on broad lines, should be a power for good to the whole profession, there are so many questions of importance, such as insurance, copyright, holidays legal defence, prices, and many other subjects that are of great commercial interest to the whole profession alike.

One thing might here be noted: that the obtaining of a closer union between the individual members of the profession is what should be aimed at if success is to be the result in this as well as all other like institutions; and this is the greatest difficulty to be overcome, for the photographer does not take so kindly to unity as most other professions do.

Here I would say a few words on behalf of the Photographers' Benevolent Association. This Society should have much more consideration and sympathy from the photographic worker. On investigation, I find that most of the funds and the greater proportion of interest and work is undertaken by the kindly well-wisher, and that don't-care-about-it apathy still belongs to the working photographer. As I have elsewhere said, every *employé* in the photographic trade in the United Kingdom holds a special interest in this Society, and half-a-crown a year is all that is necessary to be paid up by any one to place himself in the position of membership, which, in cases of need, gives him the advantage of becoming a participator in the funds of the Society. About a halfpenny per week! just think of it; and for this fraction, if paid by the body of employers, the income of the Society would be raised to 400*l.* a year, and, if the employers also joined, the return shown could not be less than 500*l.*, at the very minimum, of our outlay. Look at the power for good this would place in the hands of the Executive. If every employer would interest himself to induce his *employés* so to assist themselves, the feat would be accomplished, for they could not fail to be successful, and thus the many rivulets would swell the greater river.

For the promotion of union in the profession, I think that the institution of the "Central Photographic Club" is no mean factor.

It opens up an avenue of social intercourse and information, and anything of such a nature must help to advance a man in his business; it gives him the opportunity of being up to date, and that is one of the essentials of successful trading.

A place of meeting where, at all times, the country member comes in contact with his compatriots in the city, and where he at once gets into the centre of that which most interests him—and the friends from the provinces will also keep the city members acquainted with what is going on in the country districts—and these advantages are to be obtained at a merely nominal outlay. This Institution should have the fullest support of the profession.

The Affiliation scheme of the Society of Great Britain is also a march in photographic progress that should help to draw photographic societies together, and, if taken up with a will, must result in an intercourse that is bound to be beneficial to all, the interchange of papers and slides alone being of great moment and importance, especially where societies are too small or too young to be able to produce new subjects or original matter without help from wider fields.

The progress of the year shows steady advancement; nothing startlingly new, but there's not a week passes without the introduction of some ingenious device or discovery which tends to save labour or to perfect results.

It has been stated that there are more patents taken out in connexion with photography than in any other trade of like dimensions, and, looking at the continuous stream of applications for protection, it is easy to believe.

Printing-out papers is one phase of photographic work that has made a marked advance in the currency of the year. Gelatino-chloride paper has come into almost universal use, the beauty of the finished results secured by the use of this paper tending greatly to its growing popularity. Collodio-chloride paper has also grown considerably in demand, as it is considered by many to allow of a greater variety of tone, and also that it is more permanent than the gelatino-chloride, but to prove the latter requires the test of time. The new cold-bath-process paper introduced by the Platinotype Company has also made a rapid stride to the front, and is now almost universally adopted. The advantage of local development by its use being rendered sure and easy was a great recommendation to its success, and, where it has been fairly tested, the hot bath has been laid aside for this more perfected process.

Stereoscopic photography, which, like the sleeping beauty, has been lying dormant for so many years, lives and breathes again. A great advance has been made, and considerable work has been done in this department during this last year, and it still goes on increasing. A big future may be anticipated for it.

The hand-camera competition still runs on without impediment. The originality and ingenuity displayed and expended on the construction of these little instruments is perfectly astonishing, and the excessive number of forms placed upon the market—each professing to be the best—is marvellous. By their results ye shall know them. The work produced by them is to be found broadcast in all sorts and conditions of illustrated papers, photographic and otherwise, ranging from very bad impressions up to charming productions. So much in favour has the hand camera become, that I have no doubt but that the larger proportion of the apparatus brought for use by the members of the Convention will be found of this description. If the advances during the year have not been made by leaps and bounds, they are at least sure.

In lenses, the Zeiss, the Dallmeyer Tele-photo, and the Ross Concentric are increasing in demand. Isochromatic plates are taking a firmer hold, and the Sandell has been adopted by many.

The journalism devoted to the profession seems to be out of all proportion to the extent of the trade it caters for, but I suppose time will try them, and the weakest will go to the wall.

Since last we met we have had to mourn the loss of one of our best friends—one of the most genial and gentle of men, foremost in every good work, an able artist, and thorough experimentalist—Mr. William Bedford. I pay this tribute to his memory as one of our previous presidents and the friend of all.

And now I will leave the various members, in their various classes, during the Convention, to thrash out their various themes, one by one, scientific or chemical, each in his department, be it development, speed, light, colour, or optics, each of them needing its own specialists to do it justice.

I hope you will all spend a happy and enjoyable week.

On the motion of Mr. James Martin, the President was thanked for his able address, and the Mayor for his cordial welcome.

Light refreshments were then served, and the rest of the evening was devoted to the admirable exhibition arranged in the art gallery, and to views shown by the optical lantern. The exhibition, a fuller notice of which we will give next week, contains much that, in the estimation of the *Western Morning News*, is a revelation for the west. Eastman has a grand and tastefully displayed exhibit illustrative of the capabilities of their Solio paper and of their Nikko paper, a development paper which may run bromide paper very hard. Morgan & Kidd have remarkable bromide enlargements (one eight feet long in one piece), and specimens of the beautiful collotype process. Mr. W. Scorer, of Havant, has two direct landscape works, 36 × 20, and two of his very ingenious cameras with double eccentric fronts. Elliott & Sons have a splendid portrait of a lady from a direct negative five feet by three. Mr. E. H. Micklewood has works illustrative of his shutter for securing clouds naturally; and Messrs. R. W. Thomas of the Sandell plate. O. Sichel & Co. have a fine collection of moulds and mounts and elegant studio accessories, and a very complete studio camera. Byrne & Co.'s portrait of an infant Battenberg prince is one of the choicest things shown. Mr. W. G. Tweedy sends interesting results of panoramic photography, and J. Martin & Co., New Southgate, an ice picture. There is a very neat collection of

Dr. Andresen's chemicals, many of which are in handy cartridge form. Local photography is admirably represented. Mr. Heath, of Plymouth, includes a more than life-size autotype carbon print of the Prince of Wales, from a negative taken by command during his Royal Highness's recent visit at Admiralty House, Devonport; Mr. Hawke, of Plymouth, sends a score of photographs of the Duke of Edinburgh; Mr. R. F. Yeo, of Plymouth, has charming studies of children; and Cox & Durrant, Torquay, send a delightful portrait in sepia.

There was a lantern display at the close of the reception. Among the slides were several by Dr. Mitchell (of Philadelphia), Major Lysaght, Messrs. York, Cembrano, Bothamley, Welford, Hindley, Forsham, and Brier (of Bollington, near Macclesfield).

On Tuesday there were excursions to Tavistock and up the rivers Yealm and Tamar, landing to visit Mount Edgcumbe Park and Gardens, and Cothele, by the kind permission of the Earl of Mount Edgcumbe.

About seventy members with several ladies and local amateurs attended the invitation excursion of the Devon and Cornwall and Devonport camera clubs up the rivers Yealm and Tamar. A fine steamer had been chartered for the purpose, and an excellent luncheon was served. Col. Barrington Baker and Mr. R. H. Worth (local Hon. Sec.) were indefatigable in promoting the comfort of the visitors, who, early in the day, experienced heavy rain.

Wednesday.

The weather, which on Tuesday had been very rainy and had somewhat interfered with the excursions, improved as the forenoon of Wednesday wore on. A very large number of members had arrived to swell Tuesday's total, and more were expected, so that, numerically speaking, the meeting promises to be as successful as several of those that have preceded it. The group was to have been taken at mid-day in the Guildhall-square. The past President (Mr. George Davison) waa conspicuous by his absence from the Convention, for which no explanation was forthcoming.

Next Year's Convention.

At the committee meeting held on Wednesday morning it was decided that the Convention of 1894 shall be held in Dublin.

"ON A FAILURE OF THE LAW IN PHOTOGRAPHY THAT, WHEN THE PRODUCTS OF THE INTENSITY OF THE LIGHT ACTING AND OF THE TIME OF EXPOSURE ARE EQUAL, EQUAL AMOUNTS OF CHEMICAL ACTION WILL BE PRODUCED."

[A Communication to the Royal Society.]

It has been generally assumed that, when the products of the intensity of light acting on a sensitive surface and the time of exposure are equal, similar amounts of chemical action are produced, and, with the ordinary exposures and intensities of light employed, such, no doubt, is practically the case, and any methods of measurement hitherto practicable have been insufficiently delicate to discover any departure from this law, if such departure existed. In some recent experiments, however, I have discovered that this law breaks down under certain conditions, and I think the fact worthy the attention of those interested in the subject, since it is possible that these conditions may arise with other experimenters. Quite lately I have described the method of comparing the photographic value of sunlight with that of candle light (*Photographic Journal*, June, 1893), which was as follows:—A beam of sunlight, after three reflections from plain glass mirrors, was admitted through a narrow slit to sensitive bromide paper stretched round a drum of about four inches in diameter. The drum could be caused to rotate round its axis at any speed up to about sixty revolutions per second by means of an electro-motor. A small exposure with this light was given to the paper during the rotation of the cylinder. Subsequently an amyl-acetate lamp was placed in position at any convenient distance from the same slit, and a fresh portion of the same sensitive paper exposed to its action during a much longer period, the rotation being continued as before. The slit was next replaced by a small square aperture of some half-inch side, and further portions of the same paper exposed to the amyl-acetate light at the same distance, for varying or unknown exposures, with the drum at rest. On development the paper showed three images, a narrow band of deposit of the width of the slit caused by the sunlight, a second band of the same width due to the light from the amyl-acetate lamp, and a third row of squares of varying blackness of deposit due to the different exposures given with the drum at rest.

If the width of the slit be accurately measured, the band formed by the amyl-acetate lamp is evidently superfluous, supposing the usually accepted law to hold good under all circumstances, as by measuring the blackness, or rather want of whiteness, of the different squares, and using them as ordinates to the abscissæ which were the times of exposure, and drawing a curve through them, the blackness produced by the sunlight could be referred to that produced by the light of the amyl-acetate lamp, and its equivalent value in terms of the latter light be calculated. The band of deposit produced by the amyl-acetate lamp was introduced as a check, for its blackness could also be referred to the curve, and the width of the slit be calculated from it. On making such calculations I was surprised to find that in every case the calculated width of the slit was always considerably less than what it was in reality, the difference being far beyond that which would be caused by any error in the measurement. This led me to commence an investigation into the cause of this difference, and what has already been carried out is sufficient to show that there is a failure in the usually accepted law. It may be pointed out that, if it held good, the sum of any number of very short exposures should be equivalent to a single exposure for the same length of time.

The experiment which naturally suggested itself was to expose a sensitive surface to the action of the light of an amyl-acetate lamp passing through a slit as before, the drum on which it was stretched being caused to rotate at high and low speeds, and also to place on the same paper a scale of exposures with the drum at rest. These were all developed together. An example of one of many experiments is given as an illustration.

The circumference of the drum with the paper stretched round it was 12·25 in. The width of the slit was arranged to be 0·012 in. The amyl acetate lamp was placed 2 ft. from the slit, and a rotation of 30 per sec. was given to the drum for one exposure and 1 per sec. for a second exposure. In the first case the time of exposure during each revolution was $\frac{0{\cdot}012}{12{\cdot}25} \times \frac{1}{30}$ sec., or about 1/30,000 sec.

The sum of the exposures during 20 mins. was thus 1·176 sec.

In the other case the exposure was

$$\frac{0{\cdot}012}{12{\cdot}25}, \text{ or about } 1/1000 \text{ sec.},$$

and the sum of the exposures was, as before, 1·176 sec. Thus the first individual exposures had only $\frac{1}{30}$ of the duration of the second exposures, though in the aggregate they were the same.

A scale of blackness was made on the same paper, through a square aperture, without shifting the lamp, the exposures being $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 4, and 8 sec. On developing it was apparent to the eye that the first band was much lighter than the second. The scale and blackness of the bands were measured accurately, and the times of exposure which had been given to each band, on the assumption that the law enunciated held good, was calculated and found to be for the first band 0·6 sec., and for the second band 0·91 sec., instead of 1·176 sec., which was really given in all. Another example is where the slit was opened to 0·11 in., and the time of exposure reduced from 20 to 10 min. It was found that in this case the exposures given on the same assumption were 3·7 sec. and 5·28 sec., the real exposure given being 5·36 sec. The last experiment shows that if the slit had been slightly wider, or the rotation slower, the law would have been approximately obeyed.

Another experiment was made by throwing an image of the crater of the positive pole of the electric light on a hole bored in a plate about $\frac{1}{20}$ in. in diameter by means of a lens, and allowing the emergent beam to fall on the slit and paper, the drum being made to rotate as before. The same kind of results were obtained.

As it might be thought that this difference was caused by some action other than chemical, another series of experiments was undertaken. In these different sensitive surfaces were employed in order to eliminate any possibility of the effect being due to any phosphorescence of the paper, though none could be detected. Plates were held stationary and exposures made by admitting light to portions of them through slits of known angular aperture, cut in a disc which could be rotated at any desired speed. Similar results were obtained to those already described. The quickest rotation gave the least density. It may be remarked that the more sensitive a surface is to radiation the less marked are the differences observable for the same speeds of rotation. This is what might be expected.

As an outcome of the experiments so far made, it seems that, when exposures less than $\frac{1}{1000}$ sec. are made on a sensitive surface, and the source of illumination is an amyl-acetate lamp (Von Altneck's) placed 1 ft. from the sensitive surface, the law quoted *ante* fails.

The question of a very low intensity of light acting and of the sensitiveness to different spectrum colours is now occupying my attention.

Captain W. de W. Abney, C.B., F.R.S.

MY FIRST DAGUERREOTYPE.

THE interesting demonstration, by Mr. William England, of an almost forgotten process, but of which he was a most distinguished exponent about forty years ago, surely must have been very attractive to those who were fortunate enough to witness it. At least, I know it would have been to me, and, indeed, to any one who had ever marred the pure surface of the silver plate by a failure; for I never knew any one who had ever attained any proficiency in the Daguerreotype process who did not retain a lingering yearning for the revival of this lost art.

In the recent editorial remarks on "Daguerreotyping," the editor said that "unlike all other systems of photography, the personal skill of the operator is the sole factor in the achievement of success." How true this is will be seen by the narrative of my early struggles with this difficult process; indeed, I might, with justice, use stronger terms, and say obstinate and refractory process, for so it proved in my hands just thirty-nine years ago.

During the latter years of my apprenticeship, I had passed through the cigar-box-and-sixpenny-lens struggles with photography, and was rewarded by most complete and entire failure, but was more fortunate, however, in my printing efforts. Some paper negatives were given me by an amateur—who was, by the way, the instructor of Buckle, of brush fame—and I showed him my very imperfect results. A few hints helped me on, but the fearful price of the chemicals cleaned out the shallow pocket of the apprentice, and there were long and serious waits until sufficient funds enabled me to replenish my photographic stores. In those days hypo was sold by the country chemist at sixpence per ounce: but, to encourage me, he let me have it at threepence! Even at that price, however, the cost, from my point of view, was simply ruinous.

In a very short time the serious business of life was before me, and I went to London to face the unknown. Of course, photography had to go overboard to lighten the ship; in fact, the ship became too light, for frequently a biscuit, eaten in the National Gallery, was the sole furniture of my mid-day meal. The eye was fed, however, and that was something.

I read every scrap relating to photography that came in my way, and thus theoretically got to know a great deal more about it, and patiently waited for happier times when I might hope to ripen theory into practice. About eighteen months after my arrival in London I made a new friend, who absolutely had a practical knowledge of the Daguerreotype process. He had just returned from America, where he had taken lessons in the art, and was looking about for premises in order to commence business. When he finally got to work and put out his specimens, I am compelled to say there was a marked difference between the examples of the art brought from America and those produced by himself, the artistic merit being most evident in the foreign productions. As time went on his work improved, and his *clientèle* rapidly increased. We lodged in the same house, and therefore I daily heard of his photographic doings, and I determined the moment I could get together sufficient money to make a start. I would take lessons of him, and try my luck also.

After patient waiting the long-looked-for day came, and I took my first lesson in "Daguerreotyping." I need scarcely say this was a memorable day for me. After eagerly watching the whole process through, from the polishing of the silver plate to the final gilding operation, so well described in the article in this JOURNAL, already referred to, I saw that all I had read and done—or rather had not done—in photography would avail me nothing, and I had to completely start afresh.

The first business was to completely master the by no means easy art of buffing the plate, for upon the perfect doing of this depended the success of the final result. An absolutely "black" polish was necessary, and the faintest visible scratches, therefore, made the attainment of this impossible, and, in consequence, weakened the force of the shadows. It will be seen by this that, unlike most of the other photographic processes, black shadows were necessary in order to obtain a brilliant as well as delicate Daguerreotype. Day after day I worked at "buffing," and found it hard work, and, though it was winter-time, the coat had to come off in order to lighten the labour. The rubbing up and down on the plate with the long piece of wood, covered with buckskin, and treated with the finest rouge, seemed easy work enough at the start: but, as the hours went on, the operation became tedious, as well as tiring, and I decided that buffing could not be the most interesting part of Daguerreotyping. I suspected that my friendly instructor found this irksome part of his business quite as well done by proxy. At any rate, as time went on, with no change of employment, I mildly suggested that I wished to be something more than a photographic "buffer," and that the number of lessons agreed upon were rapidly coming to an end, and that only one stage on the photographic journey had been reached. I was assured that, when I had fully mastered this most difficult operation, I had little else to learn, as all the rest was comparatively simple. I thought of the master who kept his pupil at scales for seven years when teaching him to sing, and, in reply to remonstrance, said, "Go forth, thou art the finest singer in Europe!" Perhaps, when I became an absolutely perfect buffer, I should astonish the world with my unrivalled Daguerreotoype productions, so I worked on patiently. I think, if the truth were told, my friend was so busy, that not only was I useful, but I was less in the way when occupied by this necessary operation.

My friend had brought all his apparatus with him from America, and, as he had several surplus articles, he sold them to me. Amongst them was a camera of American make, and I must say that, though it would be regarded as clumsy now, it was far in advance of the English cabinet work of that period. It was a bellows camera, and the woodwork was rosewood. The focussing screen was inserted some distance in the camera, and was protected from the light, so that a focussing cloth was not necessary. A little trap-door admitted the former as well as the dark slide. When the latter was in position ready for operation, the shutter, which was of sheet iron, was pulled entirely out, and the lid of the camera shut down until the exposure was over. In those days a little extraneous light was not heeded, and the small amount that could get down the groove during the opening or shutting of the camera lid did not appear to affect the plate. The bellows portion of the camera was beautifully made; indeed, the whole instrument was a marvellous contrast to the clumsy wooden boxes made in England and sold as cameras. It would be interesting to learn when the first bellows instruments were made in this country. I can simply say that in 1854 I had never seen one of English make.

All the American silvered plates were slightly bevelled downward, and in appearance were not unlike miniature reproductions of the Venetian bevelled looking-glasses. They were lighter and cheaper than the Birmingham electro plates at first employed in England, and in consequence the name of Scovell—the American manufacturer of these plates—became known all over the world. This slight bending downward of the edges prevented any cutting of the fine leather surface of the buff, and also enabled them to be more readily fixed in the slight groove of the screw block to which they were attached in order to hold them tight during the process of buffing.

The American arrangement for holding these blocks of various sizes was very ingenious. The instrument was of cast iron, and in general appearance was not unlike the modern American burnishers. There was a broadish flat bar, slightly tapered and bevelled on the under side, so that the block carrier of the plate, which had a corresponding tapered groove, could be pushed along it until it was held tightly. The ends of this bar were bent upwards at right angles, and were furnished with pivots which fitted into sockets provided for them in two uprights, which formed portions of the more solid part of the apparatus, and which had to be screwed down to a solid bench in order to secure the necessary rigidity.

When the pressure of the buff came on to the plate, the socketed bar took the necessary angle to ensure even contact between the buff and plate, and thus the friction was even all over its surface. A moment's consideration will show the use of this arrangement. Had the plate been rigid during the process of buffing, the silver surface would very soon have been scrubbed away from the copper support at the edges. In those days there were *some* failures, even as now, and the cost of these plates made it imperatively necessary to use them over and over again as long as possible, for replating was nearly as costly as new plates.

The American coating boxes as they were called were far superior to the English apparatus for applying the iodine and bromine vapour to the silver plate. As the constant inhaling of the iodine and bromine vapours would have in a very short time seriously affected the health of the operator, it was necessary to devise some efficient way to keep them imprisoned, and get always ready for work. The Americans employed two square shallow porcelain pans with the edges ground perfectly true. These were placed side by side in a box that was provided with a framed top which fitted closely on to ground tops of the pans. A sliding carrier with inner frames for the various-sized plates travelled from pan to pan along grooves in the wood work, but there was plenty of wood at each end of the carrier, so that, when the plate was over the iodine pan, the bromine one was tightly covered, and *vice versâ*. This American contrivance was so much superior to all others that it finally drove all the rest out of the market.

I wish I could speak with equal praise of the American mercury bath, but I cannot, and for reasons which will appear later on. My friend had not one to spare so I proceeded to get one made on the

American model. The matter seemed so simple that I did not apprehend any difficulty. All that was needed was a hollow cast-iron pyramid which had to be fitted on a retort stand, and made to slide up and down so as to adjust the flame of the spirit lamp in order to get the correct temperature of the mercury. Of course, the pyramid was fixed with its hollow base upwards, and on this was fitted the carrier with the silver plate downwards, to receive the fumes of the mercury which was placed at the bottom of the well thus formed. A thermometer with metal index plate was attached to one of the outer sides of the inverted pyramid so as to record the right temperature of the mercury necessary for the development of the latent image.

VALENTINE BLANCHARD.

(To be concluded.)

DODGES.*

THE PRINTING FRAME.

A QUARTER-PLATE picture can be vignetted into cabinet or half-plate size by using a half-plate printing frame with a piece of cardboard, the same size with an aperture cut out for the quarter-plate negative, covering the join with yellow or black paper, as in the example I show you; the same arrangement applies to larger sizes.

PLAIN AND FANCY BORDERS.

At times you may wish to have a margin round a print, perhaps a plain one round a landscape, or a fancy one for a portrait. For that purpose a mask must be provided of opaque paper, cutting out an oval, square, or any other shape desired; place the outer portion on the negative in its proper position, then the sensitised paper, and print. By using a larger frame, and filling up the space round negative with cardboard, a much wider border can be obtained; a plain white border gives, I think, a neat and bold appearance to a print. It may, on other occasions, be desirable to print a fancy border, and it will be necessary then to make a negative of the design required, marbled paper or imitation morocco paper will answer the purpose. After printing with the plain border, the part already printed must be covered with the piece of opaque paper cut out of the mask; slightly stick it in its place on the print, and print the border from the border negative provided for the purpose. There are several modifications of this style of double-printing which will, no doubt, suggest themselves as occasion requires.

THE NEGATIVE.

I now come to dodges in printing from the negative, and will suppose that, on examination of the negative, unpleasing defects are observed. There may be shadows too intense, one side thicker than the other, the foreground too thin, &c. All these matters want attention and correction, and for these and similar faults I prefer simple to more elaborate means, and I don't think there are many faults but what can be corrected by means of semi-transparent material, tissue paper, and the like. Use it in this manner: suppose the lens does not cover the plate sufficiently, the corners of the negative are then thin and print dark; in such a case, gum pieces of paper on the corners of the frame, to shade off the corners and so prevent any unpleasant appearance. A road is perhaps too dense: cover all except the road with tissue or yellow paper, one side of negative thinner than the other, and so print quicker, paste tissue paper over one side. Perhaps a central portion of the negative is thin, cover the whole of the negative with tissue, and a second or third piece of the centre, and so on—in fact, I know nothing more generally useful than tissue paper. It is also invaluable for thin negatives; use one, two, or more thicknesses; in fact, any negative is better for printing under it. As an example, I show you a print from a negative of an interior, about the worst I can find, another print from the same negative dodged with tissue and yellow paper; I think the superiority of the latter over the former is apparent. Another example is of a workshop; the light at the window is rather strong; consequently, printed as usual, it is unsatisfactory, but, if after printing to usual depth a piece of opaque paper is taken with an aperture cut the shape of the window, and the window is printed deeper, a great improvement is made.

For landscapes a bent cardboard shade is very useful, and is a simple means to dodge a negative with a thin foreground. If any clouds are in the negative, it will help, if not entirely bring them out. I show you an instance of a print from a negative without a shade, and another using a shade, and I recommend you to try it. I first saw this idea mentioned in a paper by Mr. Blanchard, and I consider it a valuable dodge.

* Continued from page 410.

Negatives are further dodged by working on the back. In the case of a group some of the faces may print too dark, in which case a light touch of pale blue paint on the back of the negative will improve the print; also, tissue paper can be pasted on the back or gummed by the edges, and worked on with a pencil or crayon to increase the high lights, cutting away parts of the paper to increase shadows. I show you a portrait which I think treatment of this kind has improved. It is from the negative of one of our members, who kindly lent it me to experiment with. No. 1 is a print from the negative in its first state; No. 2 the same after intensification with mercury and ammonia; No. 3 is after the negative had been backed with tissue paper and worked on roughly with pencil to take out the brick marks, also vignetted. The cabinet is from the same negative, printed in a half-plate frame as before described.

Matt varnish on the back of the negative is also another means of improving a print; but, unfortunately, it is a dodge of itself how to get the varnish on the plate, and I do not think it will be out of place to describe how it is done. When you first try it, you will perhaps get the varnish on the under side of the plate, or over your fingers, up your sleeve, and on the carpet; in fact, anywhere except the right side of the plate.

To practise the trick, I can recommend you thin gum water; it does not cost much if wasted, and it will flow in about the same manner as varnish if not too thick.

To coat a plate with matt varnish, the plate must be cold; with spirit varnish, warm. Take the plate at the left-hand near corner by the thumb and finger of the left hand, hold it in a horizontal position, supporting it by the tips of the extended second finger. Pour the varnish in a pool in the middle of plate, then gently tilt the plate so that the varnish slowly runs to the corner held between the thumb and finger; then tilt it to the other left-hand corner, then to the right outside corner; finally, with one gentle sweep, pour the surplus off at the corner nearest you on the right-hand side, gently rocking the plate at the same time, to prevent lines forming. The plate must now be laid at one side to dry, and, when dry and hard, can be worked upon with pencil and brush, and parts scraped away with the knife to increase the shadows if necessary. This mode of dodging is useful to put clouds in a weak sky. Get a suitable cloud negative as a guide, and, with pencil or crayon and stump to shade off, copy as well as you can the cloud negative. With a little practice it is easy to get passable results. A blue pencil is also one of the easiest articles to work with I have ever tried.

When thinking over this matter, it occurred to me to try ground glass itself, and I think (after trial) that it has some advantages. It is remarkably easy to work upon, and can be used over and over again. To use it, take a piece of ground glass and place it, ground side up, on the top of negative, film side up. Work on it to increase high lights as usual with black and blue pencil, blue for medium effects. To increase the shadows it is not possible, of course, to scrape away the matt, but the same effect can be obtained by thin gum water. Put it on lightly with a small brush, the thinner the better (this is important, because, if thick, it will have a diminished effect), and let it dry. After doing what you think necessary, place the ground glass at the back of negative, the ground side next back of negative, then print as usual. A softer effect will be produced by placing the ground glass on the back of the negative, working on it and printing in the same position. In the former case only one thickness of glass intervenes between the ground side of glass and the film of negative, in the latter case there are two thicknesses. If you wish to use ground glass again, the work can easily be removed by that useful kind of soap that "won't wash clothes." Matt varnish is very inferior to ground glass in its liability to damage.

VIGNETTING.

There are many ways of doing this, and many effects to be produced. A good plan is to make a cardboard screen for the purpose to go on top of printing frame, leaving a space between negative and cardboard. Cut a hole half an inch smaller than you wish your vignette to be, then gum tissue paper round the edges, also a piece of tissue paper over the whole aperture. This softens the effect to a large degree. It is also advisable—in fact, with gelatino-chloride paper, necessary—to stuff wool between the cardboard and glass to prevent the light unduly spreading over the whole print.

DOUBLE PRINTING.

I give you an example of this. On looking through my negatives I selected one with a cow, and decided to transfer her from Chingford to Hampstead Heath. I then printed the cow on a piece of sensitised paper, cut out the animal with a penknife on a piece of glass, and stuck the piece cut out on the Hampstead negative in the position in which I

wished the cow to appear. The other part of the print was stuck on the negative of the cow, so that the cow could be seen exactly in the aperture; the other part of the negative was then covered with opaque paper. The cow was then printed on a piece of sensitised paper in the position required, then a second print from the other negative, taking care that the cow already printed was exactly behind the mask, and the trick is done, more or less cleverly according to the care and skill exercised. There are other ways of doing this, but the example is as good as any.

C. O. GREGORY.

(*To be concluded.*)

News and Notes.

MESSRS. WORMALD & COS. new address is Rodney-road, New Malden, Surrey.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.—July 8, Monsal Dale and Ashford. Leader, Mr. J. T. Lees.

HACKNEY PHOTOGRAPHIC SOCIETY.—July 8, Excursion to London Colney. 11, *Lantern Slide Reduction*, by Mr. A. G. Nunn.

RECEIVED.—*Traite de Photo-lithographie.* By Leon Vidal. (Paris: Gauthier-Villars et Fils, 55, Quai des Grands Augustins.) *The Great Barrier Reef of Australia.* By W. Saville-Kent, F.L.S., F.Z.S. (W. H. Allen & Co., 13, Waterloo-place). These and others in our next.

AN AMATEUR PHOTOGRAPHER'S CAMERA PARTY.—Mr. G. A. T. Middleton, of 42, Bolingbroke-grove, Wandsworth-common, is organizing an amateur photographers' camera party to Belgium for the week commencing August 2, 1893. Full particulars and itinerary may be obtained from him at the address given.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.—July 8, Last day for sending in photographs for the Stoneleigh Excursion Competition. 11, Social Evening. 12, Whole-day Excursion to Charlecote, Hampton Lucy, Wellesbourne, Sherborne, and Compton Verney. Leader, Mr. W. Jones. Train leaves Snow Hill for Warwick at thirty-two minutes past eight.

J. H. STEWARD'S PHOTOGRAPHIC CATALOGUE.—Mr. J. H. Steward, of 7, Gracechurch-street, and 406, Strand, has just issued a new photographic catalogue, which is devoted to particulars and prices of cameras in considerable variety, lenses, stands, shutters, and other accessories. The Omni and Standard cameras appear to be particularly well adapted for those requiring a strongly made, serviceable instrument, having all desirable movements.

"SUMMER TRIPS ON THE RIVER THAMES."—Bearing this title Messrs. Salter Brothers, the well-known boat builders, of Folly Bridge, Oxford, have sent us a capital little pamphlet, illustrated, containing complete guide-matter as to fares and times for their steamers plying between Oxford and Kingston. An account of the trip is also given. With photographers especially, these trips should be popular, an unequalled field for camera work being afforded by the lovely scenery encountered. The pamphlet may be obtained from Messrs. Salter, price one penny.

ASSOCIATED FOREIGN TOURS FOR AMATEUR PHOTOGRAPHERS.—The Association for the Promotion of Home and Foreign Travel, of 41, Eastcheap, E.C., inform us that special arrangements have been made for associated tours to districts which are particularly rich in features of attraction to amateur photographers, as well as to all who take an interest in architecture. One of the tours is arranged to visit the finest cathedrals and chateaux of northern France and the course of the beautiful French and Belgian Meuse. The other tour takes in the Central Pyrenees and the ancient Republic of Andorra, a district which at present is practically unknown, but which is one of the most interesting in Europe. Fuller details of both tours are given in a pamphlet supplied by the Association.

MR. HENRY BLACKBURN'S STUDIO FOR INSTRUCTION IN DRAWING FOR THE PRESS.—The well-known art critic and journalist, Mr. Henry Blackburn, has opened a studio devoted to this purpose at 123, Victoria-street, S.W., which we hope to have the pleasure of visiting shortly. From an *Educational Review* reprint on the subject, by Mr. Arthur Montefiore, we learn that Mr. Blackburn is meeting with considerable success in teaching artists the requirements of work for photographic reproduction. We cull the following passage from Mr. Montefiore's *brochure* with much pleasure:—"This brings me to a question on which Mr. Blackburn is properly emphatic. Critics are continually inveighing against these 'cheap and nasty' processes, entirely forgetful or ignorant of the fact that it is *not the process but the draughtsman who is generally in fault.* Men will continue to draw what the public call 'pretty pictures,' ignoring entirely the question whether the process can reproduce them or not. Some men won't—others, apparently, can't—learn the simple rules of drawing for photographic reproduction. I know of a sketch by an R.A. in which the stars came out a beautiful black on a white sky! Now, if the draughtsman has a reasonable amount of knowledge, the result may be so beautiful (for the fidelity of photography in line-work can be exquisite), that I have known the reproduction mistaken for the original drawing, and that by an expert. I cannot add a stronger argument in favour of the study of drawing for the processes so largely used in the press." We have before now noted that Mr. Blackburn has shown a great appreciation of photography as an aid to artists, and we are glad to have his testimony on a point in connexion with which half-educated newspaper art critics are constantly denouncing photo-mechanical work, namely, its unsuitability for reproducing artists' drawings.

CHECK PATTERNS ON HALF-TONE PRINTS.—"A good many process workers" (says *Process Work*) "have no doubt puzzled their heads over the fact that when they attempt to reproduce a print from a half-tone block by the half-tone process, there is a peculiar chequered appearance all over the picture. This has been variously ascribed to the grain of the paper, to the print on the back of the paper, and, in fact, anything but the right cause. It is really due to the superimposing of one set of parallel lines upon another, and so producing the effect of the magic-lantern chromotrope. Any one who has a screen and a half-tone negative, can soon test the matter by putting the screen and the negative together, and holding them up to the light. You will then see the check pattern that has troubled you; or again, if you lay your screen over a half-tone print, the same thing will be visible. But observe further, if you turn the screen circularly, the pattern will gradually become smaller, and when the lines of the screen cross the picture at right angles, the pattern has disappeared altogether, and a rather pretty mezzotint appears. The application is obvious."

NEW FORMULA FOR SILVER BROMIDE PAPER WITH METOL-HAUFF.—Messrs. Fuerst Bros., say:—"For bromide paper the normal metol developer requires much less exposure than ferrous oxalate. The best plan is to use the metol-potash carbonate developer in concentrated form. The developer should be kept up to strength, and exposure made to suit that strength, so as to obtain results which cannot be distinguished from results by ferrous oxalate. A little bromide solution (1:10) say half to one grain per ounce of developer, should be used, which allows more latitude of exposure than ferrous oxalate. If these instructions be carried out, the best tones will be obtained. If the developer, as a whole, is much diluted, or if the alkali is much reduced in proportion, or if too much bromide be added, the tones will be more grey and black than is usually desired. When soft greyish prints are required, as for after-toning or intensification, the plan is to dilute the developer. The process of development is speedy, and there will never result any discolouration of any kind, even if the prints are kept long in the developer, as when a large quantity of bromide has been added. The gain of time in exposure and development for enlarging is considerable, and will commend itself to all who enlarge on this paper. No clearing bath is needed; the prints are extremely amenable to the processes of toning after fixing.

EMOTIONS OF THE HEART IN PHOTOGRAPHY.—"Recently," says Mr. George Davison, in the *Photographic Gazette*, "addressing some art students, Mr. W. F. Yeames, R.A., sought to give photography its proper place in the training and work of the draughtsman. It is something to find a painter admitting the actual use made of photography by draughtsmen. Almost without exception they get practical assistance in their drawing from it, and, in most instances, at the same time abuse and misrepresent it. Mr. Yeames admitted that photography lightened the labour of the draughtsman and *extended the range of his subjects;* but, he averred, 'in no photograph did one see any expression of the emotion of the heart, which were qualities artists had to deal with.' How far a painter may legitimately or with advantage use photography will always be a matter of personal opinion. The tendency of all photography is to educate the eye of the public as well as that of the artist, and to raise the standard of excellence and correctness. As to expressions of the emotions, Mr. Yeames would probably find considerable difficulty in so defining his meaning as to exclude photography from getting such qualities into its productions. The character of a worker may be shown in his photographs, and the more he learns of his technique the more subtle may be the signs of his individuality and perception. Photography, as Mr. Yeames stated, deals in facts, and expression of emotion is one of these facts. The kind of emotion one sees in ninety-nine out of a hundred of our Royal Academy pictures is certainly not out of the range of the susceptible and capable photographer. Mr. Yeames may not know so much about 'emotions' as about the use of mechanical photography. The brush will do mechanical work as well as the camera. When painters discuss such subjects, they generally find it convenient to use terms vaguely and without definition."

PHOTOGRAPHING IN NORWAY.—Mr. Edward J. Smith, of Park Royd, Halifax, writes: "I have not sooner responded to your invitation for information on the above subject, hoping that some one having a wider experience would reply, but, a fortnight having elapsed without response, perhaps my limited knowledge will be better than none. Writing, then, from personal experience, extending only so far north as Sogne Fjord, I should decidedly say there is not much scope for a stand camera placed upon the deck of a steamer. In the first place the Fjords, though exceedingly grand as viewed with the eyes, do not lend themselves well in a general view to picture-making; and, secondly, the deck of a steamer is about the worst place that could be chosen upon which to erect a tripod, unless the camera is pointed directly at right angles to the side of the vessel, which is the most trying position from which to take moving objects; it is almost impossible to get the field of view free from ropes or spars, and, if the deck be at all crowded, one's fellow-passengers vote the sprawling legs a decided nuisance. There are a few 'bits' that may be taken from deck, such as passing vessels, and the little landing-stages with their picturesque groups of natives, &c., but these are far more easily secured with a hand camera, which may be either rested upon, or held right over, the side of the vessel. When, however, there is opportunity of going ashore, by all means take the tripod, and give as long exposure as possible. The special features of the barren hills are entirely lost with snap exposures, whereas time exposures give in beautiful detail the bare limestone rocks and dwarf herbage. Trees in our sense of the word are unknown on the west coast. In August, I found that a Ross R.S., used at *f*-11, gave good drop-shutter exposures, but in Norway, as everywhere else, the only good exposure meter is 'brains.' My best results were with *f*-64, and exposures from three to twenty seconds, according to light, Ilford ordinary. In passing, I may just mention I took two makes of plates; every Ilford exposed gave a good result, my failures were entirely confined to the other make. Some steamers are fitted with dark rooms; but, if there is not this accommodation, a changing bag of some sort is necessary, as for some months there is not any night."

FRAUD BY A "PHOTOGRAPHER."—On Friday, June 30, John Wilson, 48, described as a photographer, and formerly of Ipswich, was charged with having obtained by false pretences 4s., the moneys of the Rev. W. R. Tate, at Walpole; 2s. 6d., the moneys of Harry Sallows, at Halesworth, and Annie Booth, at Huntingfield. Mr. Blofeld appeared for the prosecution, and detailed the facts in the first case. The prisoner drove up with a horse and cart, and boy, to Walpole Vicarage, and told Mr. Tate that he had taken a photograph of the church, and should like to take one of the house. At the same time he handed the Vicar a card, giving an address, 5 Tintern-terrace, St. John's, Ipswich, and stated that all photographs must be paid for when ordered. Witness gave the man 4s., and he went through the form of photographing the house, but no photograph was ever received. Ultimately the prisoner was apprehended by Superintendent Andrews, of Halesworth, at Lynn. The superintendent, who understands photography, searched the house, and found some twenty-six negative plates, but none of them relating to Walpole. He also found a camera and lens, but they were in such a dilapidated state that he was of opinion they were incapable of being used for the taking of a photograph. The inspector afterwards visited Tintern-terrace, and found one table left on the premises, but that was all. There were no signs of photographic processes ever having been carried out there. In his evidence, the superintendent added that he found at prisoner's lodgings at Lynn a cigar box containing some chemicals in boxes, but not sufficient to take one plate. Prisoner, in defence, handed in a photograph of a country seat at Lynn, and said that, if his apparatus were dilapidated, he could not have taken that. The superintendent replied significantly that he saw those photographs on sale at Lynn. Prisoner emphatically declared the photograph was his own production, and handed in another of another kind that he had bought to prove a difference. Charging the jury, the Chairman said the prisoner seemed to think, or would have them believe, they were trying the question whether he could photograph; but that, of course, was not the issue. The real question was, whether he got the money by false pretences, and it appeared from the evidence that he had never supplied a photograph of the house as he had undertaken to do. The jury promptly returned a verdict of guilty. The prisoner mentioned that he had been locked up for three months. Mr. Blofeld did not proceed with the other two cases, but said he held in his hand a document showing that the prisoner had been carrying on the same practices in various parts of the county. The Chairman said he was aware of this, although, of course, he could not tell the jury. Complaints had been made about the prisoner in his (Lord Rendlesham's) neighbourhood. Taking into consideration his detention for three months, the Court now sentenced prisoner to a further term of three months' hard labour.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 10	Darlington	Trevelyan Hotel, Darlington.
„ 10	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
„ 10	North Middlesex	Jubilee House, Hornsey-road, N.
„ 10	Richmond	Greyhound Hotel, Richmond.
„ 11	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 11	Derby	Smith's Restaurant, Victoria-st.
„ 11	Great Britain	50, Great Russell-st. Bloomsbury.
„ 11	Hackney	206, Mare-street, Hackney.
„ 11	Manchester Amateur	Lecture Hall, Athenæum.
„ 11	Stockton	Mason's Court, High-street.
„ 12	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
„ 12	Leytonstone	The Assembly Rooms, High-road.
„ 12	Munster	School of Art, Nelson-place, Cork.
„ 12	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 12	Southport	The Studio, 15, Cambridge-arcade.
„ 12	Stockport	Mechanics' Institute, Stockport.
„ 13	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
„ 13	Glossop Dale	
„ 13	Hull	71, Prospect-street, Hull.
„ 13	London and Provincial	Champion Hotel, 15, Aldersgate-st.
„ 13	Manchester Photo. Society	36, George-street, Manchester.
„ 13	North Kent	Gravesend.
„ 13	Oldham	The Lyceum, Union-street, Oldham.
„ 14	Cardiff	
„ 14	Croydon Microscopical	Public Hall, George-street, Croydon.
„ 14	Halifax Camera Club	
„ 14	Holborn	
„ 14	Ireland	Rooms, 15, Dawson-street, Dublin.
„ 14	Maidstone	"The Palace," Maidstone.
„ 14	West London	Chiswick School of Art, Chiswick.
„ 15	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 29,—Annual General Meeting,—Mr. Alexander Mackie in the chair.

Mr. T. E. FRESHWATER read the annual report of the Committee:—

ELEVENTH ANNUAL REPORT OF THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

In submitting this report the Committee have to congratulate the members on the very sound basis on which the Association stands. There is a good balance on the right side, though this balance would have been much greater but for the large sum spent on the binding of so many volumes of the photographic journals; but we have the value, though not the cash, and, if we go on increasing the library to the extent we have lately, we shall soon want another bookcase, so I will ask you to look around and see if you can find another kind friend to give us one. There have been large gatherings of members and visitors. Many valuable discussions have taken place, arising out of lectures given and papers read by members and others well known in the photographic world, amongst others being:—*Intensification*, by Mr. Teape, the discussion on which lasted three evenings; *On a Simple Apparatus for Testing Oxygen*, by Mr. Haddon, assisted by Mr. Grundy; *Photographing Paintings by Artificial Light*, by Mr. W. E. Debenham; *On the Calculation of the Angle of View*, by Mr. Everitt; *Retouching*, by Mr. Redmond Barrett; *Investigations in Spirit Photography*, by Mr. Traill Taylor, which has caused no small stir in the photographic world; *The Sandell Plate*, by Mr. Fry; *Determination of the Speed of Plates*, by Mr. Williams; *The Influence of the Hand Camera*, by Mr. W. D. Welford; *Is the Present Construction of the Photographic Studio Wrong in Principle?* by Mr. W. H. Harrison; *Development of Instantaneous Exposures*, by Mr. Parfitt; *Stereoscopic Photography*, by Mr. Dando; *Photographic Limits*, by Miss Catharine Weed Barnes; *Various Rapidities of Printing Processes*, by Mr. Foulkes Winks; *Flashlight Continuous Lamp*, by Mr. Hudson; *On the Difference in Bulk of Liquid Ammonia*, by Mr. Haddon; *The Hurter & Driffield System of Testing the Speed of Plates*, by Mr. A. Cowan; *The Toning of Chloride Papers*, by Mr. Welford. A course of Technical Lectures have been started, which at some future time it is hoped will be put together in book form. We have had one on *The Lens*, by Mr. Traill Taylor; *On Camera, Tripods, and Dark Slides*, by Mr. Clifton; *On Developers*, by Mr. E. J. Wall; and we hope this next year to get through a good many more.

The Lantern and Musical Evening was attended by nearly 350 members and their friends; in fact, the large room in the hotel was not big enough for the gathering.

The Lantern Evenings have been much appreciated, and when Mr. Hindley showed his Irish slides the room was over-crowded.

The Fortnightly Outings have not been so well attended as they might have been.

The Library has had many additions and valuable gifts of books from the friends of the Association, and they have been very carefully arranged by the Librarian, Mr. F. W. Pask.

The Affiliation scheme seems to be successful. The Association has been ably represented on the Committee of Delegates by Messrs. Everitt and Pask, and much good work has been done.

We have lost one of our most able members through death—that is Mr. William Bedford, and I think the last photographic meeting that he attended was that of this Association.

There have been a good many new members elected during the year and several resignations, and the Committee ask the members to do all they can to increase the number and look around to see who they can bring into the ranks of this Association; also, they ask the members to do a little more in way of getting papers to be read and subjects for discussion, and fifty-two meetings in the year are a great many and entail a large amount of work in this matter.

We cannot close this report without expressing our great regret that our late Secretary, Mr. Drage, has been compelled to leave us. The Association has grown and made great strides during his three years of office, and we can only say that we hope the long holiday that he is about to take will do him much good, and that we shall see him back again safe and well.

The report, together with the balance-sheet, which showed the Association to be in a healthy financial condition, were adopted.

Two or three alterations in the rules were made, and votes of thanks to the various officers for their services during the past year were adopted.

Mr. P. EVERITT proposed, and Mr. W. E. DEBENHAM seconded, a vote of thanks to Mr. R. P. Drage, for his services to the Association as Secretary during the past three years, in recognition of which the same gentlemen proposed a resolution that Mr. Drage be elected an honorary member of the Association. Both resolutions were carried by acclamation.

The election of officers for the ensuing year resulted as follows:—*Committee:* Messrs. G. W. Atkins, Thomas Bedding, J. Weir Brown, C. H. Cooke, P. Everitt, C. H. Oakden, J. S. Teape, W. D. Welford.—*Librarian:* Mr. F. W. Pask.—*Curator:* Mr. A. Haddon.—*Trustees:* Messrs. J. Traill Taylor and J. B. B. Wellington.—*Hon. Secretary and Treasurer:* Mr. T. E. Freshwater.

A vote of thanks to the Chairman concluded the proceedings.

North London Photographic Society.—June 20, Mr. A. E. Smith in the chair.—Mr. Oakley referred to the meeting of the Affiliation Committee on June 6, which he had attended as one of the delegates of the Society, and reported that, stated shortly, the business transacted consisted of a balance-sheet being presented, and two sub-committees, each consisting of two delegates, being appointed and respectively commissioned to tilt with the English railway companies on the subject of reduced fares for photographers, and to consider what the Affiliation rules meant. Mr. Oakley had no doubt that the affiliated 5000 awaited the reports of these sub-committees in nervous expectancy. Mr. Walker showed prints on gelatine paper, the toning results being unsatisfactory. Mr. Bishop advised the use with this paper of the combined toning and fixing bath, made according to the formula recommended for Solio paper. Mr Williams advised workers to make the chloride of gold they used, and, preferably to others, from Australian gold coins, as these contained no copper alloy. Mr. Morgan then gave a lecture and demonstration on the *Amidol, Metol, and Glycin-Hauff Developers*. He stated that amidol was essentially a developer for all-round work, whether for negatives, lantern plates, or bromide paper. He especially urged the formula in which the dry crystals were added to the solution of sodium sulphite immediately before use, and, in cases of over-exposure, adding water and bromide according to requirements—the last-mentioned even to the extent of three grains to the ounce of developer. He averred that a good printing negative could be made with amidol as a developer which had received only one-third of the exposure necessary to produce one when pyro was used. Metol was a developer to be used in two solutions, one being the free alkali. It was not so powerful as amidol, and any amount of tentative work could be done with it. For bromide prints it bid fair to supersede the ferrous-oxalate developer altogether. He had been experimenting at the works of a large photographic company that day, and, as a result, it was admitted that metol developed a print equally well with half the exposure required when ferrous oxalate was used as the developer. The lecturer did not enlarge much on glycin, it being a more recent introduction; but, from what he intimated, the audience concluded it would be a kind of automatic developer, such as the button-pressing fraternity would gladly hail if they ever dared on development. You only had to put the exposed film in the solution and take it out when it was reduced to a perfect negative.

Northern Photographic and Scientific Association.—On Saturday, July 1, through the kindness of Mr. George Murray, F.R.S.E., F.L.S., a visit was paid to the Natural History Museum at South Kensington, and a most enjoyable afternoon was spent. It has been arranged to have an excursion every Saturday afternoon throughout the summer. Next Saturday, July 8, there will be an outing to White Webbs Park and Enfield. Train leaves Broad-street at five minutes to three; Finsbury Park, twelve minutes past three; Harringay.

(G.N.R.), fifteen minutes past three; Hornsey, seventeen minutes past three; Wood Green, twenty minutes past three; and Bowes Park, twenty-two minutes past three.

East London Photographic Society.—June 27.—A question from the question box was read: "Wanted, a good formula for a borax bath. The Chairman recommended one ounce of borax to eighty ounces of water for stock, for use, take one ounce of stock and one grain of gold. Mr. E. M. Minns then read his paper upon *Subjects, and how to Find Them.* During the course of this most interesting paper, the lecturer strongly advocated the use of a view meter, and showed one of his own construction; he also advised the use of blue spectacles, so as to do away with the colouring effects in the view, and only to perceive the relative values of the high lights and shades; he further said that the "subject" was only a secondary consideration, the manner in which it was portrayed was everything.

Leytonstone Camera Club.—June 28, Second Annual General Meeting, the President (Dr. W. Pickett Turner, E.C.C.) in the chair.—Mr. Albert E. Bailey, Hon. Secretary, read the report for the past year, which was highly satisfactory, accounting for weekly meetings during the winter, and weekly outings during the summer; a brief *résumé* of the lectures, demonstrations, and public entertainments showed a very varied and interesting programme had been gone through, special reference being made to the great success attending the first annual exhibition, which had resulted in the satisfactory balance of 24*l.* being added to the revenue of the Club. The balance-sheet of the Club for the past year was next presented and adopted, showing an increase of receipts over expenditure of 38*l.* 2*s.* 10*d.* The election of Officers resulted as follows:—*President:* Dr. W. Pickett Turner.—*Vice-Presidents:* Messrs. E. Widdrington Byrne, Q.C., M.P.; W. B. Whittingham, J.P.; A. Horsley Hinton; D. J. Morgan; J. F. Sanderson.—*Council:* Messrs. G. H. Cricks, A. T. Cufley, H. E. Farmer, A. Frost, G. H. Hart, A. J. Newton, D. G. Riddick, F. W. Wates, A. P. Wire.—*Hon. Treasurer:* Mr. Tom Symmons.—*Hon. Secretary:* Mr. Albert E. Bailey.—*Assistant Hon. Secretary and Curator:* Mr. Montague Atkinson. The Hon. Secretary announced the number of members as 136, that the subscription for the new year would remain the same, 5*s.*, and that before the next winter season the Club hoped to be in their new hall and studio. The definite date for the 1893 exhibition had been fixed for November 20 to 25 inclusive. A vote of thanks was passed to the Chairman. The Hon. Secretary wishes particularly to call the attention of both amateur and professional photographers in the vast Epping Forest district in which they work to the many advantages of this Club, offering, as it does, throughout the year an almost weekly entertainment and use of dark room, and shortly a studio, for the annual sum of 5*s.* On the completion of the new premises, it is proposed to introduce an entrance fee, so there is no time like the present to join. The headquarters, the Assembly Rooms, are about three minutes' walk from Leytonstone Station, G.E.R., and the Hon. Secretary's address, Rose Bank, South West-road, Leytonstone.

Liverpool Amateur Photographic Association.—June 29, Mr. Paul Lange in the Chair.—Three new members were elected. Excursions to the following places were announced: Burton (Cheshire), for beginners, Saturday, July 8; leader, Mr. J. T. Norman-Thomas. Puddington, Saturday, July 22; leader, Mr. F. Anyon. Mr. W. T. Wilkinson gave a lecture and demonstration on photogravure. After describing the class of negative required for photogravures, a carbon positive was developed, then a ground was laid with resin on copper plate, and a carbon negative developed upon dusted copper plate, the image being afterwards etched in relief. After replying to a few questions of technical interest, the spectrum was projected from the lime-light through a prism, and various colour screens interposed to show the orthochromatic value of various aniline dyes, and also demonstrating the value of different screens, both for orthochromatic work and providing a safe light for the dark room.

FORTHCOMING EXHIBITIONS.

1893.	
July 7–8	Photographic Convention of the United Kingdom, Plymouth. Hon. Secretary, F. P. Cembrano, jun., 10, Cambridge-gardens, Richmond, Surrey, S.W.
August	Welsh National Eisteddfod. The General Secretary, Pontypridd.
Sept. 25–Nov. 15 ...	Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1–31	Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 9–Nov. ...	Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
December	Madras. The Hon. Secretary Amateur Photographic Society, Madras.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,551.—"Improvements in the Fronts of Optical Lanterns." J. H. Barton.—*Dated June* 27, 1893.

No. 12,590.—"Improvements in Vitrifying Photographic Prints on Glass, Metal, Porcelain, China, and like Substances." H. W. Cox.—*Dated June* 27, 1893.

No. 12,621.—"Improvements in Photographic Cameras." G. I. Spalding.—*Dated June* 27, 1893.

No. 12,633.—"Improvements in Apparatus for Vignetting Photographic Prints." E. M. Ashley.—*Dated June* 27, 1893.

No. 12,655.—"Improvements in Apparatus for Trimming Photographs." Complete specification. A. C. Rettie.—*Dated June* 28, 1893.

No. 12,656.—"Improvements in and in connexion with Saturators for use in Signalling, Optical Lanterns, and for similar Purposes." J. G. Parvin.—*Dated June* 28, 1893.

No. 12,734.—"An Appliance for Washing Photographic Plates and Prints." W. Thomson.—*Dated June* 29, 1893.

No. 12,839.—"Improvements in Tripod Stands for Photographic Cameras and other Purposes." L. A. Marion, H. Guibout, G. Bishop, F. Bishop, and J. P. Kirk.—*Dated June* 30, 1893.

No. 12,840.—"Improvements in Apparatus for Storing and Exhibiting Transparent Pictures, Photographic Negatives or Positives, and the like." L. A. Marion, H. Guibout, G. Bishop, F. Bishop, and J. P. Kirk.—*Dated June* 30, 1893.

No. 12,860.—"Improvements in Photographic Cameras." H. H. von Hochberg, Prince of Pless.—*Dated June* 30, 1893.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE DOUBLE ANASTIGMAT OF C. P. GOERZ.

To the Editor.

Sir,—In The British Journal of Photography of June 23, page 396, Dr. P. Rudolph, of Jena, makes an attempt to submit to an unfavourable criticism the comparison prints published by Mr. C. P. Goerz. At the outset of his critique, hints are thrown out as to the validity of the patent, with the evident intention of favouring misconceptions by suppressing the true facts of the case.

The type of construction which forms the basis of the double anastigmat had already been made the subject of an application for patent in England on December 19, 1892, a fact which was well know to Dr. Rudolph. The latter had made experiments in March, 1892, with the object of obtaining landscape lenses of good illuminating power, and claims to have, in the course of these experiments, arrived at the form of the separate lenses on which the double anastigmat is based. These trials have, however, not led to satisfactory results. Dr. Rudolph has not only admitted this fact in private conversation, but has also stated it in public. In his lecture, given on March 18, 1892, before the Freie Photographische Vereinigung in Berlin, on the subject of the Zeisa anastigmats, the elements of which he had calculated, he has made the following *verbatim* statement:—"The doublet type invented by me, is doubtless the only one by means of which anastigmatic flatness of field can be obtained without injury to the other properties expected from a good photographic objective." (See *Photographisches Wochenblatt*, Berlin, 1892, page 153, *a. f.*)

If, therefore, Dr. Rudolph in his letter says that already in 1892—the time of his lecture—experimental objectives of the type of the double anastigmat had been made, I can only understand from that statement that such trials have produced negative results.

I find my assumption confirmed in the work, *Theory of Optical Instruments after Abbe*, by Dr. S. Czapski, scientific co-operator at the optical works of Carl Zeiss. Breslau, 1893. Dr. Czapski writes in this work, after commenting upon the most important types of construction of photographic objectives, page 205, the following:—"At length endeavours have been made, after abandoning restriction to two single component parts, to obtain improved effects by a combination of three lenses, single or cemented. These attempts, made in various quarters, have, however, not yet been rewarded with undoubted success."

In his specification for the British patent, dated March 3, 1893, Dr. Rudolph certainly says: "The practical question as to whether in a combination of the above description it is possible to obtain a sufficient anastigmatic correction, and at the same time to comply with the other conditions required in photographic objectives, has been answered in the affirmative by theoretical and practical investigation of both types of the new triple lens." But nothing is mentioned about the time when this affirmation took place, and only a sufficient astigmatic correction is spoken of—a rather elastic term.

By calculating the elements of construction given by Dr. Rudolph in his specification for patent, I have been able to ascertain that both the detailed constructions show inaufficient astigmatic and spherical correction.

I have only closed my investigations, which have led to the construction of the double anastigmat, at the end of last year, after years of preliminary labour, which, as far as I can show, takes me back to the middle of 1889, and after correction of astigmatism of the radial lines and of spherical aberration, I have found not only that there exist kinds of glass which induce achromatism, but also that these kinds of glass possess the property of reducing the secondary spectrum, and further, that astigmatism is not only eliminated from the radial lines which come first into consideration, but from the whole surface of the image, and

finally that up to an angle of seventy-two degrees absolute flatness of field has been obtained.

Not until I had safely recognised all these advantages did I feel myself at liberty to declare that I stood before an important invention, of which I do not intend to allow my priority to be removed by the incomplete labours of others.

Lastly, I feel it my duty to make the following statement:—

When we entered the double anastigmat at the Patent Office, neither I nor Mr. Goerz had the slightest notion of similar labours in this direction on the part of Dr. Rudolph. We did not gain cognisance of this fact until we paid a visit to Jena at the end of December last. On that occasion we were informed that it had then been resolved to apply for a patent on the basis of Dr. Rudolph's investigations.

The circumstance, therefore, that Dr. Rudolph, nevertheless, postponed his application until March 3 last, requires further explanation.

I did not think myself justified to omit this remark, and the less so because the communication on the part of Dr. Rudolph opens the widest field to misconceptions.

As regards the critique on the comparison prints published by Mr. C. P. Goerz, I will now show that Dr. Rudolph, though laying claim to the construction of the double anastigmat, has not even conceived the important advantages of the same.

Dr. Rudolph asserts that the antiplanat and euryscope had not had a fair chance on account of the free aperture of *f*-6. What on earth has free aperture to do with astigmatism? That with objectives possessed of unavoidable astigmatism the effect of the latter can be diminished by a judicious arrangement of aperture and distance of lenses, whereby through timely vignetting a large portion of disturbing rays is cut off, was undoubtedly known to the constructor of the lynkeioscope; he well knew how to successfully utilise this experience, and attained thereby that his aplanat, by employing larger stops, gives much better results than other objectives of a similar kind with the same size diaphragm. And that this is so the photographic prints are intended to show—nothing else.

While, on the one hand, according to Dr. Rudolph, the antiplanat and euryscope are at a disadvantge by reason of their free apertures being too large, the anastigmat of *f*-7·2 on the other hand is at a disadvantage on account of not being corrected for a larger aperture.

There could be, surely, nothing more natural than to select from the price lists of the various makers objectives intended for the same purpose, and which in aperture and focal length approach as nearly as possible the double anastigmat; and of the Zeiss anastigmats No. 3 of series III. is that which in the just mentioned conditions almost completely harmonises with the double anastigmat, while Series II. of the Zeiss anastigmats does not include a suitable focal length.

Now, Dr. Rudolph asserts that no disadvantages would have resulted to the Zeiss anastigmat against the double anastigmat, if instead of a Zeiss anastigmat of *f*-7·2 one of *f*-6·3 had been drawn into competition. But instead of supplementing the published comparison prints by a corresponding photograph taken with a Zeiss anastigmat of *f*-6·3, which would at once have decided the correctness of his assertion, if founded, Dr. Rudolph produces in evidence of his statement certain prints which have been obtained under chosen conditions of disadvantage to the double anastigmat.

Even though stopping down to *f*-15·5 cannot be admitted as a measure for the examinations of syatems of strong illuminating power, the result in favour of the Zeiss anastigmat is still further removed by the circumstance that Dr. Rudolph approaches the object to the short distance of 1·2 meter with an objective lens corrected to an infinite distance. Of what worth such manipulations are I leave to the judgment of any unprejudiced person.

I am prepared to repeat the photographic exposures as represented by the prints with a Zeiss anastigmat of Series II., under the assistance of Dr. Rudolph or his representative, and declare emphatically that such exposure can only lead to further confirm the superiority of the double anastigmat.

The reproach that the two first objectives of the photographs have a shorter focus than the three others may have some justification, but as only specimens of this focal length are in commerce, nothing remained for Mr. Goerz than to use them. Moreover, any one with a technical knowledge can easily appraise and take into account the amount of the defect which may arise from the slight difference of the focal lengths, from the data given with each of the prints.

From the unequal definition of the two sides of the photographs, Dr. Rudolph infers that not the centre, but one of the sides, of the plate had been focussed. This assumption is erroneous. The unequal sharpness has much more its cause in the fact that the iron rails by which the Stegmann apparatus for reproduction used for the production of the originals was guided, though accurately directed upon the centre of the trial plates, were placed, as I could ascertain after closer scrutiny, not completely vertical to the plate. This circumstance, which affected uniformly all the exposures, cannot, however, in any way be considered a fault which might induce erroneous conclusions. On the contrary, it is particularly well adapted to demonstrate the difference in the lateral want of definition with objectives more or less corrected for astigmatism.

Finally, Dr. Rudolph objects to the omission of the author's name on the prints.

In producing the originals for the photographs, we have been assisted in a most amiable manner by Professor Dr. Gustave Tritsch, privy medical counsellor in Berlin, for which assistance we acknowledge ourselves to be greatly indebted to him. Professor Dr. Tritsch, to whom the prominent qualities of the double anastigmat at once became evident, exhibited such lively interest in this new objective, that he has sacrificed several days in testing them, and was not only present at the production of the originals, but also at most of the extremely painstaking, and sometimes tedious, preliminary labours.

The placing of the plates was separately executed by all persons present, in order to render ourselves as much as possible independent of personal errors, and exposure was not made until the placing by all agreed.

Present were: 1, Privy Medical Counsellor Professor Dr. G. Titsch; 2, Mr. Paul Goerz; 3, the undersigned; 4, Mr. Riffarth; 5, the operator of the Institute for Reproduction of Messrs. Meissenbach, Riffarth, & Co., who developed the plates.

With each of the objectives taken for trial at least two exposures were made, and the best only used for the prints.

If Mr. Goerz has omitted to attach to the prints the name of Professor Dr. Tritsch as author—this Dr. Rudolph no doubt has meant—it was done chiefly for this reason, that such a notification could only produce the impression of an advertisement, which in my opinion our double anastigmats are not in need of.

With a subject of such importance it cannot fail that, very soon, scientific authorities who have no interest in either side will comment fully upon the questions which here come into consideration. I can only welcome this in the interest of my good cause.

Asking you, Sir, to kindly admit the contents of this letter to your esteemed JOURNAL,—I am, yours, &c., EMIL VON HÖEGH.

Berlin.

THE CONCENTRIC LENS.

To the EDITOR.

SIR,—I had not intended troubling you further in this matter until some reliable independent testimony was obtained, but I am unwilling to let Mr. Stillman's letter of June 8 remain so long unanswered in face of the unfair charge he makes against me in his postscript.

Mr. Stillman is no ordinary controversialist. I was provoked, in the first instance, to lodge an emphatic protest against a statement that seemed to me inaccurate and misleading, twice repeated—a claim for the lens that is repudiated by the makers and has no foundation in fact. That so insignificant individual as myself should presume to question Mr. Stillman's accuracy, and suggest that his facts are fancies, seems to have roused his indignation, but we Yorkshire folks are a plain, practical lot, and have a habit of sticking to a point until proved right or wrong. No amount of indignation will crush us, and if we get into a dispute we accept the responsibility.

Just note how Mr. Stillman has performed the operation known as "climbing down." At first he contended that the concentric defined as sharply at *f*-16 as at *f*-64 over a plate as large as the focal length of lens. Then he changed to "any given object," and now he has watered that down to "such definition as meets his requirements." Had he said this at first, this controversy would not have arisen.

Then Mr. Stillman's style of argument—a long letter, not to me, but certainly at me, in which he commiserates other users of the lens for not achieving the impossible because we have not a nice delicacy of touch, or our cameras are not sufficiently well made, while Mr. Stillman proves his superiority by admittedly sending you a partially developed negative taken in a camera with a cracked front. Our cameras must be very bad.

Mr. Stillman's own interpretation of my protest was, that if I was right his contention was "brag, or worse." Now, he says I may take any course I like to prove my case, as "it does not concern him in the least." This is the same gentleman who contended that the instructions sent out by Messrs. Ross with the concentric were "illogical" because they did not support his views. Mr. Stillman is an excellent judge of what is illogical.

In conclusion, I regret I am unable to accept any advice from Mr. Stillman in the matter of courtesy. My letters have been very much on the same lines as his, and if I have sinned in this respect he is not entitled to reproach me. I take it as a little ruse to cover his retreat. I will send a concentric to Kew, and submit the report to you in due course. Whether for or against, we will have proof, which will be the one grain of wheat in this mountain of chaff.

Thanking you in anticipation,—I am, yours, &c., F. H. BURTON.

Roundhay, near Leeds, June 27, 1893.

IMPROVEMENTS IN PHOTOGRAPHIC LENSES OR OBJECTIVES.

To the EDITOR.

SIR,—*Apropos* of new lenses that are now being issued, permit me to say that in Patent No. 1261, of 1889, it was not my intention to place upon the market a new lens of such formation and advantages as that existent objectives, single or double, rapid rectilinear or wide-angle, should thereby become obsolete, but, on the contrary, by the use with

them of my patented combinations of greater public utility, that this end should be attained by simple, yet *correct*, means, and, at the same time, that a great saving to the photographic artist should be effected. That these desired results have been, and can be, obtained by the series of combinations specified in my patent cannot truthfully be denied. They are partially placed on the market in the French goods of F. Darlot & Co., and brilliant results are secured when, in workshops of British experts, the lenses are carefully centred and ground or selected exact to specification. That such combinations are absolutely corrected is proved by the fact that in the proportions specified no alteration can be made without detriment to their symmetrical definition, either in the centre or in the outer edge.

Owing to the facilities afforded by such a formation for obtaining a deep globular field (with the smaller stops in use), or, reversed, a flatter field (with the larger stops in use); or for obtaining an exceptionally deep, long narrow field, such as the cabin of a steamer or a long corridor (when, in such case, they can be placed one in front of the other in the space between the plane of the diaphragm and the front collecting objective of a half-plate rapid rectilinear doublet, or of an Optimus 10 × 8 rectilinear, wide angle, or other doublet); or, again, a narrow angle for obtaining a view of a distant subject (when, in such case, they may be placed at point, so called, of principal focus, outside and at rear of any photographic doublet, or single ordinary achromatic lens, and whereby, also, "instanto" effects may be obtained); the combinations, by preference, consist of four parts or pieces, two positive and two negative lenses, after a manner described in my specification, and divided into two separate cells, which whole combinations can, as aforesaid, "be applied *in* or *with* any photographic achromatic lens; astigmatism being corrected for, it follows that a correct media being added to any correct media the whole is correct, whilst a symmetrical and "the most accurate resemblance between the object and the image is secured," as shown in copies of finest engravings.

Consequently, as before written, it was no point of mine to interfere with the construction of an outer front collecting, or, in doublets, rear dispersing objective on lines as made previous to date of my patent, but to provide combinations to become, as it were, handmaids to render them increasingly effective and useful. Such being my case, it becomes my duty to, on the foregoing and on other grounds hereinafter stated, again present the claims of my Patent, No. 1261, of January 21, 1889, befor the public photographic world.

I. It would be superfluous to correct that which is correct, and these absolutely correct media are found specified in the first series mentioned in Patent No. 1261; they form the key to guide the construction of equivalents, as mentioned in following series, which were purposely inserted by me to prevent infringements. British opticians do not, of necessity, require the aid of other experts to calculate in two or three part the equivalents of the said series of four parts (as, for convenience, placed in plane of diaphragm front and rear of a doublet, with an air space between such, as is afforded by the stop-slot, width of angle being attained and retained, together with increased or decreased size of object, at will of the operator). To many the various series quoted in my patent seemed to be superfluous; but, upon examination with the first key-guide series, they will be found, I am well assured, to cover all needful ground.

Some months back a Resident Barrister mentioned to me that, in experimenting with an ordinary achromatic lens, instead of a stop, he placed behind it a piece of tinfoil, and, no matter in what part of that piece of tinfoil he pricked a minute pin-point hole, he found a perfect picture delineated on the screen or ground glass behind. This, in the minds of most people, will argue ill for the correctness of calculations dogmatically describing the formation of *two* partial focal points, formed by rays passing through "the meridional and sagittal sections respectively (why so called, one ray shoots as much like an arrow as does another wherever it gets through?). It follows, then, that that form of lens, or combination of lenses, which in practical work gives the best all-round results, will commend itself for use.

II. Correction for "astigmatism" will, in the rapid rectilinear doublet, be found to be a correction for "residual error," lying between the points A (at top-slot) called "principal focus," and *other* points between it and the points B (at rear-objective), called "conjugate foci;" this, in a very complete measure, is got rid of by insertion of my combinations at A, making these combinations principal to the front collecting objective, and transmittents to the rays passing through it; and B, the rear objective, become principal to the combinations at A, whereby "residual error" is so removed. This will be found to be the case with any rapid rectilinear doublet by a conscientious maker of repute; and is proved, by the interior (15 × 12) of the Crystal Palace, taken by Negretti & Zambra with my whole-plate, eleven and three-quarter inch focus, rapid rectilinear doublet (Fallowfield), the focus being increased by my combinations to fourteen and a quarter inches equivalent focus, stop of a quarter inch orifice. Lines—of the multiplicity of iron pillars of the vast building—rectilinear; and girders sharp to outer edge of circle of the image, received through the front collecting objective, and whereby great width of angle is obtained, to manifest advantage.

III. By placing the combination of four parts, contained in the two separate cells, in the plane of the diaphragm, they act either as a collecting or dispersing lens to the front or rear lens of a photographic doublet. Used singly with them, as may be desired by the operator, rectilinear lines being in marked measure still secured, and with a comparatively small stop, objects from twenty feet to over three miles are delineated in good definition or focus. Again, the "compensating" part of my combination in cell by itself may be allowed to remain in its position in the plane of the diaphragm, and the other portion, in a cell by itself, be placed at the point previously occupied by the front or rear lens (of the doublet), which had been unscrewed and removed for that purpose, and the correction for "residual error," mentioned above in Section II., becomes distinctly marked and observable. Therefore it appears clear that the position at point called principal focus, in which the combinations are placed in their connexion with "an ordinary achromatic lens," has to be considered rather than a fixed system of calculations as to "radii of curvature of the surfaces of the lenses," and "central thickness of the lenses." As, again, as a general rule, the radii of curvature of combinations must perforce have that relation to the radii of curvature of the "ordinary achromatic lens," or lenses, in conjunction with which they may be used—as have the various inner skins of an ordinary Spanish onion in varying "radii of curvature" to meet the requirements of the radii of curvature of each outer skin to which it is adapted, be that onion of what size or shape it may. But the shape of the human eye might, under the same conditions, be followed to advantage, and Professor George Butler Bradshaw (Gold Medallist in Science) informs me that the eye of the sparrow sees the hawk before the hawk's eye discerns the sparrow. The variation of radii of curvature of positive and negative meniscus lenses of from three and a half inches to seventy-two inches focus has been offered to be done for me by a London maker of such lenses, whilst it will scarcely be disputed that *no* optician would rightly be considered as an "expert" who was not *au fait* as to the methodical fulfilment of such requirements with the "ordinary achromatic lens," or lenses of any diameter with which he purposed to use combinations of lenses.

IV. The question, then, of correction for the astigmatic aberration of simple ordinary single meniscus lenses may be tested by taking any pair of positive meniscus lenses of, say, sixteen inches focus, either of which, viewed through by a person of normal sight, will "neutralise" a negative ordinary single meniscus lens of same focus, in such a manner as that a series of parallel lines, a quarter of an inch apart, will be found of exactly the same distance apart whether seen through the two neutralising lenses or on either side of them. Similarly, this pair of positives of sixteen inches focus—placed one on either side of a negative meniscus lens of eight inches focus, and found to neutralise it in such measure as that the same series of parallel lines will also still appear equidistant, whether viewed through the three neutralising lenses, or on either side of them (at points of impact and epact, so to speak, respectively); then either one of those two positive lenses may be used with that eight-inch negative as its corrector for astigmatism, subject to (after a similar process of testing) a positive ordinary single meniscus lens of forty inches focus, placed with a negative meniscus corrector lens of eighty inches focus, being together used with the previous mentioned pair as a compensator. These four parts, inserted in two separate cells (or cemented together or in pairs), as described in Patent No. 1261; the curvatures regulated as mentioned in Sec. III. herein; used in or with an ordinary achromatic lens or doublet, "with a single or divided objective tube," and placed at the point called principal focus, which may be either in the plane of the diaphragm, or in front, or at rear of either a single ordinary achromatic lens, or rapid rectilinear, or wide-angle doublet. It will be found that no one of these four parts can be replaced by any other lens of a different focus, even a slight variation showing a tendency to introduce spherical or other aberration. It will also be found that the positive may be separated from the negative at certain varying distances, if what are called "tele-photo" results are required with a short-focus camera.

To borrow, then, a simile from Lord Salisbury's speech at Derry:—Should "Infringerites" attempt to introduce into the British land of Canaan improvements in lenses which are already effected under a British patent of January, 1889—now that these plain facts in connexion with the patent (No. 1261) are again pressed upon British opticians and the scientific world, specifying a *mathematically exact* principle of construction and correction, I hold that a syndicate of experts behind Patent No. 1261, as a rampart, would be unassailable before any court. Be this as it may, my desires have never extended beyond requiring absolutely customary British "fair play."—I am, yours, &c., HUGH BLACKWOOD.

Beckenham, Kent, June 20, 1893.

"A FEW MORE WORDS."

To the EDITOR.

SIR,—That considerable opposition will be evinced towards the scheme as mooted in "Darkest Photography" on the score of "Free Trade," *cela va sans dire*. But where, it may be remarked, has free trade landed us? As pointed out in the previous article on this subject, it has caused a tremendous influx into the ranks of the profession without a corresponding degree of excellence. You are asked now to protect yourselves against this great incursion, which has exercised such damaging effects on your prosperity. The remedy, as suggested, is, to a great extent, in

your own hands. Be united! Act with a greater spirit of unanimity! Show to your fellow-men that this great art-science of photography, of which you are, or ought to be, so justly proud, and which you, as the professional exponents of, have brought its varied works to such a high state of perfection, shall no longer be invaded by a mob, sometimes composed of only the merest tyros, and henceforth only tested and proved men shall remain in, or find a welcome, in your ranks.

With regard to the licensing of photographers, there is one very great point to be urged in its favour, and that is, What body possesses such powerful influence within itself for its own trade's benefit as that of the "Licensed Victuallers?" and why should not such a happy state of affairs exist for the "Licensed Photographer?"

Another point is almost entirely overlooked in connexion with photography, and that is, the vast army of persons who are employed, either directly or indirectly, in the various manufactures and kindred trades required for the production of only a dozen cabinet photographs. This is again a matter for serious thought and reflection in connexion with the political economy of this vast kingdom. As the Government of the country has, by the introduction of photography some fifty years ago, been relieved of a terrible incubus in providing, or finding the means of support for the many thousands which our art-science has found good and remunerative employment, possibly no industry has ever cropped up so quickly, or made such rapid strides within so short a period, and therefore it behoves us to do all that lays in our power to protect this gigantic industry, and not let its vitality be choked, as seems probable it will, unless some decisive steps are speedily taken whereby to remedy the present state of affairs.

It is therefore suggested that a quick and easy means of obtaining the voice of the profession on the proposed scheme is this: All photographers to be invited to send a post-card, with their names and addresses thereon, and just these words, "*In favour*," to THE EDITOR, at the office of THE BRITISH JOURNAL OF PHOTOGRAPHY, 2, York-street, Covent Garden, London, W.C., and these post-cards would go far to simplify matters, and assist in initiating the necessary proceedings, so as to push forward the project of "Registered and Licensed Photographers."—I am, yours, &c.,

June 30, 1893. PIONEER.

AMATEURS AND PROFESSIONALS.

To the EDITOR.

SIR,—I beg to express my thanks for permitting me in your issue of June 30, to defend the occupation of shop-keeping from the imputation of degradation made against it by one of your contributors. I would further like to make a few remarks on the vexed question of amateurs and professionals.

One of your correspondents suggests that amateurs would be wiped out if they had to pay a tax of ten or twelve guineas a year; undoubtedly they would. Seeing, therefore, the remedy is admittedly potent, why is it not applied?

Well, in the first place, photography was not invented for the purpose of giving a body of professionals a monopoly of the art, and one man has as much right to practise it as an amusement as another has to practise it as a business. Can your correspondents be so childish as to suppose that Parliament will pass such an absurd law—they are surely joking?

Only a short time ago a Lancashire County Council or Local Board proposed to the Chancellor of the Exchequer that cyclists should be taxed five shillings per year. The proposal was not entertained for a moment.

Undoubtedly there is much to be said on the professional side. The amateur does, to a small extent, affect the trade, but the remedy is not Acts of Parliament.

The only way in which amateurs can unfairly compete with professionals is in the line of underselling them, or in giving photos away free. We must appeal to the good feeling of amateurs not to act so thoughtlessly.

If they must take photos for money let them charge the proper price, and if they can afford to do them without receiving pay let them carry round a subscription card for some hospital or charitable institution.

Then, when a person wants a portrait doing, do it on condition that a subscription for its value be given to the charity. Of course there will be exceptions to this rule; there are times when it would be correct and proper to make presents of photos to our friends, such as views, and special subjects of a like nature.

But let no amateur practise the indiscriminate free giving of photos. It will only tend to make them common and unappreciated, and when a charge is made let it be the usual professional charge for the same class of work, whether the amateur keeps it himself or devotes it to charity.

Then, in my opinion, professionals will have no need to complain of the amateur, and the problem will be solved. They have just cause to complain of the amateur who undersells them or gives away his work for nothing without discrimination.

Could an association be formed of amateur photographers binding each member to those terms, it would help to bring about the result so much desired.—I am, yours, &c., WILLIAM JAMES FARMER.

68, *Blackburn-street, London-road, Blackburn, July* 1, 1893.

To the EDITOR.

SIR,—I am sorry to see so many foolish utterances in the JOURNAL on this question.

It is as evidently impossible to restrain amateurs from the use of the camera, or from selling their productions if they find buyers, that it is the veriest waste of time and material to print the absurdities which have lately been written on these matters.

As well might the professional bakers seek to restrain home-made bread, dressmakers to prevent unlicensed infringement of their sphere, authors to tax the unprofessional essayist, and so on with every trade in the country! Is it not true that most trades are at present depressed, and people of all mercantile pursuits complaining?

There are causes for the depression in photography which are very plain to be seen do we but look for them.

"To him that hath more shall be given." Yes, if he does good work, and spends largely in advertising.

Nay, sometimes it is bad work that pays best; the flattering retouching, the untruthful effect of unnatural lighting, possible only in a studio furnished at great cost with an elaborate system of blinds and reflectors; these, and the magnificent "get-up" of the studio of the monied man, take a large slice from the general run of photographers.

A little lower in the scale commences the system of price cutting, of taking small orders and making up for it in number of sitters, overworking and underpaying assistants, running a number of branch studios for the profit which should be obtainable from one.

Panic fear of each other is a large factor in the present crisis. If it happens that the next stand, however unpromising, is working at lower prices than, say, mine, down must go my prices, however inferior his work.

Grabbing at one another's business, competing for estimates where the lowest tender is always accepted, and other things not so patent to the public, all combine to make our position what it is. We are largely paying the penalty for our own sins, and it is purblind folly to lay the blame on the amateur.

A certain man took transfers for 3*s.* 6*d.* minimum. Being one day asked for a block, he took the transfer, paid 2*s.* 6*d.* for etching, and furnished the block for 3*s.* 6*d.* Why? Because he heard that somebody in that trade was doing them for so much. (I generally publish my name, but wish not to do so in the present instance.)

Some of the very best work I have ever seen has been done by amateurs, and some of the most valuable discoveries of photography have been made by amateurs. To deny it is to plead ignorance of the history of photography.

But what is the cause of these causes? How comes it that we find ourselves in the toils of advertising monopolies, price-cutting, falsifying, labour-sweating, seven-day working, neighbour besting, toiling for nothing? The answer is to be found, but it has nothing to do with photography; therefore, unless at special request, and by special licence of the Editor, I shall not divulge it. Indeed, to many correspondents on the subject, it would, I fear, be unintelligible.—I am, yours, &c.,

June 29, 1893. INDIVIDUAL.

To the EDITOR.

SIR,—No one can fail to sympathise with the unfortunate professional photographers who, while suffering through the laws of political economy, lay all or most of the blame on the amateurs.

The recent suggestion that the latter class should pay a heavy licence for the privilege of carrying a camera points out the most practical way of dealing with the matter.

There may, however, be a good deal of conservatism to overcome before such a tax could be imposed, and as the ranks of our legislators include a number of amateur photographers it is to be feared that a certain amount of class prejudice will oppose the scheme.

The suppression of the amateur will, doubtless, seriously damage the manufacturers of plates, cameras, &c. The latter will find it to their interest to pay the tax for the amateurs so as not to lose such good customers.

If this happens the National Association of Professional Photographers will, of course, have to buy off the opposition of the manufacturers. The financial results may prove complicated.

The principle of taxing those who amuse themselves with any occupation outside their own trade or business is too good to be applied only to photographers. As soon as the public have been educated up to it, we shall of course tax amateur carpenters, gardeners, soldiers, *et hoc genus omne*. They all interfere with those engaged in the corresponding trades.

The Chancellor of the Exchequer would be only too delighted, and many vexatious duties (including perhaps the income tax) could then be taken off.

I would only suggest that the snap-shottist be exempted from the proposed licence. Such a large proportion of his shots are failures that he greatly benefits plate-makers, without doing any appreciable harm to the professional photographer.—I am, yours, &c., ECONOMIST.

July 1, 1893.

LEYTONSTONE CAMERA CLUB, SECOND ANNUAL EXHIBITION

To the EDITOR.

SIR,—Owing to the great success and overcrowding attending our First Annual Exhibition held on last November 10, 11, and 12, the Council of this Club have decided to extend the time this year to a week. The date is also fixed, and it will be held at the Masonic Hall, High-road, Leytonstone, opening on Monday November, 20, and closing on Saturday, November 25. Further particulars will be duly announced, and it is earnestly hoped that our numerous photographic friends who supported us so well last year will do so again this year, when we hope to eclipse our previous efforts.—Yours faithfully, ALBERT E. BAILEY,

Rose Bank, South West-road, Leytonstone. *Hon Sec.*

"MUSIC HATH CHARMS."

To the EDITOR.

SIR,—My attention was lately attracted by an advertisement which appeared in a popular photographic journal demanding the services of a "musical retoucher," the particular quality of voice required being soprano. This appears a novelty in the way of orders, but one which, I am sure, will be readily filled. In the mean time "wonderment guesses" why is such a combination desired, and to what more or less useful purpose will it be applied when found? Perhaps the best way to satisfy my curiosity would be to wait until a retoucher with a tenor voice is applied for, when, perhaps, it will be my good fortune to be selected to take part in a "retoucher's madrigal" or a "stripper's roundelay." Whether or not such happiness will ever be mine, this idea of combining two hitherto widely separated vocations seems a happy one, and is rich in suggestions. Attending, first, to such as are quite utilitarian, and therefore business-like, one might suppose that the system of having a retouching department conducted on harmonic principles would answer very well. I know by experience that singing is a great relief to the nervous tension caused by prolonged application to such tedious and monotonous work as retouching. I knew a surgeon who had a habit of whistling softly the air of some old ditty—a cross between a jig and a country dance—when performing the most skilful and perilous operations; doubtless he did so in order to keep himself cool and his hand steady. Many employers think that you cannot do two things at once, and discountenance talking and singing whilst at work. Talking may be bad, as it is apt to become controversial and take up too much attention; but there is not the same objection to singing, as long as it is not of that class which requires the accompaniment of gestures and poses, or too many "runs" and "shakes." Singing acts beneficially on the circulation, remedying in some measure the ill effects of sitting; moreover, the energies receive that stimulus which the work cannot give, activity is sustained, one is prevented from falling asleep, or quarrelling with his neighbour, unless it be over a question of "tempo" or "pitch," the work receives less begrudging attention, and the result is—progress.

Shakespeare says, "The man who has not music in his soul is fit for treasons, stratagems, and spoils." He does not particularly allude to retouching, unless in the last part of the sentence he refers to spoilt negatives.

In connexion with this notion of employing stippling songsters, or singing stipplers, many amusing thoughts present themselves. One can picture the spectacle of an energetic foreman wielding the bâton, which might in this case consist of a retouching pencil, and seeing that the bows—I mean the other pencils—keep time with the music. He prefers pieces that have an "allegretto" movement, deprecates anything like "adagio," but has a partiality for "accelerando al presto."

A "photographic establishment choral society" might do double duty, so many birds might hit two objects with one stone—by being placed in proximity to the studio their harmonious breathings would serve to evoke that lively and amiable expression of countenance in the sitters which it is the aim and endeavour of all good operators to obtain. Experience would soon show whether the best singers turned out the most artistic retouching, which we might expect them to do by dint of their mental faculties being elevated and quickened to a perception of the beautiful, whether it be found in the graduated tones of a negative or in a modulated scale. Certain it is that amateur vocalists are so fond of exercising their voices and their talents that many would be found anxious to acquire the art of retouching in order to gain admission to such musical salons as the retouching-rooms of the future promise to become.

Finally, we can imagine the fashion extending to other departments, until at last it becomes a *sine-quâ-non* in an operator that he be also operatic, and it may even lead to a solution of our present "Depression in photography" problem, for if once the public takes to the new photo-musical fad it will only patronise those establishments which are ready to add to the allurements presented by a system of rendering the harshest and plainest of features soft and agreeable, the further attraction of being dissolved into ecstasies by strains of the sweetest music, vocal—and it may come to this—instrumental whilst waiting one's turn in the reception-room or undergoing the process, which will no longer be stigmatised as the "ordeal" of being photographed. The subject is so charming; but I must tear myself away from it, sufficient to say that by the time that the last-named state of things shall be *un fait accompli*, the profession shall have been subjected to such complete and remorseless action of the laws of natural selection and the survival of the fittest, that the unmusical among them will have disappeared, leaving the fiddling photographer more elbow-room for his scrapings and the photographic flautist freer space and air as he "softly purling glides on the even tenor of his way." Simultaneously another vexed question will be settled, the last element of discord will be eliminated, and all photographers henceforth will hold the undeniable and inestimable privilege of calling themselves artistes, with or without the "e."—Yours, &c.,

July 1, 1893. THE PIPING BULFINCH.

COLOURED LANTERN SLIDES.

To the EDITOR.

SIR,—We notice in the June issue of "Supplement" to THE BRITISH JOURNAL OF PHOTOGRAPHY an article taken from the *Photographic Times*, written by Mr. L. C. Laudy, and must say we fully endorse what he says about "the need of more trained artists in the slide-colouring line." He very properly denounces the "rubbishy painting extant—harsh, wild, and sensational colouring, and that those who are induced to try their hand may avoid the above, and restrain that childish appetite for lurid and glaring effects, and be guided by a *chaste* and *educated* taste." He then adds, "The field of lantern-slide colouring is an excellent and tempting one . . . . will be delightful and *lucrative* in its results." (The italics are ours.)

Now, we wish to add a few remarks, the result of nearly half a century's experience in painting slides by hand, and colouring photographic slides. The majority of the public refuse to pay a fair price nowadays for the colouring; the cheap 18*s.* a dozen complete (photograph and all) have done it. Our dealers say they "*cannot sell the true artistic work*, and *that a good slide by an educated artist* would be passed by as tame and poor, &c." Really, what inducement is there to be found for educated men to compete, receiving, as they would (from the dealers), from 3*d.* to 6*d.* per slide for their work? Then, again, the glaring and vulgar colouring by the trade workers (as shown in all our opticians' and chemists' shops) that are turned out by the thousand, are done by girls and children, in stuffy rooms in or near London—mostly by people who never knew anything of art or taste. Poor things, they cannot afford the time to improve themselves or their work, and, as to *reading up a subject*, that is out of the question. What art training do you suppose any of the people have had that are regularly advertising in yours and other papers? It is the *quantity* of cheaply daubed trash that pay them best and real sweating out of girls and children. How different it was twenty or thirty years ago, before the advent of the present grade of "artists!" Very different it must be with the true artist! He wants good pay, with leisure to do his work conscientiously and well. He cannot afford to advertise, because he could not work for enough to pay the expense. And, lastly, if a man of ability *must* spend half his earnings in advertising for work, he will turn to better-paying methods of earning a livelihood We know of several clever artists who have left slide-painting in disgust. A man of ability is worth 3*l.* to 5*l.* a week at the very least; can any of the "sixpenny art" pay that sum? What number must he do per week?—We are, yours, &c., WILKINSON & Co.,

Holmeside, Sunderland. *Dissolving View Slide-painters.*

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange ratchet safety bicycle, ball bearings all over, for good hand camera (¼ or 5×4). Facile or Kodak preferred.—Address, G. M. MILLER, 15, Cambridge-terrace, Belgravia, London.

Wanted, 12×10 camera, three double slides, globe enameller, good hand camera, or accessories. Exchange Singer tricycle, as new, cost 26*l.* nét, or 24×18 hot rolling press. Address, J. ASTON BRIGGS, Whitby.

Wanted whole-plate studio camera, with two double backs and carriers. Will exchange a 15×12 enlarging, &c., camera, with full set carriers for same.—Address, H. WILKINSON, 2, Church-green, Harpendsu, Herts.

Will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY from 1889 to 1892 (inclusive) and a few odd numbers of *Photography* for graduated background or interior.—Address, FREDK. HURD, Photographer, Shepton Mallet.

Will exchange a 15×12 reversible camera, long extension, with two double and one single slides, for a 10×8 folding bellows camera, with three slides, double.—Address, JOHN BROOKS, Photographer, 40, Parliament-street, Burnley, Lancs.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

CONSTANT READER.—You omitted to give your name.

KNOWLEDGE IS POWER; A. J.; and others, in our next.

ACCESSORIES.—Mr. W. H. Redshaw, of Bourne, Lincolnshire.

G. WRIGHT & CO.—Why not advertise the solution for that purpose?

EBOR.—Apply to Mr. W. I. Chadwick, St. Mary's-street, Manchester.

LUX.—The simplest and, in the end, the cheapest plan will be to purchase a new dish.

W. M.—It is doubtful if the stains can be removed. Try the effect of very dilute hydrochloric acid, or, failing that, oxalic acid.

G. REYNOLDS.—Yes; the chemicals are measured out by avoirdupois weight—sixteen drachms, of twenty-seven and a half grains each, to the ounce.

T. RAYMENT.—So far as we are aware the collodion transfer for the so-called "Club Picture" is extinct. Therefore, if you must have them, we suspect you will have to learn how to make them for yourself.

SPOTS.—We know several ways by which the stains may be taken out, but none that will remove them without also removing or changing the colour of the fabric, so that the remedy would probably prove much worse than the disease.

R. T. WATSON.—The best way will be to obtain instruction from a practical worker of the process. If you desire to work the process as a business, the best way will be to "article" or apprentice yourself to some of the firms who take apprentices, and many do.

E. HOPPER.—A portable studio such as you desire will be constructed by any of the horticultural builders in your neighbourhood. If you require one second-hand, no doubt an advertisement in the columns devoted to such purposes will secure what you desire.

E. R. NEWMAN.—Whether the emulsion was defective or not we, of course, cannot say. The negative sent (which arrived in fragments) was not sharply focussed, which may in some measure account for its apparent lack of detail. Its appearance is not inconsistent with over-exposure.

E. WALTON.—Your friend is quite right, the boiling point of water is 100°, but that is on the Centigrade scale. On the Fahrenheit scale, with which you are familiar, it is, of course, 212°. On the Reaumur scale, the boiling point of water is 80°. The latter is the scale most used in Germany and Austria.

H. R. P. asks: "Can I, as an amateur photographer, let photographs of mine be sold for a charitable purpose, thereby receiving no benefit for myself, without infringing the laws for exhibiting as an amateur. Kindly answer this."—This query is on all fours with that put by C. Moore, and the reply will apply in both cases. Each of these correspondents appears to be anxious not to lose the privilege of being *bonâ-fide* amateurs.

C. E. COE writes: "Will you please answer the following: What is the best way to vignette bromide paper and opals, by artificial light, when printing in contact? I have tried several dodges, but up to the present cannot get a reliable result."—Mask the negative as in silver printing—that is, with it placed some distance from the negative—and keep the frame moving during the exposure, so that the light is diffused between the mask and the negative.

BROMIDE.—1. If the manipulations as described were carefully carried out, there ought not to be any spots at all. Obtain a fresh batch of paper and compare with the old. 2. If the glasses be clean, and are in good contact, such appearances are generally present, but we have never found them show in a print, by whatever process it was made. The markings complained of, we suspect, are due to other causes. 3. No work on ceramic photography in the English language is in print at the present time.

C. W.—Makers of dry plates do not publish the formulæ by which they make them. Therefore we cannot tell you how the particular brand you are so anxious about is produced. Probably others besides you would like to know. It is very unreasonable to expect that manufacturers should publish the various methods they employ, although some few amateurs may possibly desire to prepare the whole of the material they use themselves. It is possible, though scarcely probable, that some amateur Society might be induced to offer medals for pictures made entirely on material prepared by the exhibitor. C. W. had better take the initiative and see the result.

OILS puts the following queries. I shall feel greatly obliged to you if you can give me advice through your columns, as to the best way to clean and remove creases from an oil painting on canvas, which is badly cracked and soiled. The canvas has been taken off the stretcher and been carelessly rolled up? 2. Can you also tell me what preparation is the best for varnishing an oil painting?"—In reply, 1. To give the necessary information for it to be of any use would occupy several columns of the JOURNAL, and even then it is probable that an inexperienced hand would inevitably ruin valuable pictures in the first few essays. We advise that the work be put into the hands of an experienced picture-restorer. 2. Mastic varnish; but it should not be applied till the picture has been prepared for its reception. Many valuable pictures are ruined by injudicious treatment.

C. MOORE writes: "A gentleman, amateur in photography, has succeeded in taking some very fine views of the cathedral here, and I shall be glad to know if it will disqualify him from competing as an amateur if the photographs are exhibited at my shop, and sold by me on behalf of a local charity? None of the proceeds will go to the gentleman; in fact, he is in a position not to require or desire any. The photographs are placed unreservedly in my hands, and it is to prevent any possibility of disqualification that I hesitate to make a sale before hearing from you in your JOURNAL."—The question just now is very vexed as to what qualifies an amateur and what a professional in photography. We know that a considerable number who are looked upon strictly as amateurs, and pose themselves as such, allow their pictures to be published, and take a liberal commission on the sale of them. We should like to have the opinion of some of our readers on the question raised by our correspondents.

G. A. writes as follows: "We have moved into fresh premises, and in them cannot get a toning bath to act. The print, on immersion, refuses to change colour. After twenty minutes it tones in the high lights, but the shadows absolutely refuse to put on any gold whatsoever, so come from hypo quite yellow. We have made up quite a dozen new baths, buying fresh chemicals. Bottles, dishes, &c., have been thoroughly washed so as there to be nothing to cause precipitation of gold. Fresh paper has been tried; the same results exactly with P.O.P. and sulphocyanide, so it cannot be due to paper. The failure is due, we think, to precipitation of gold; but how it comes about we should feel obliged for you to tell us. We use acetate and P.O.P. baths. On some acetate baths we have noticed the gold deposited a day after, but P.O.P. refuses to tone directly, so the gold must be reduced simultaneously."—If the facts be as stated, and all the vessels are chemically clean, we should suspect either the water with which the toning baths were prepared, or the water with which the prints were washed prior to toning. If the latter be the regular supply to the district in which our correspondent resides, we quite imagine the trouble does not arise from that. We surmise that the difficulty is due to some trifling manipulatory detail, which, of course, we cannot localise.

RECEIVED.—T. N. Armstrong; J. Pike; E. Dunmore; H. Dennis Taylor; and W. T. Wilkinson.

PHOTOGRAPHIC CLUB.—July 12, Members' Open Night; 15, Outing to Burnham-on-Crouch.

*** Several interesting communications, answers to correspondents, &c., are unavoidably held over.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1732. Vol. XL.—JULY 14, 1893.

RATIO OF GRADATION.

Mr. Bothamley did good service at the Convention in endeavouring to remove what might not inaptly be termed the deadlock on this question between highly skilful scientific theorists and skilful practical workers. He disclaimed any intention to introduce new facts into his lecturette, but led his hearers into paths from which they could look at old facts from different standpoints. He pointed out that, while it was patent that in this gradation question photographers appeared not to agree, it yet might turn out they were talking really of different things when they imagined they were discussing the aspects of one only; and he did not hesitate to point out the folly of using loose nomenclature in discussing scientific results. He strongly accentuated the fact that nothing that Messrs. Hurter & Driffield had written was contrary to the contention of practical men that the printing value of a negative was greatly under control. Messrs. Hurter & Driffield, in their valuable researches, required to discover the relation that existed between the amount of silver deposited and the amount of light to which it was owing. Put into simple language, their experiments, in their view, go to prove that, if a certain amount of light results in a certain amount of silver being reduced, twice as much light will give twice as much silver, and so on. By means of two simple diagrams, representing a set of four gradations, Mr. Bothamley showed how the printing value of a negative might be vastly improved by altered development, and yet the proportion or ratio existing between the highest, the lowest, and the medium tints remain the same. Some difficulty was felt in accepting to the full his valuation of the important position as regards the ratios held by fog. Fog, he pointed out, was rarely, if ever, absent from a negative. The typical perfect one, with "absolutely clear glass in the shadows," rarely, if ever, *was* absolutely clear glass in the shadows, and this would be readily seen by placing the plate upon a piece of white paper.

To every one conversant with mathematics it is a truism to state that, by adding to each term of a geometrical ratio, the ratio is altered. If fog deposit be added to the light deposit, the ratio that would be obtained by a fog-free plate is interfered with, and the printing value may positively be a function of actual fog. When a plate is over-exposed, and it is said that the ratios are altered by the usual mode of counteracting over-exposure, Mr. Bothamley pointed out that what happened was that all the alterations worked for less fog, while with under-exposure the correcting methods introduced fog.

A great part of the interesting discussion that followed turned upon this view. Mr. Cowan, while quite ready to believe that he was not really at issue with the lecturer, claimed that fog had not the influence claimed for it. Dr. Mitchell, Mr. R. H. Worth, and Mr. Watmough Webster joined in the discussion, the latter gentleman introducing to notice what he considered a neglected factor in fog valuation. Messrs. Hurter & Driffield always experiment with an unexposed portion of the same plate when estimating the light reduction, and subtract the fog value exhibited on the non-exposed plate from the total value. Mr. Webster considered that in counting fog reduction as a constant in estimating the value of two portions of one plate placed in a given solution, a mistake was made. He contended that it was then a variable quantity, and said that the experience of practical men would show that it was possible to expose half of a plate to the image of a light object varied by the presence of a few actual blocks, lines, or spots, and obtain those lines or spots almost clear glass, although the unexposed half be decidedly fogged. Mr. Cowan considered this to be a mistake. It is a matter, however, that any one could settle for himself by a simple experiment or two.

We make no excuse for thus attempting to bring before our readers the salient points of an interesting discourse, if for no other reason than to accentuate the fact that the important and valuable experiments of Messrs. Hurter & Driffield have been performed in such a systematic manner, and estimated on a basis of scientific principles in a way in which the use of mathematics was unavoidable, that a really fruitful discussion cannot be carried out on any other basis. The majority of photographers have no use for mathematics, and may presumably be little acquainted with them; hence if a small committee were elected from our leading Society, instructed to examine and report on the much-vexed question, their verdict would stand a chance of being received as final.

We would conclude by adding a further contribution to the fog question, which, nevertheless, may possibly increase to fog. Not one of the speakers at the Convention said one word as to where the fog deposit was to be placed in the negative. For aught they said, it might be indifferent whether the fog deposit was between film and glass, on the outside of the film, or evenly distributed through it. In other words, so far as the argument went, the added piece of tissue paper Mr. Cowan instanced might be placed between negative and printing paper, or outside the printing frame, without altering the scale of gradations in the print. Would this be the case?

VIGNETTING BY ARTIFICIAL LIGHT.

The operation of vignetting is one that requires a great amount of care in order to produce the best results under the ordinary circumstances of daylight, but when artificial light is in question the difficulties are very materially increased. Whatever may be the method employed for masking and softening the image, it is of course of the utmost importance that the light be as diffused as possible, and it is the production of the necessary diffusion that renders the task of vignetting by gas or other artificial light so much more difficult than by daylight.

Of the unknown devices in use for daylight vignetting, none answer practically with artificial light without very considerable variation in the mode of use. We may perhaps make exception in favour of the mechanically graduated screens of glass or paper sold for vignetting purposes, but these are comparatively little used, and far from perfect in their performance. If a perfectly graduated vignette glass or screen for use in contact with the negative can be secured, then all the difficulty at once disappears, but the provision of one such for each separate negative is a practical impossibility. Failing that, we can only do our best to imitate the diffusion obtainable in daylight.

Of the mechanical methods employed for masking the negative, there is a sufficient choice, and probably each individual will have his favourite, though, if properly used, nothing is simpler or more efficient than a plain aperture with serrated edges, and covered with tissue paper. Such a screen placed at a distance of from three-eighths to half an inch from the negative will, in diffused daylight, produce the most delicate gradation, and if the position of the printing frame be frequently changed, or, better still, if it be kept in constant motion, the evenness of action will be still further promoted.

It must be borne in mind that the securing of gradation is not the only difficulty in vignetting; to be perfect it must be uniform, and this can only be obtained when the light falls equally in all directions upon the negative. In vignetting in daylight, should the light be stronger from one side of the negative than the other, the inevitable result will be that the shading on one side of the picture will be deeper or more extended than on the other; and, if this be true of diffused light, it is even more so when sunlight or artificial sources of illumination are concerned, and the necessity for softening the action of the light by every possible means becomes greater.

It is not our intention to describe the numerous varieties of screens employed in vignetting, but rather to show how they may best be utilised in connexion with artificial light, and we shall therefore assume that such a one is employed as would give a satisfactory result if employed in ordinary diffused daylight. The question, then, is how best to imitate the diffusion of light from a clear sky.

The simplest and most natural plan is to utilise reflected light, that is, to expose the negative, not directly to the source of illumination whatever it may be, but to allow the light to fall on an extended surface of suitable colour, such as the wall or ceiling of a room, and to expose the negative to that. If the printing frame be held above the head in such a position that no light reaches it directly from the chandelier or lamp, but only that reflected from the ceiling, a very satisfactory gradation will be secured, and, if at the same time the frame be slowly rotated, additional uniformity will be assured.

Another plan consists in suspending a board by its four corners in a perfectly horizontal plane, and causing it to rotate, the moving board being used as the table on which to expose the vignetting frame. If this be fixed in such a position with regard to the source of light that the latter falls on it at an angle of from 30° to 40°, and the board be set in even motion, the gradation will be as perfect as in diffused light. But it must be borne in mind that any irregularity of motion or departure from the horizontal will, with a fixed light at close quarters, produce a corresponding want of uniformity in the gradation.

A further means of softening and equalising the gradation by whatever means obtained consists in interposing a sheet of tissue paper or ground glass midway between the vignetting screen and the negative in such a manner that the intervening screen itself becomes, in a measure, the illuminant. This, of course, gives much greater softness, though it necessarily increases the exposure. A simple frame of three-eighths of an inch in thickness, to fit in to the front of the printing frame, will suffice to carry the tissue paper on one side and the vignetting screen on the other, and can be made attachable to any frame.

Some little more attention might well be given by dealers in this country, as is the case in America, to the provision of special frames and appliances for vignetting, and more especially for vignetting bromide and other films that necessitate the use of artificial light.

The Chicago Exhibition.—We learn by a telegram just received that the Judges appointed to make the awards to the exhibitors are to commence their labours to-morrow (Saturday). It is to be hoped that they will prove satisfactory to all concerned. Anyhow, exhibitors must be better satisfied to have their works adjudicated upon by a jury than reported upon by any single individual. Had this system been adopted in the first instance, much unpleasant friction would have been avoided.

The "Benevolent."—During the outings of the Convention last week, especially when these took place on a steamer, Mr. Hedley Smith rendered excellent service to the Photographers' Benevolent Association by going frequently round with the contribution box. After a song, say by Mrs. Mason, W. D. Welford, Birt Acres, or others, off on his rounds among the passengers would start Mr. Smith, whose appeal for the "smallest donation" was seldom disregarded. In this way the goodly sum of five pounds was collected and handed over to the President of the "Benevolent."

Gold.—A great many professional photographers prefer to make their own chloride of gold, and usually, notwithstanding it is illegal, employ the current coin of the realm for the purpose. From a return just made, it appears that no less than 16,000,000*l.* worth of worn gold was withdrawn from circulation last year. In making the chloride new coins should always be selected. This should be manifest to every one; but we recently saw some about to be used which, upon being weighed, showed a deficiency in weight of several grains in the bulk. New sovereigns cost no more than worn ones, and they yield more chloride.

An Incomplete Novelty.—The *Literary World*, alluding to an American work, *Titled Americans*, which gives a list of American ladies who have married titled Englishmen, and some of those who have married titled foreigners, says: "The most remarkable feature of the book is the list appended of the unmarried scions of our nobility, with their estimated incomes—a sort of *vade mecum* for Chicago millionaires." Surely, such a work would be far more complete if it were illustrated with the portraits of the titled bachelors and widowers. We imagine there would, in some instances, at least, be no difficulty in obtaining them if the object were explained. Here is a hint to further "American enterprise."

The Royal Academy.—A resolution has been submitted to the Council of this body, and has been discussed by it, according to which Academicians and Associates will have to limit the number of their exhibits at the annual show to six, while outsiders are not to send in more than four. This, if the resolution be adopted, will considerably lighten the labours of the committees of selection, while it may induce some artists to concentrate their energy on fewer works instead of expending them on a larger number, sometimes at the expense of execution. Would not some such regulation with regard to photographic exhibitions be an advantage, particularly some of those held in provincial towns and the suburbs of London? In many instances an exhibitor would figure to better advantage by showing half-a-dozen pictures than he does by exhibiting twice or thrice that number.

The Silver Market.—Photographers are less directly interested in the value of silver now than they were formerly when the nitrate was required for baths in the collodion process and for sensitising paper. Now the silver nitrate is rarely required, if at all, by many photographers. Still, the market value of the metal largely concerns dry-plate makers and those who supply ready-sensitised paper. Silver has been depreciating in value for many years past, and the announcement of the lowest record has often been made. The record has, however, again been broken, for a fortnight ago it was quoted at 29½*d.* per ounce. About five-and-twenty years ago it stood at something over 60*d.* per ounce. The market has recovered somewhat, but is still in a very excited condition, and the value of the metal has fluctuated as much as several pence an ounce from day to day. Unless the new regulation with regard to the Indian mint be relaxed, or more mines are closed, it is clear that even the present price of silver will not be maintained for any great length of time.

Show Cases.—In connexion with the lack of enterprise shown by some portrait photographers, we have on more than one occasion commented upon the small attention given to the specimens exhibited in the show cases and shop windows. These are shown to attract sitters, and therefore, one would think, should be in keeping with the times. To exhibit portraits in summer attire when the snow is upon the ground, or in heavy winter attire during the dog days, is certainly a mistake from a business point of view. We were forcibly reminded of this one day last week, when the thermometer was registering over 80° in the shade. While admiring some excellent pictures in a show case in one of our fashionable West-end thoroughfares, we overheard one young lady remark to two others, "Just look at those people in furs! Ugh! how horrid!" Furs in photographs are always effective, and there is little doubt that the same pictures would be looked at by these same people with admiration a few months hence. With ladies the immediate style and fashion tell for much.

Royal Cornwall Polytechnic Society's Exhibition.—The sixty-first annual Exhibition of this Society will open at Falmouth on Tuesday, September 5, 1893. As heretofore, medals and prizes are offered in various departments, including photography, the class being open to professionals and amateurs, and a section being devoted to photographic apparatus. List of prizes and all further information may be obtained from the Secretary, Mr. Edward Kitto, F.R.Met.S., the Observatory, Falmouth. Information respecting the photographic department may be obtained from Mr. W. Brooks, Laurel Villa, Wray Park, Reigate (member of the General Committee). Medals are offered by the Society for meritorious productions in the following subjects:—Outdoor photography (professional): 1. Landscape, not less than 20×16 inches. 2. Landscape, 12×10 inches, and under. 3. *Genre.* 4. Architectural (exterior). 5. Instantaneous, including marine. 6. Animals. 7. Enlargements. Indoor photography: 1. Portraits, not less than 20×16 inches. 2. Portraits, 15×12 inches, and under. 3. Home portraiture. 4. Still life, flowers, &c. 5. Interiors, architectural or otherwise. 6. Photo-micrographs. 7. Enlargements. Amateur: 1. Landscapes. 2. Architectural, exterior or interior. 3. Hand-camera work, not less than twelve examples. 4. Instantaneous, including marine. 5. Still life. 6. Enlargements.

The Royal Wedding.—Probably on no previous occasion in a single day were so many plates exposed, and with so little result, as on the day of the marriage of the Duke of York and the Princess May. We are told by dealers that, at the beginning of last week, there was quite a run on the most rapid brand of plates of the various makers of the quarter-plate size. The day, as far as light was concerned, was all that could be desired, and hand cameras were to be seen at all points on the routes of the processions. Yet how disappointingly small is the proportion of really good pictures that were secured as compared with the attempts made! A large number of novices have by now realised the fact that obtaining even fairly good negatives of events, such as that referred to, in the streets of London is by no means easy of accomplishment. Where there is a large crowd of people packing a thoroughfare, with high buildings on either side, there is always a considerable amount of haze and dust, which brilliant sunlight makes painfully conspicuous, that quite obliterates distance, though that may not be far off, unless there is a strong wind blowing. It is this that has caused so many of the negatives to appear fogged when developed. However, many of the negatives obtained, though they may not be good photographically, will serve as interesting souvenirs of the occasion in time to come to those who took them.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.*

On Wednesday morning the General Meeting was held at 10 a.m., the President in the chair. Mr. Cembrano read the minutes of the last meeting, which were approved. He then read a list of societies which had sent delegates. These included the following: — *The Photographic Club*, J. Guardia and S. H. Fry; *Richmond Camera Club*, R. L. Kidd and P. Ennis; *North London Photographic Society*, J. Traill Taylor; *Leicester Club*, J. Porritt; *Munster Club*, Major J. D. Lysaght; *Manchester Society*, J. Brier and E. Woodward; *Tooting Club*, Mr. L. E. Morgan; *London and Provincial Association*, W. D. Welford and S. H. Fry; *The Photographic Society of Ireland*, A. Warner. There were also a large number of other ladies and gentlemen present from all parts of the kingdom, among the latter, not members of the council, being Messrs. J. W. Webber, Bromley; A. Haddon, Greenwich; Birt Acres, Barnet; W. M. Ashman, Bath; J. S. Hawke, Plymouth; E. J. Humphery, London; F. W. Hindley, London; and E. Marlow, Birmingham.

On the proposition of Mr. C. H. Bothamley, the General Committee with the addition of a few fresh names were re-elected.

Invitations from the Photographic Society of Ireland to hold the next meeting in Dublin, and from the Shropshire Camera Club to meet in Shrewsbury were submitted to the meeting. A vote having been taken, it was declared that a large majority was in favour of Dublin.

The President then asked the meeting to accord a very hearty vote of thanks to the Mayor of Plymouth for his most generous reception of the Convention, to the Plymouth Institution for the loan of their premises, to the Local Committee for all they had done to make the meeting pleasant, and to the leaders of the excursions. If Tuesday's excursion might be taken as a sample, then they had a store of interest and beauty to come. Of course, the weather could not be commanded, but, in spite of the thunder and lightning and the torrents of rain, all managed to enjoy themselves, and the little sing-song in the saloon was by no means the least enjoyable feature.

A cordial vote of thanks was given Mr. Cembrano, the Hon Secretary; and Mr. C. H. Bothamley, in proposing it, said the prospects of the Convention had never been so bright, and that was due largely to the efforts and tact of their Hon. Secretary.

Mr. Cembrano, in acknowledging the compliment, said with this meeting his first year's service came to an end, and he was pleased to say that, for the first time in the history of the Convention, there was

* Continued from last number.

a balance on the right side. (Applause.) It amounted to 15*l.* 19*s.* 9*d.*, and next year he hoped it would be doubled, although the number of members was certainly a good deal less. So far he had received subscriptions from 173, which was a good deal more than he expected, considering the great attractions in other parts of the country this week.

Messrs. John Howson and S. B. Webber were elected auditors.

The following motion, submitted by Messrs. H. Snowden Ward and E. J. Wall, was recommended by the Council for adoption:—"Resolved, that the Photographic Convention of the United Kingdom acknowledges the courtesy of the Photographers' Association of America in inviting British photographers to attend its Conference this year as honorary members, and this Convention wishes its Committee to add to its rules one to the following effect:—That all members of the Photographers' Association of America be considered honorary members of the Photographic Convention of the United Kingdom, and, if travelling in the United Kingdom at the time of the Convention, are invited to take part in its proceedings."

Mr. Wall, in proposing the adoption of the motion, regarded it as a first step towards a Photographic International Union.

The Hon. Secretary seconded the motion, remarking that he had received courteous and encouraging messages from the Photographers Association of America.

The motion was carried unanimously.

Mr. J. Traill Taylor, whilst in full accord with the desire to cultivate brotherhood with their American brethren, would point out that some of their brethren at home had a feeling of soreness towards the Convention, and that others regarded it with apathy. When the Convention was at Birmingham a debt was incurred, not perhaps wisely, and doubtless without due authorisation, by the brethren there, but in the interests of the Convention. Some, and he himself among them, looked upon this as a debt of honour, and he would suggest that, now the Convention had funds in hands, the Council should try to defray that debt as soon as possible, and thus remove the feeling of soreness, and also to overcome the apathy of places like Manchester.

Mr. Taylor's suggestion was adopted.

It was moved by Mr. A. Werner, and seconded by Mr. H. M. Smith, that the following be elected members of Council for the ensuing year:—F. A. Bridge, Dalston; J. J. Briginshaw, London; C. H. Bothamley, Taunton; A. A. Carnell, Plymouth; A. Cowan, Southgate; J. P. Gibson, Hexham; M. J. Harding, Shrewsbury; H. M. Hastings, West Kensington; A. L. Henderson, London; T. C. Hepworth, London; R. Keene, Derby; J. A. King, Bath; W. Lang, jun., Glasgow; P. Lange, Liverpool; A. Levy, London; C. Phipps Lucas, Kent; A. Mackie, London; W. W. Naunton, Shrewsbury; J. Porritt, Leicester; A. Pringle, Bexley Heath; B. J. Sayce, Liverpool; A. Seaman, Chesterfield; H. M. Smith, Stroud Green; J. Stuart, Glasgow; H. Sturmey, Coventry; J. Traill Taylor, London; A. Tate, Belfast; L. Warnerke, London; G. W. Webster, Chester; J. B. B. Wellington, London; A. Werner, Dublin; R. H. Worth, Plymouth; F. P. Cembrano, Richmond; E. Appleby, Bath; J. L. Lyell, London; E. G. Humphery, London; J. Fergus, Largs; W. Taylor, Leicester; R. L. Kidd, Hampton; T. Mayne, Dublin; and Major Lysaght, Queenstown.

At noon the official Convention group was taken in the Guildhall-square by Mr. Heath, of George-street, Plymouth, and the President announced, in the course of the afternoon, that the negative had turned out very satisfactorily. Mr. Scorer, of Havant, also took a group on a plate 28×20 with a camera that would take a plate 30×24. Numerous other "shots" were had at the group, one by Mr. Kidd, giving a fine picture which will be presented to our readers next week.

Wednesday Evening.

This evening the Mayor of Devonport (Mr. Alderman W. Waycott), along with some of the Aldermen and Councillors, together with Mr. Croydon, the Vice-President, Mr. C. H. Moore, the Secretary, and with other members of the Devonport Camera Club, received the members of the Convention. The President of the Club, Colonel Stewart, was unavoidably absent on duty in another part of the country.

The Mayor said it gave him much pleasure to offer the Convention a hearty welcome, especially in their Council Chamber, whose walls were adorned with interesting examples of the photographic art taken by a former official of the Corporation, Mr. C. R. Rowe, their late borough librarian. It was with regret that he saw that the Convention excursion up the River Tamar on Tuesday was sadly interfered with by the rain, but he hoped fair skies would favour them during the rest of their sojourn, so that they might see in their fullest glory the beauties of the district of which the residents were so proud. They would, doubtless, be interested in knowing that at Devonport was born Robert Hunt, one of the earliest and most painstaking investigators of the principles and chemistry of photographic operations. He apologised for the absence of the Town Clerk, who was on a holiday, and of several members of the Council, who were busy preparing for the Royal wedding celebration on the morrow.

The President, in a genial speech, acknowledged the heartiness of the Mayor's welcome, and said it was an added pleasure to know that they were assembled in the birthplace of Robert Hunt, to whom photographers owed so much.

Mr. C. Croydon then, in the absence of Colonel Stewart, the President, offered the Convention a hearty welcome on behalf of the Devonport Camera Club, paying a tribute to the memory of Robert Hunt, with whom was associated John Towson, another Devonport man, so well known as the originator of great circle sailing, mentioning that Colonel Stewart was the inventor of the Panoram camera, and graphically illustrated the great uses of photography in astronomy, microscopy, and natural history.

Mr. A. Tate, J.P., of Belfast, acknowledged the Club's welcome of the Convention, remarking that everywhere in the district they had been received with kindness and cordiality, and, in allusion to Mr. Croydon's remark, said photography was now the trusty handmaid of every science, seeing more than the eye of the astronomer, the physician, and the naturalist.

Wines, tea and coffee, and other light refreshments were then served, and an adjournment was made to the Town Hall, where a most interesting optical lantern exhibition was enjoyed.

Following this was a lecture, copiously illustrated by the lantern, by Mr. J. T. Cunningham, M.A., of the Marine Biological Laboratory, Plymouth, descriptive of the developments of soles, crabs, jelly-fish, and of the habits of the angler fish and the hermit crab.

A paper on the *Special Properties of the Zeiss Anastigmatic Lenses*, by Dr. Paul Rudolph, with diagrams and specimens, was taken as read.

A lecture on *Photography in Relation to Medical Record and Demonstration* was down on the programme to have been delivered by Mr. Andrew Pringle; but, owing to the absence of that gentleman from illness, it was not given.

Thursday.

This day was devoted to a most enjoyable excursion to the ancient town of Totnes, and thence down the Dart to Dartmouth. The party, nearly seventy in number, started from Plymouth shortly after nine o'clock in the morning, and Totnes was reached about ten o'clock. The town looked gay with many flags, while in the streets were people, young and old, in holiday dress, making ready for the festivities. The keep of the old castle was ascended for the view, and many pictures were taken of the gate in Fore-street and of the church, whilst a score of photographers all in a row were seen intent on making pictures of the well-wooded island. Ere Totnes was left the children assembled on the Plains and sang the National Anthem, and some snap-shots of the scene were taken from the pedestal of the monument to Wills, the Australian explorer. Most enjoyable was the trip down the River Dart. It was made in a steam launch, and a roomy boat and two smaller ones towed by the launch. The English Rhine, with its grand woods sloping down to the water's edge, and with its many windings, was seen at its best. Little could be done photographically on the way down, but the hand camera was in constant use as soon as Dartmouth Harbour was reached. By H.M.S. *Britannia*, naval cadet training ship, the launch went slowly, that photographs might be taken; then at greater speed the party proceeded to the harbour's mouth, to view the castle so picturesquely situated on the shore. Yachts, some dressed rainbow fashion and others in full sail, the Kingswear horse ferry boat, and the high banks, with beautiful residences nestling among woods and gardens, and the castle itself were the constant objects of members' attention. Returning

from the harbour mouth, the party landed on the quay, and, proceeding to Bodley's Hotel, enjoyed a substantial luncheon, after which the President, in sympathy with the feelings of the company, gave expression to the hope that the Duke of York and his bride would be blessed with a long and happy life, and heartily thanked Mr. Barnston for acting as leader of so interesting an excursion. Then the party separated to photograph the Butter Walk (in one of the quaint houses of which King Charles II. held court), the Church of St. Saviour, scenes in the harbour, and the softening effect of a sea fog which drove over the hills above the town was seen. All were agreed that the borough and its land-locked harbour was truthfully described by the Queen on one of her visits as "Beautiful Dartmouth." The return to Plymouth was by train, *viâ* Kingswear and Newton, Torbay and Torquay affording charming views in the bright sunlight.

In the evening there was a fair gathering at the Plymouth Athenæum, when Mr. Bothamley gave an address on *Some Points in Connexion with Development*, on which Mr. G. W. Webster, Mr. A. Cowan, and others made remarks.

Other papers, on *The Power of Compensating in Development for Variation in Exposure*, by Professor W. K. Burton; *Latitude of Exposure and Speed of Plates*, by Dr. F. Hurter; and *Our Pictorial Failures*, by the Rev. F. C. Lambert, M.A., were taken as read.

The members then adjourned to the Hoe, to witness the great pyrotechnic display (including the burning of a ship) in connexion with the Royal Wedding celebration.

Friday.

There were three excursions this day, respectively to Lydford, Bickleigh Vale, and Dockyard and Keyham, Cattewater.

The annual dinner was held in the evening, and was numerously attended, many ladies, as usual, being present.

The toast list, which was laudably limited, comprised the Queen and the Royal Family; and The Convention, proposed by the President, was responded to by Mr. R. H. Worth, local Hon. Secretary, and Colonel Barrington Baker, who then, in the name of the Plymouth Club and in a few fitting remarks, presented the Club's medals to Mr. Mason, President, and Mr. Cembrano, Secretary, as a memento of the Plymouth meeting, both of whom acknowledged the graceful gift.

Songs, speeches, and recitations were contributed by Mrs. Mason, Mrs. (Dr.) Mitchell, Messrs. A. Cowan, S. H. Fry, A. Werner, C. H. Bothamley, G. W. Webster, A. Tate, Fuerst, Laurence, Welford Newman, and Mowll. The dinner, taken all in all, was a great success.

Saturday.

A meeting of the Council was held this morning to elect a president.

Mr. J. Traill Taylor said that, as the meeting next year was to be held in Dublin, it was fitting that a representative Irish gentleman should be elected. The name of Grubb had for a long course of years been honourably connected with photography, both through the father, the late Thomas Grubb, and the son, Sir Howard. He therefore begged to propose that Sir Howard Grubb, F.R.S., be elected president for the next year. This was seconded by Mr. Alfred Werner, who observed that Sir Howard's high position in Dublin would ensure the success of the Convention.

This was carried by acclamation. A telegram was received from Sir Howard, accepting the position.

This terminated the proceedings.

THE CONVENTION EXHIBITION.

We now give a more detailed account of the exhibits:—

Messrs. Morgan & Kidd.—We have referred to the large portrait of the lady which occupied the place of honour in the room. It was trimmed down to 8 ft. by 4 ft., having been taken 6 ins. larger both ways. It was supported by two large portraits of a lady and cavalier, somewhat inferior in dimensions, but equally excellent in technique. Pictorially speaking, Mr. Kidd's *Misty Morning*, an enlargement from a hand-camera view taken on the return journey from the Edinburgh Convention last year, was probably the best landscape in the room. Their works in carbon challenged attention, especially a portrait of a lady seated in an ornate chair. Several of these were nicely coloured. They had also a fine exhibition of works in collotype, a department into which this firm is now going extensively.

Mr. Heath, Plymouth.—Among this artist's exhibits was an "At Home" portrait of H.R.H. the Prince of Wales; also portraits of their R.H. Princesses Marie Victoria and Alexandra of Edinburgh. There were also various carbon prints.

Messrs. Elliott & Son, Barnet.—A singularly fine portrait of a lady, enlarged from a negative by Werner & Son. This was a direct print in carbon, produced from a plate of the large dimensions of 64 × 38 inches.

Mr. John Hawke, Plymouth. — This artist's exhibit consisted of a frame of eighteen portraits of H.R.H. the Duke of Edinburgh, which bore the announcement that they were from part of a series of thirty-one negatives taken in forty-two minutes.

Mr. W. C. Tweedy, Plymouth. — This exhibit consisted of a number of views, some of them embracing an exceedingly wide angle They are entitled "Experiments in Panoramic Photography."

Mr. H. Yeo, Union-street, Plymouth. — Mr. Yeo is evidently a master as regards the taking of children, of which this formed one of the most charming collections to be met with. Some are enlarged and are skilfully coloured.

The Eastman Photographic Materials Company had an imposing exhibit which occupied one entire side of the room. The leading feature in their exhibits was soliotypes, plain, burnished, and enamelled, mainly in rich purple and black tones, and in every size from twenty-two inches downwards. The capabilities of solio paper have never before been so well illustrated. This firm exhibited for the first time specimens on their new Nikko paper. The tones of these are of a peculiarly warm and brilliant character. The various exhibits are from negatives by Lafayette, Dublin; Brown, Leicester; Yeo, Plymouth; and several by American photographers.

M. & T. Scott, Edinburgh.—Several excellent enlargements from negatives by Warneuke, Glasgow; Hawke, Plymouth; Ellis, London; Heath & Bradnee, Exeter; and Villiers & Quick, Bristol.

O. Sichel & Co., London.—Two good enlargements from negatives respectively by Byrne & Co., Richmond; and Cox & Durrant, Torquay.

W. Scorer, Havant.—Direct prints of Netley Abbey and Portsmouth Town Hall, taken on plates 30 × 24 inches.

The Sandell Plates were well represented by numerous scenes, groups, interiors, and other subjects, prominent among them being *St. Mark's, Venice; A Royal Vinery; Frogmore; Dean Stanley's Tomb*, &c.

Messrs. Benthall & Co. exhibited their ingenious simplex camera stand, of which we gave an account a few weeks since.

Messrs. Geo. Houghton & Sons showed Clement & Gilmer's telephoto lens in brass and aluminium, together with the well-known shuttle hand camera.

Beale's Non-Actinine had a prominent place on the table, and the albums, frames, mouldings, backgrounds, and other exhibits of Sichel & Co. were well to the front. This last firm also exhibited a portrait camera for 15 × 15 plates, and an outdoor camera expanding to fifty inches.

Messrs. Taylor, Taylor, & Hobson had appliances in the shape of a camera front fitted with flanges and lens mount showing their system of perfect screw attachments.

The new developers were in good display. Messrs. Fuerst, Leblanc, Morgan, and Haussmann were present to impart information when required.

Messrs. Geo. Mason & Co. showed a model of a singularly compact projection lantern, believed to be the smallest practical lantern that has yet been seen. The catalogue of this firm now forms quite a thick volume.

The following are the papers that were read:—

RECENT DEVELOPERS.

By E. J. Wall.

A writer in one of the journals lately said, "On what grounds and to what purpose this eternal puff of the most recent? Is there a 'fashion' in photography that we must all betake ourselves to the last *haute nouveauté* or proclaim ourselves slovens? Amidol! metol! glycin! These are 'the only wear,' and the old clothes are gone to the ragman! But suppose that the old should be better?" I think possibly in the last sentence we may find the reason why we have "this eternal puff," or, I would rather say, this eternal experimenting with new things. I take it

that there is a general feeling of a desire for progress, whether in technique or art, and that to this desire we must put down the craze for the last new developer, the latest lens, and the latest printing process. If some such healthy feeling did not exist, photography would not have made the progress it has done in the last fifty years.

To our professional brethren who, when working in the studio, may be said to work practically under given conditions, not the least of which is to turn out good work which shall remunerate him suitably for his skill, his time, and outlay, there is possibly not so much temptation to experiment, especially when experimenting may mean increased expense without any increase of revenue; but to the amateur, to whom expense is possibly not so much an object, and who firmly believes that he may yet discover a panacea for all ills of under or over-exposure, or careless or ignorant working, there is a very strong temptation to exchange "old lamps for new."

One of the subjects which has claimed no small amount of attention since our last happy meeting in Edinburgh is that of the new developing agents—amidol, metol, and glycin—and I propose to summarise the results of a few experiments which I have made.

The number tablet of Warnerke's sensitometer was used as a convenient subject to expose with. The light chosen was a Welsbach or incandescent gas burner, the supply of gas being passed through two governors to regulate as far as possible the supply. Commercial plates marked with one batch number and one speed number were bought, and exposed one after the other as quickly as possible, and then treated with the various developers.

Mr. Bothamley's standard pyro-soda developer was used for the pyro to obtain a standard. The other developers were modified to try what was the effect of modifying the proportion of the constituents of the various chemicals.

Amidol is a salt of di-amido-phenol, and is fairly soluble in water, forming a slightly acid solution. It is far more soluble in solution of sodium sulphite, and with a saturated solution it is possible to get as much as sixteen grains of amidol dissolved in every ounce.

The distinctive feature of amidol is that it forms a very energetic developer in conjunction with sulphite without the addition of an alkali, and for this reason alone I think it is worthy of consideration as obviating any chance of frilling, which was not unknown with eikonogen and hydroquinone when used with caustic alkalies.

The first method of using this developer, suggested by the makers, was to prepare a stock solution of sulphite and amidol, and dilute as required. Such a solution, however, has, I think, given rise to some of the contradictory statements we have heard about this developer, but it is now generally accepted that keeping it in this form is certainly not the best way of using it, and I have here a negative which fully bears out this idea. A plate exposed in a studio was cut in two, and part developed with a freshly made solution, the other part developed with a similar solution three weeks old. The difference is so striking as to need no comment to those who see it: the one part, that developed with fresh solution, is dense; the other, developed with old solution, a veritable ghost. As amidol is readily soluble in water or sodium sulphite, there is not the slightest difficulty about making a solution up as required.

Coming now to practical tests, I have tried the addition of varying quantities of sulphite, amidol, and bromide, and I will summarise the results I have obtained.

The normal developer used was amidol, 1; sulphite, 10; water, 100. In this the image appeared in 10 seconds, and development was complete in 5 minutes. Increase of sulphite in the proportion of 15, 20, 30 merely reduced the time before the appearance of the image and the time of development, but when over 20 parts of sulphite were used the plates fogged very quickly. Increase of amidol also accelerates the appearance of the image, and enables one to obtain density very readily, and I may here state that, with some plates I have tried, the amidol has to be increased to the extent of 10 to 15 grains per ounce before sufficient printing density could be obtained. Dilution of the developer with water delayed the appearance of the image, and tended to thinness of image, though this, of course, can be compensated for by developing longer.

The addition of bromide in small quantities—that is, up to about 1 grain per ounce of developer, seemed to have little or no influence, but in larger quantities to the extent of 8, 10, and 20 grains per ounce, the appearance of the image was enormously delayed, and, notwithstanding a development protracted to over six hours, neither density nor as many numbers could be brought out. So far, I think that a more certain and reliable restrainer will be found in the use of a weak acid, such as citric or acetic.

The influence of the temperature of the developer was tried as follows: A developer was cooled by means of ice till it registered 35° Fahr. In this the image appeared in ten minutes, and took one and a half hours to gain anything like reasonable density, and was then finally too thin. A developer of the same constitution was heated to 70° Fahr., and the image appeared almost the instant the developer touched the plate, and development was finished in two minutes, the plate being slightly fogged.

I have here two negatives developed with amidol, kindly made for me by Mr. Beckett, of Hackney, as examples of ordinary studio work, and he says that negatives developed with amidol or metol do not require so much retouching as pyro-developed negatives, and, as he does the best part of his own work, he ought to know. I hand these round specially for the benefit of our professional brethren.

Finally, it has been said that plates for development with amidol require less exposure than for pyro. This I cannot believe; I have made a series of very careful tests, cutting exposures down, and I have not found that amidol will fetch more out of the plate, it will not fetch out what is not there, but what it will do is to flash the image up and give far softer results, which are more amenable to after-treatment than the harsh negatives so often yielded by pyro with under-exposed plates.

It has also been recommended to use amidol in conjunction with metabisulphite of potash and an alkali. So far my experiments have only enabled me to obtain a filthy mess of a developer, and magnificent examples of dichroic fog, but I intend to try it with other plates, because all plates do not require or stand exactly the same method of working.

It seems to me to be absurd to suggest the use of an alkali when we can get such excellent results without it; but Dr. Stolze suggests keeping a stock solution of amidol and metabisulphite, and then at the moment of using neutralising with bicarbonate, not carbonate of potash, but so far I have not been able to obtain better results with this than by dissolving the amidol in plain sulphite just before use.

Metol is the sulphate of methyl-para-amido-meta-cresol, and is a glistening powder of faint buff tinge. It is soluble in water to the extent of two and a half parts—100 of water. In solution with sulphite, it forms a colourless solution, which keeps its developing power, so far as I can see, unchanged, thus having the advantage of amidol in this respect. Like amidol, it develops without the addition of alkali when used with sulphite, but the images are extremely thin and weak. The alkaline carbonates of potassium and sodium may be used, and of the two potash gives a quicker developer and rather more density, soda having a tendency to a slower development and softer results. Bromides act in small quantities merely by delaying the appearance of the image and prolonging development. I developed some plates with eight to sixteen grains of bromide to the ounce of developer, and with the latter quantity the image was twenty minutes in making its appearance, and, after six hours' development, only four numbers were rendered visible. In small quantities, however, bromides seem to have far less action than with pyro and some of the other developers.

A normal developer may be considered to be one containing metol three grains, sodium sulphite thirty grains, carbonate of potash or carbonate of soda fifteen grains to every ounce. If distilled water be used, there is no necessity to use so much sulphite, and I have not been able to detect that the omission of the sulphite has any ill effect on development beyond a slight tinge given to the gelatine. Increase of the alkali tends to produce harder results, that is, the higher lights are denser than the lower. Dilution with water produces greater softness, whilst increase of metol causes again greater density.

Testing as to the influence of temperature, I found that at 35° Fahr. development was unduly protracted, and only thin images obtained, but in no case could I get a lower number, whilst heating the developer caused fog. I again tried with metol to see whether it brought out more than pyro, or, in other words, whether it permitted of a reduction of exposure, and I am compelled to say that my results were distinctly contradictory to this statement. The main advantage of these two new developers is that within reasonable limits, in fact, I do not think I should be far out if I said it was impossible to obtain that hardness which is so easy to obtain with pyro and slight under-exposure.

Glycin is oxyphenyl-glycin, and is a pinky, salmon powder, smelling strongly of carbolic acid, not very soluble in water, and more soluble in sulphite solution or an alkali, when it forms a colourless solution, which seems to keep well as a normal developer. I have used glycin five grains, carbonate of potash twenty-five grains, water one ounce, and find that diluted with water or addition of bromide gives far more transparent

negatives. It is characteristic of glycin that it requires no addition of bromide in order to give negatives absolutely free from fog under conditions and with plates, that with amidol, metol, and pyro invariably gave fog. It is, in its action, I think, more like ferrous oxalate than any other developer, and should be useful for black-and-white work, and I have used it for this purpose with excellent results. I have not used it so much as metol and amidol, but am inclined to think it is less useful for landscape and portrait work than the others, though for plates overexposed in the field I have obtained some capital results by using a very weak glycin developer, in the proportion of glycin one and a half grains, potash carbonate twelve grains to the ounce, and allowing plenty of time for development.

Of these three new developers, I think the one that will find most favour is metol, because it is more akin to the older developers, in that it is used in two solutions with an alkali. All of them are applicable to bromide paper and transparency work, but I must confess that so far my use of them for this purpose has been so small that I am loth to say anything about them.

Within the last two months yet another developer, reducin, has been announced, which, like amidol, requires no alkali, and it is quite possible that we are by no means at the end of our list yet, and that thanks to the energy and researches of our German friends, we may be blessed with still more tools to play with.

I have, of course, condensed my remarks, and I have not brought down any experimental plates, though I had intended to do so, but I thought it would hardly interest you to look through between 150 and 200 negatives. Nor have I in any case tried for what Messrs. Hurter & Driffield have defined as a perfect negative. I have tried these developers from the same standpoint as a man in practice would use them, but I hope I have said sufficient to prove that it is worth while giving the new-comers a fair trial, even if it is not found that they will oust our dirty old friend pyro.

Since the above was written, Messrs. A. & L. Lumière's paper, read before the Société Française on June 2, has been published, and I briefly summarise it. They suggest the use of the oxalate of di-amido-phenol as preferable to the chlorhydrate, which is one of the commercial forms of amidol, and the oxalate is formed by them by double decomposition of potassium oxalate and chlorhydrate of di-amido-phenol. The one is, of course, well known to you all, and the latter is amidol Hauff; 20 parts of this dissolved in 200 parts of water, and mixed with 19 parts of oxalate of potash dissolved in 200 parts of water gives a solution containing 21·5 parts of oxalate of di-amido-phenol. This salt is sparingly soluble in water 1 in 2000, but far more soluble in sodium sulphite solution, and by means of this it is possible to get a concentrated solution. A 2 per cent. solution of sulphite will dissolve 1½ per cent. of oxalate of di-amido-phenol, a 5 per cent. sulphite solution dissolves 3 per cent., a 10 per cent. 5½ per cent., and a saturated solution 7 per cent.

Messrs. Lumière state that increase of the strength of the di-amido-phenol above 3 per cent. gives no increase of energy of the developer. A very few drops of 10 per cent. solution of ammonia accelerates very much without giving any fog, but that with larger quantities of ammonia a general black fog is produced. A few drops of 10 per cent. solution of acetic acid is the best restrainer, small traces of bromide having but little effect.

Finally, they suggest the following formula for instantaneous work:—

Oxalate of di-amido-phenol		5 parts.
Anhydrous sodium sulphite	30 to 40	,,
Distilled water	1000	,,

For time exposures reduce the quantity of sulphite to ten to twenty parts.

The advantages of the oxalate salt are that both in the solid and liquid state it is more stable, considerably less sulphite is required, which, from an economical point of view, is not to be despised, and, finally, it will not stain the skin.

I only received the number of the *Bulletin* containing this paper last Tuesday, and have not, therefore, had much opportunity of doing more than try the method suggested by Messrs. Lumière, but I have tried it both with amidol-Hauff and amidol-Andresen, and find it certainly workable, and I think it will prove to be in practice an advantage, and for those who would like to try it I suggest the following rough-and-ready formula:—

Dissolve 20 grains of amidol in ½ ounce of distilled water, add 80 minims of the normal 1 in 4 oxalate solution as used for ferrous oxalate developer, then add from 1 to 2 ounces of 1 : 3 solution of sodium sulphite, decant or filter from any precipitate, and the developer is made.

I had hoped to have been able also to make some mention of the method of developing plates with gelatino-silver emulsions, as suggested by Dr. Jenney, which has appeared in several photographic journals during this last month; but, whilst I have only just had time to concoct the awful mixtures suggested, and try them for about a dozen plates, I am unable to say anything for or against because of such few experiments; but it is certainly a promising field for experimentalists, and the process may prove yet another valuable assistant in practical work for obtaining pictures.

Mr. L. E. Morgan did not agree with the statements as to the reduction of exposure by means of amidol. If they were going to use amidol, the exposure must be reduced very much. Taking pyro as a standard, the reduction must be one half.

Mr. Birt Acres found that with a very weak pyro developer he could get everything he desired. The negatives just shown appeared to him to be flat.

Mr. Cembrano thought that they could get a softer picture with pyro than with anything else.

Dr. Mitchell said his impression was that the new developers at present offered no advantages over pyro. He felt there was a strong reducing power in them, however; but, as yet, it was like the task of chaining lightning to bring them down to the practical uses of photography.

Mr. A. F. Mowll thought they could not judge as to the printing qualities of the old and new developers, as one had to be made more dense than the other.

Mr. Sturmey considered that amidol should be used rather as an assistant to pyro than to its exclusion. The two combined had given him the best results he wished for.

Mr. Henderson thought they were simply working in the dark with regard to new developers.

The President was inclined to the belief that pyro negatives, if well worked, were to be preferred to any other.

In replying to the discussion, Mr. Wall said the new developers had the advantage, that was much as it required a great deal of training and experience to get good results with pyro, anybody could succeed with the former.

LANTERN-SLIDE MAKING.

By Charles L. Mitchell, M.D.

The preparation of lantern slides is a subject upon which so much has been both said and written within the past few years, that it would seem almost impossible to say anything new. And yet, notwithstanding this, the number of really *good* lantern slides made bears but a small proportion to the entire amount produced, or to the large quantities of plates, &c., used for their preparation. So that it seems, perhaps, after all, something might be still said on such a trite and commonplace subject. Having, during the past few years, occupied much of my time in lantern-slide making, I have acquired considerable familiarity with the different methods usually employed in America, and also made some modifications of my own, so that, while not pretending, in the limits of the present paper, to give a complete *résumé* of the subject, it may be of interest if I detail, in a general way, the methods mostly in use by American lantern-slide makers.

The vast majority of lantern slides made in America by amateurs are prepared from gelatine plates, collodion emulsion being very little used, and wet collodion being employed by but few outside the regular commercial slide manufacturers. Perhaps this may be partly explained by a prevailing fondness for the black and grey tones, so easily obtained with gelatino-bromide emulsions. There is, however, a rapidly growing taste for warmer tints in brown, and even sepia, or Bartolozzi red. Quite a number of different brands of lantern-slide plates are found in our market, and of varied excellence. Of these, those prepared by the Eastman Company are probably the most popular. I have always used gelatine dry plates for preparing my own slides, and I am a firm believer that, all things being equal, it is quite possible to prepare as good, if not, perhaps, even a better slide upon a gelatine plate than can be obtained by any other procedure, while its convenience and readiness for immediate use render it much to be preferred.

The size of the American lantern-slide plate is always $3\frac{1}{4} \times 4$ inches, thus differing from the English size, which is usually square, and $3\frac{1}{4} \times 3\frac{1}{4}$ inches. We in America think the oblong shape the best, as it allows of a rather larger picture, gives ample room for the label, and also for taking hold of the slide when placing it in the lantern. We can hardly expect in a country like England, where customs are firmly established, that a change of size would readily be adopted. And yet it is highly desirable, in view of the growing interchange of slides between not only England and America but also with other countries, that some one standard and uniform size for all should be adopted. The present difference often leads to considerable annoyance on account of fitting the

varying sizes into the carriers generally used for the lantern. This difficulty is less in America, however, than in England, for it is always easier to put a small slide into a large carrier than it is a large slide into a small carrier. I notice, indeed, that one English photographic periodical has announced that in future it will receive no slides for competition unless made of the uniform size of $3\frac{1}{4} \times 3\frac{1}{4}$ inches. This is much to be regretted, for it would seem possible in such cases to use an ordinary "push through" carrier, and I hope the example will not prove contagious, for it will tend to check these international exchanges and competitions, and prevent many on each side of the water from becoming acquainted with the best examples of well-known workers.

In the preparation of lantern slides I believe that the majority of our best workers in America prepare their slides by reduction in the camera. I have been informed that in England the reverse is true, the larger number being prepared by contact. I think this difference may partly be ascribed to the fact that the sizes of negatives adapted for contact printing ($3\frac{1}{4} \times 3\frac{1}{4}$ and $3\frac{1}{4} \times 4\frac{1}{4}$ inches) are not as popular in America as they are in England. We do not use the $3\frac{1}{4} \times 3\frac{1}{4}$ size at all, and for all small work the most popular size is 4×5 inches. This does not lend itself so well for contact work, and hence the reducing camera is more frequently brought into requisition. My own preference is unquestionably for reduction by the camera, even when preparing slides from small negatives. There seems to be a certain quality gained which is sometimes missing in contact work, and, in addition, the process affords many facilities for shading or vignetting different parts of the negative which may need either holding back or prolonged exposure.

The character of the light used is also another prime factor. In my own experience I use two different lights—a south light, where full sunlight falls directly upon a ground-glass window; and a north light, where the window is of clear glass and at an angle of about 45° to the horizon, thus securing an even, soft illumination all over the negative. I use one or the other of these lights, according to the character of the negative, as will be detailed later.

Returning again to the subject of lantern-slide plates, I may say that I do not believe it possible, when using all varieties of negatives, dense or thin, to obtain uniform excellence with one grade of plate. This would stand to reason, for a slow landscape plate will give a different negative from one made with an emulsion of high rapidity. I therefore use two grades of plates, one quite slow, giving great contrast, the other several times as rapid. In the former I use the Eastman plate, for the latter the transparency plate made by the Cramer Dry Plate Works, of St. Louis, Mo. These two varieties are used as follows:—Given a very strong, perhaps even harsh, negative, quite dense, and yet with plenty of detail. In order to bring out all the best points of the negative, a strong, intense light is required, and nothing but sunlight seems to answer the requirement. A weaker light will not penetrate the dense portions of the negative, and the corresponding parts of the positive will lack detail. Furthermore, the negative probably possesses too much contrast already, and the endeavour should be to reduce this contrast, and at the same time obtain all the detail possible. I therefore use here the fast lantern-slide plate, and fully time the exposure, using a diluted developer. The harshness of the negative is thus materially reduced in the positive, and the rapidity of the plate makes it more susceptible to the weak light coming through the dense portions of the negative, and thus renders the detail properly. Lantern slides made in this manner are usually quite warm in tone.

Now, on the contrary, suppose a soft, thin negative full of detail, but with comparatively little density. Here the advantage of the slow plate and the soft north light becomes apparent. This soft, even illumination is amply sufficient to penetrate any part of the negative, and yet, not being so intense as the sunlight, does not so rapidly overtime the plate. The slow lantern-slide emulsion is amply sensitive enough to render the detail perfectly in all parts of the negative, and with a moderately short exposure gives good contrast and brilliancy much exceeding that of the original. It is thus possible to obtain from an inferior negative quite a crisp and brilliant lantern slide. The tones obtained by this method are usually grey or black.

For a developer, I use a mixture of eikonogen and hydroquinone in the proportion of fifteen parts of hydroquinone to eighty-five of eikonogen. Eikonogen by itself does not always give the brilliancy or the density desired, but this is easily obtained when a small percentage of hydroquinone is added. The development of a lantern slide is an entirely different matter from that of a negative. In the latter, the time of exposure, and the intensity of the light, are always, to a certain extent, unknown factors, and the developer must be modified according to the necessities of the case. With the lantern-slide plate, the developer, as far as regards the proportion of reducer and alkali, is always the same, so also is the lighting of the negative. The developer should, therefore, be of a standard strength ascertained to give the best results with a normal exposure, and then, when making the exposure, it must be shortened or lengthened until the desired result is obtained. It will not do here to give a short exposure, and then push development by adding more alkali. The plate will soon fog, and an amount of fog which might perhaps be allowable in a negative would be fatal for a good lantern slide. Nor will it do to overtime, and then restrain development with a bromide, for we will be apt to get harshness, much density, and opacity in the shadows, all fatal defects for a good slide. What should be sought is a correct exposure, then a normal developer, and as the former is always under our control, it is better to reject a few plates and change the time of exposure until we have it just right, than it is to attempt to modify the developer.

The question of tone here comes in for consideration. This is a matter influenced, first, by the plate, next by the developer, next by the character of the light, next by the exposure, and, lastly, by the negative itself. As I have before remarked, the cool grey and black-and-white tones are preferred by many in America. There we use eikonogen, hydroquinone, ferrous oxalate, or pyro soda—all developers producing black or grey tones. The warmer tones in most of the slides made by English workers are, I am told, due largely to the use of pyro and ammonia as a developer. Still, for true warm tones gelatine can hardly be made to equal those obtained with collodion emulsion, either washed or dry. It is quite possible, however, with a strong negative, a sunlight exposure, a little over-timing, and a developer well diluted with water, to obtain quite warm tones with an ordinary gelatino-bromide emulsion.

As far as regards fixing, there is nothing superior to the acid fixing bath, now so well known. It prevents staining and clears the plate thoroughly.

The plate should always be varnished, to protect it from the effects of moisture. I use for this purpose the "Zapon" varnish, a solution of nitro-cellulose in amyl-acetate and wood alcohol.

As regards matting, the square opening, with rounded corners, is used by us for all commercial slides. Amateurs who make their own slides vary the opening, however, making it oblong, upright, oval, or round, according to the artistic treatment of the picture.

In labelling the slide, a thumb label is placed on the lower left-hand corner of the face of the slide, while the descriptive label is placed on the opposite end (right hand), sometimes on the face, but more usually on the back of the slide.

Much might yet be said regarding the arrangement of the negative, apparatus for varying its position (so that either the whole or but a portion can be used, the choice of lenses, varieties of cameras for reducing purposes, &c., but it would occupy too much time. The few extremely general remarks that I have made on the subject of lantern-slide making will, I trust, serve to indicate some of our most usual methods of working, and present, perhaps, one or two novel modifications of the orthodox and regular modes of procedure.

After some desultory observations respecting the relative advantages of the American and English sizes of lantern slides,

The President said that, on a commercial scale, the wet-collodion process was the only method by which uniform tones could be obtained.

ARTISTIC EXPRESSION WITH THE HAND CAMERA.

By J. Guardia.

At this period in the history of photography, when every user of a camera is sorely puzzled to know whether his work is fine art or not, it seems to me useful, now we are assembled here, to pause a few moments and conwhere we stand and whither we are drifting.

While some writers claim for photography the highest artistic possibilities, others quite as strenuously assert that it is but a mere mechanical process, admitting of no variation in the hands of different workers, and therefore unworthy to rank as an art at all. Now, I think that the truth here lies, as is so often the case, midway between the two extremes, and that we should rather say that, though photography as generally practised is not an art, yet artistic expression is not impossible to photography. Further, if we admit, as I am afraid we must, that photography has not as yet realised its proper sphere as an art, we may at least hope that the day is not far distant when, acknowledging its limitations and understanding its possibilities, photography will at last gain an honoured place among the fine arts.

But are we really doing anything towards this wished-for end? No, for the principles of art are order and culture, and in photography—in

the photographic world of to-day—nothing but disorder and confusion, yes, and ignorance too, prevail.

I am not now speaking of the great majority of people who "dabble in photography"—who go about the country securing pleasant mementoes of the places they visit, with the sole aim of amusing themselves and entertaining their friends. They are quite right in what they do, for, after all, they stick to what will always be the most popular side of photography—*photography as a mechanical process*, in which good apparatus and dexterity of hand are their own reward. Neither, of course, am I addressing myself to the select few (real artists at heart) who are, each for himself, earnestly trying to find a clear path out of the difficulties which photography is constantly setting before them. Their work bears the seal of their strong individuality, and is, therefore, truly artistic.

But I am speaking of the general body of photographers, whom you may see at our clubs, who often write in our papers, who cram our exhibitions with their worthless productions. There is not one of them but thinks himself a born artist. But look at their work, and you will see no art at all—merely a weak imitation of some other art by means of photography. And this work is turned out in cart-loads, and is bemedalled by omnisapient judges, and crushes out any real pictures that may have strayed amongst it. What wonder that in the end artists merely laugh at us!

Our photographic world is chaos. We are all authors, publishers, and readers; artists, critics, and judges. We elect scientists to decide weighty questions of art, and artists prattle about chemical problems. We all know so much that we are always quarrelling, and we only unite to howl down any man who shows a little originality, and who strives to rescue us from our slough of despond. There are men abroad who, before they bought a camera, had never even stopped to consider that there was such a thing as art in the world, and who, probably, have not seriously studied a single word about it since; but their fingers were deft, and they produced negatives beautiful to look at, and which earned them a goodly show of medals. And, lo! one day they issue forth past-masters in high art. Other foolish people, after years of deep study and constant work, hopelessly exclaim, "Art is long, and time is fleeting." Not so our facile photographer; he masters it all in a few months.

We clamour to be recognised as artists, but the bulk of the work at our exhibitions shows nothing but our absolute lack of taste. To select two samples only. Take first what we are pleased to call a "genre picture." How is it done? You begin by placing the cart before the horse, *i.e.*, by first selecting your title, and then looking around how to construct your work of art. Some figures are now more or less gaudily dressed and stuck in impossible attitudes before an impossible background, and the *chef-d'œuvre* is accomplished. The result is applauded by the general run of photographers as a marvellous feat—a wonderful inspiration. To a person of taste such productions seem eminently absurd; in fact, when they happen to represent historical subjects, the effect is often so incongruous that the authors themselves must at times feel ashamed of their own work.

A particularly mistaken class of *genre* pictures is that which results from "double printing." Although this has enjoyed the advantage of being practised by some exceedingly clever people, their very best results have only served to prove that such tricks are entirely out of place in photography, and that nothing will ever be gained by these efforts to mimic methods which are legitimate and admissible in painting and allied arts only.

Another proof, if one were needed, of the bad taste displayed by photographers is to be found in the mounts they use. We need not mention the wonderful green and chocolate bevel-edge enamelled cards on which the professional fixes his perishable productions. No one has ever called the ordinary portrait-taker an artist, except himself; but let us consider the mounts patronised by the "artistic amateur." Where could one find a more glaring proof of his incompetency to make photography a fine art than the "plate-sunk" mounts to which he consigns *his* efforts? What on earth a plate-mark has to do with a silver or platinum print, I presume, no one has asked himself. We have here a deliberate fraud—a confession on the part of the man that he distrusts the art he practises, and an attempt to make people believe that what he is showing them is not a photograph.

This affectation is not art, and can do us no good. If a plate-mark is essential for our work, let us have real one; let us print in photogravure.

Fault-finding is an unpleasant task, and I do not intend to continue in this strain. I think, however, that what I have said may account to some extent for the contempt which photography is experiencing from painters and other artists, who should be, and may yet prove, her best friends. It seems to me that artists have not taken photography seriously at all as yet, but how can we wonder at it when to the majority of photographers themselves a camera is only a plaything, and photography but a joke. My work of destruction having ended, I will attempt to explain the path which I think we shall have to follow when we clearly understand the nature of photography and her only true sphere of action as an art.

That photography, an invention little more than half a century old, should have so quickly spread throughout the world, and should be practised with equal enthusiasm by persons so different in temperament, position, or education, it must have something in its very essence which supplies a universal want, or gratifies some feeling which all civilised men share in common. The love of beauty in nature is more general than one is likely to suppose, and the very feeling which finds its loftiest expression in our great painters is but evolved from the unconscious efforts of primitive man, and, in fact, arises from tendencies inherited from our animal ancestors. As Professor Baldwin Brown so aptly explains:—"On every grade of his being man possesses an ideal self-determined life, existing side by side with, but apart from, his life as conditioned by material needs. This life expresses itself in, and is nourished by, various forms of free and spontaneous expression and action, which on the lower grades of being may be termed simply 'play,' but on the higher grades take the shape of that rational and *significant play* resulting in art." Now, I think we may readily admit that the success of photography is due to its having given us an easy means to satisfy that desire for "play," that wish to forget the troubles of our daily labours which, as we have seen, is natural to us; or to its having made it possible to everyone to express by his unaided efforts whatever artistic feelings he may have acquired through natural disposition or education.

The foregoing remarks, while explaining the wide popularity of photography as a *pastime*, give us no gauge of its merits as an *art*. That photography *can* be made an art we need not waste much time in asserting. As Nadar recently said:—"Why should photography not be an art, considering that, in copying nature, the painter, the draughtsman, the sculptor, and the photographer all aim at the same goal? Why should we trouble about the means employed if this reproduction of nature awakens in us the same impressions which we felt when looking at nature itself? The superiority of the painter, the draughtsmen, and the sculptor would seem to consist in their power to create. But the use of the palette gives of itself no more right to the title of work of art to any reproduction of visible objects than does the employment of a camera. Photography is in itself a science and an art, and, above all, a means to an end. Its results essentially depend from the taste, the artistic knowledge, and the temperament of the worker."

In forming an estimate of photography as a means of artistic expression, and in accounting for the unfavourable attitude which the general body of artists preserves against us, the enormous disadvantages which artistic photographers have had to contend, and are still contending with, should not be lost sight of. These are disadvantages which, in the nature of things, could scarcely be avoided in the early days of the new art, and which are now being rapidly overcome, and will, no doubt, soon entirely disappear. The principal difficulties which retarded photography in its progress as a fine art were—(1) The low sensitiveness to light of the materials employed, requiring long exposures, and (2) the inadequate nature and unmechanical construction of the apparatus used. The speed of plates has enormously increased within the last few years, and manufacturers are even now vying with each other to turn out plates of greater and greater sensitiveness. With regard to a more correct rendering of the different colours, however, much remains to be done. Celluloid films also promise considerable advantages over glass plates, though they are as yet scarcely perfect enough for the best work.

But it is the old apparatus which must bear the greater part of the blame for the low position which photography still occupies as an art. Lenses, it is true, have long been perfect enough, especially since the introduction of Jena glass. If the lenses generally used are of too short a focus, as undoubtedly is the case, the opticians are not to blame. In shutters, too, the photographer has been fortunate to secure the services of the highest mechanical skill, and though the modern shutter is a comparatively new creation (called into life by the increased sensitiveness of dry plates), it is already, both in speed and efficiency, well in advance of the present requirements of photography. With cameras, however, the case is very different. Designed originally by incompetent persons, they have remained to this day the evident production of cabinet-makers and carpenters, whose only improvements during fifty years may be said to be the substitution of the shaky bellows camera for its steady but ponderous sliding-box ancestor, and the addition of simple movements, like rising front and swing back. The same type of apparatus has been adhered to,

not by a few, but by all makers, and this, not only in the early days when the slow processes employed demanded nothing better, but long after plates had reached a high degree of sensitiveness. For fifty years photographers have had to carry about bulky implements, necessitating the use of a strong stand, and requiring long delays for setting them up ready for work. What wonder, then, that photography never reached its proper province among the fine arts—*the representation of life in nature*, with all its beautiful but evanescent phases and movement, which has only now become possible, thanks to the modern hand camera.

"Fine art," says Ruskin, "is that in which the hand, the head, and the heart of man go together." What chance has the hand, the head, or the heart with a 15 × 12 field camera, and a tripod weighing five pounds? Before hand cameras were invented, what was the aspect of nature as recorded by photography? A dead maze of trees, and fields, and buildings. The rivers and lakes showed no ripple; they were merely a mass of glaring white. The streets were deserted, and tenantless houses were but a mockery without reason. The beauty of cloud and atmosphere was unknown—was represented by acres of white paper. Here and there a group of soulless caricatures of human beings were, indeed, to be seen, all stuck up in constrained attitudes. Not breathing, and moving, and palpitating with life and energy, but either blurred out of all recognition or fixed in unnatural poses, like wax dolls glaring at nothing—"puppets without muscles, and silhouettes without substance." Such was the world as depicted by the slow exposures of the old photography—an inane reiteration of topographical notes, or a spiritless multitude of lay figures in Sunday clothes.

But, with the advent of the modern hand camera, all this has changed. The ripple on the water can be seen and almost heard; clouds, fleecy or heavy, float across the sky; the elegant movements of the swiftest animals are recorded; bustling crowds of men, women, and children are shown to us, picturesque in their ever-varying, unconscious attitudes in the course of their daily occupations, their toil, or their play. The traveller to distant countries will no longer bring uninteresting records of ruins and desert solitudes, but animated pictures of the life, the troubles, and pleasures of the whole human race, from the tropics to the polar regions. A hand camera, ever ready, easy to carry, and able to withstand all changes of climate and vicissitudes of travel, will help photography to outstrip the other arts in the representation of all the evanescent phenomena of nature, in making nations know and understand one another, in furthering the brotherhood and union of the human race. Useful to every one in indelibly recording what he sees, it will help the stay-at-home to portray his friends in familiar and natural attitudes, the traveller to bring back living records of his wanderings, the artist to show us nature as he sees it, deprived of its ugliness, and with its beauty enhanced.

This, then, is the true sphere of photography as a fine art. Creation is impossible to us, let us therefore leave this to other arts. But we still have the great power of *selection*, and of showing our good taste and artistic feeling. Let us cultivate this to the highest pitch we can attain, and employ it in the representation of life, and movement, and beauty of form in nature; a field large enough, and one which the other arts cannot touch. We shall then be doing good and useful work—work that will live.

The course which we should follow in our aim towards artistic perfection is, I think, clear enough, but to follow it means hard work. Let us be true to ourselves, always willing to learn from others, but doing what we honestly think right, whatever the uneducated multitude may say. Let us study nature, for it is the fountain-head of all beauty. Let us cultivate art, that we may improve our good taste.

There is no reason whatever why we should not photograph everything that interests us, whether it is a picture or not; but let us acquire sufficient practice and knowledge to be able to see and secure a beautiful pose or subject whenever nature unexpectedly presents it to us in the course of our rambles. In order to do this with certainty, we must not only use good tools, but must gain great skill in using them. But let us never forget that tools and skill are but means to an end.

I should like to see the day when a photographer only shows *as pictures* one or two of the very best photographs he has taken during the year—when he does his utmost to make these as perfect as possible, by carefully enlarging them, if necessary, by printing, mounting, &c.

Let us have exhibitions of such selected work, let it be judged by *trained* artists, and then we shall stand a chance of proving that photography can be made a fine art, for artistic expression is possible by means of the hand camera.

Mr. R. Keene, alluding to the remarks about the plate marks in the mounts, considered that they were frequently a great improvement to a photograph.

Mr. W. M. Ashman thought it might not possibly be known to Mr. Guardia that in former times streets could be photographed without being perfectly desolate. Skies also were not cloudless.

Mr. Traill Taylor asked Mr. Guardia how long it was since hand cameras were invented, in virtue of which such a revolution in artistic photography had been effected.

Mr. Guardia.—Five years.

Mr. Taylor appealed to Mr. Guardia, for his own sake and that of accuracy, to strike out from his paper all those mis-statements about deserted streets, clouds and atmosphere being unknown, soulless caricatures of human beings, with like statements equally devoid of truth, as well known to every one who was acquainted with the state of photography much longer than five years ago.

Mr. Mowll, too, could not agree with all Mr. Guardia had read. It required much greater intelligence and skill a few years ago than was imagined in these "press-the-button" days, and the work turned out now was not better than it was then.

Dr. Mitchell said that while artistic pictures can easily be made by the hand camera, much depended upon the man who was using it. Hand cameras were often very useful on account of their compressed bulk.

After remarks by Mr. Birt Acres and Mr. Fry,

The President had to differ from Mr. Guardia, and alluded to the high art merit of the works of Wilson of Aberdeen, Wortley, and numerous others, produced long years before hand cameras were known.

MULTIPLE FILMS.

By S. Herbert Fry.

The subject of compound or multiple-coated films is so new, and supplies so many fresh ideas for practical work, that I cannot pretend in this paper to do more than deal in a touch-and-go fashion with it. My remarks will only be valuable, if at all, for some practical suggestions as to the best methods of utilising the advantages which the principle of combining emulsions of differing characteristics and speeds into one film offers.

Novelty.

Although it would, perhaps, be safer to say that, for the prevention of halation, multiple films in gelatine emulsions are rather the result of a happy thought than an entirely new idea, yet, as far as a practical manufacture is concerned, there is, I think, little doubt of their absolute novelty. Experimentalists may have dreamed of some such thing; as, indeed, of what have they not? but it has not hitherto become a realisation.

Still, we have in the old collodio-albumen dry plate a compound film consisting of a collodion bath plate with an albumen sensitised film placed on top of it, and one of our veteran workers, Mr. Forrest, of Liverpool, only a few days since, spoke to me most eulogistically of that old method, and hopefully of the multiple gelatine film for sympathetic reasons.

That process is not only beyond my recollection, but probably there are few in this room who had any practical acquaintance with it.

Manufacture.

In making a multiple film dry plate, a coating machine may be said to be necessary to secure a regular flow of emulsion for the second and third coating. With this exception there are no technical difficulties but such as are common to the manufacture of dry plates generally. Each coating is dried before the next one is laid upon it, and the most important consideration for the emulsion-maker is to provide an emulsion with as small a proportion of gelatine to silver salt as possible.

Theory of the Film.

In determining the relative speeds and characteristics of the different films a large field for experience and experiment is open, and time alone can determine whether the present arrangement is that best suited to attain the end in view. This may roughly be stated to be the nearest approximation to a single film in which the top surface shall be of the highest possible speed, and the bottom of the film of a density-giving silver salt, an emulsion slow and dense in the highest degree. The film should gradually change from one characteristic to the other. In theory the lowest portion of the film should perfectly resist the passage of actinic light. Bolas has, I think, referred to this point in some of his recent writings, and I take it to be the ideal of a sensitive film suitable for all purposes.

Such a film, with our present knowledge, is not possible. We must be satisfied with the best substitute for it. I refer to this especially because it has been asserted that there are steps or jumps in the sensitiveness of a multiple-coated film which are ascribed to the difference in speed of the various separate coatings. I do not propose to do more than allude to this for a simple reason. An examination of the pictures

produced by the films does not, I think, reveal any obvious fault answering to this criticism. I can conceive that, were a multiple film wrongly used, as, for instance, were the top film stripped off with the idea of securing a negative upon the lower film only, then, in such a case, there might be a lack of detail due to the removal of the top layer, and this might appear to be a jump in the sensitiveness between the two films. Such a method of working is not to be recommended, and I do not purpose to seriously consider improper uses of the film. It not infrequently happens that dangers or difficulties anticipated in theory do not occur in practice. This is such a case.

As to the part played by the underlying films, I regard them as prepared to take up and usefully employ such actinic rays as fall beyond the scale of correct representation in the overlying films.

Distribution of the Image.

Let us assume a case in which the range of contrast is great, such as a dark interior with a light and bright window. Let us also assume that which, I think, is generally the case, that for such a subject an exposure upon a dry plate is more or less of a compromise between the time necessary to properly photograph the deep shadows, and that necessary for the bright lights. Indeed, if it be not so, where is the difficulty in making such pictures?

In the multiple film the image of the window will be formed upon the lowest film, and the middle tones upon the second film, whilst the details in the deep shadows will be upon the top film. In other words, the image will be distributed in a selective manner, and this can be easily demonstrated by stripping off portions of the film of such a negative, and ascertaining the action of light upon the lower films.

In the example given I have supposed that the exposure has been abnormal, that is to say, that the exposure has been made to act upon the sensitive material so as to sufficiently impress the details in the deepest shadow upon the top film, leaving the brighter portions to act selectively upon the lower and less sensitive emulsions.

It is with such an exposure that the best value can be obtained from the multiple film. It is possible that, because better effects of light and shade are produced upon a multiple film by abnormal exposures, some have considered it a matter of necessity that such films should be, in a photographic sense, slow. This is an inference not warranted by the premise, as there is no reason to believe that the top film in any way loses speed by being imposed upon a film of emulsion instead of a glass plate. Without hazarding any conjecture as to the why and the wherefore, I think that, in a pictorial sense, there will be found a greater range of gradation and more roundness, and, if I may coin a word, more stereoscopicity, of effect, with an increased (or abnormal) exposure than obtains in a homogeneous film with any exposure.

It must also be borne in mind that, with the ordinary dry plate, the effect of more exposure than will influence the region of correct representation makes for flatness of image and loss of true gradation. With the multiple film, however, it tends towards increased roundness of image. With an exposure calculated to reproduce the shadow details to their fullest extent, and which I describe as abnormal because it is more than can be usefully given to a homogeneous film, are the best results obtained with the new tool. I am disposed to suggest that this is only a natural result of the ability of the multiple film to successfully render a longer range of contrast. In other words, the sensitive film which will reproduce in natural ratio the widest range of light and shade may be expected to produce at the same time the best pictorial effect.

It is for this reason that I am entirely opposed to the idea of over-exposure and stripping the top film, a method which I regard as an indication of failure to properly understand the principle of the compound film. We are, by this method, only able to make a picture upon one of the lower films. Now, for this purpose, it is best to use such a one in its simple form, and not to risk failure by exposing through some other film, which has to be wasted. Wilful waste makes woeful want, as the old alliteration has it.

In point of fact, the useful detail of the negative will be found upon the top film, and this detail we cannot afford to lose in our negatives.

Halation.

The question of the freedom of the compound film from halation or light reflected from the posterior surface of the supporting glass plate, depends upon two points—first, that the difference in sensitiveness between the top and bottom films shall be at least as great as the difference in the value of the light reflected from the brightest and the least bright portions of the object to be photographed; and, secondly, upon the method of development employed. There can be little doubt as to the efficiency of the principle employed, viz., that the light shall be intercepted and usefully (in the photographic sense) employed by the lower film. When "backing" is resorted to to prevent reflections, it is but a makeshift method of obviating the disagreeable effects of light in the wrong place. The principle of the multiple film is to prevent the light passing into the glass or support. In actual work a triple film gives practical freedom from this defect in most trying circumstances, and that without backing.

This is not the place to discuss whether a commercial article is effective or not; but I am compelled to add, that if the difference in sensitiveness between the top and bottom films in the commercial article be not now sufficiently wide to secure without halation the most violent contrasts which may present themselves for representation, the principle still applies, and it is but necessary to lower the photographic sensitiveness of the bottom layer to perfectly effect the object. Or, as an alternative for extreme ranges of contrast, a fourth film might be added. So much depends, however, upon the method of development, that I believe three films to be ample for all practical purposes.

Exposure.

I now pass to the question of development and practical treatment of the films. There are two exposures for multiple films.

First, *the normal*, is the correct exposure for the top film, supposing it to be coated upon a glass plate by itself in the ordinary way. For such an exposure development will be normal, and precisely the same as it would be supposing the sensitive film to be of a homogeneous rapid character. That I need not discuss further.

The second exposure is one which I prefer to call *abnormal* rather than over-exposure. It will be apparent that, with underlying films of less rapidity, and each underlying film protected by a light-absorbing filter of emulsion above it, without recourse to any device in development for restraining or retarding the effects of the light action, the lowest films are capable of absorbing and using a largely extended exposure. I am informed that the relative rapidities of the three emulsions in the triple films are as 1, 4, and 30, and, when to this margin of speed which exists between the top and bottom film is added the resistance to light passage of the first and second films themselves, it will be obvious that there is a considerable available margin of latitude in exposure. The point, therefore, when over-exposure in the usual sense of the word begins, is so far away from the normal as to render it unnecessary to take it into immediate consideration.

Development.

With an abnormal exposure, development must be "tentative." There are two methods:—

First, by working with solutions of suitable energy to develop the image until sufficient detail be obtained, and then, by the liberal use of a soluble citrate, to develop up density and contrast from the lower films, in which there is a store of density-giving emulsion to which the ordinary worker is quite unaccustomed; or, secondly, to begin with a very dilute and restrained (with bromide) solution, so as to secure in the lower film sufficient density first; afterwards, if necessary, acting upon the top film with a more energetic developer, to bring out such detail as may be desired.

I am not quite certain as to which of these methods I prefer, but I am largely influenced by the fact that it is the second method which the inventor of the plates relies upon to make his pictures. I have had the pleasure, on more than one occasion, of seeing him develop 15 × 12 interiors by this method with such ease, and so much regular success, as to make me doubtful of the propriety even of mentioning the first method.

I cannot do better, therefore, than give his method, premising that the same principle applies whatever developing agent be employed. The developer Mr. Sandell prefers is a mixture of hydroquinone, eikonogen, and rodinal, as follows:—

Concentrated Solution.

Hydroquinone	30 grains.
Eikonogen	100 ,,
Rodinal	9 drachms.
Sulphite of soda	2½ ounces.
Carbonate of potassium	2½ ,,
Water to make	20 ,,

Supposing we have to develop a plate which has received, say, three times a normal exposure, generally the best results can be obtained

with from three to six times a nominal exposure. Commence development with a weak solution, thus:—

Dilute Tentative Developer.

Stock solution	1 part.
Water	15 parts.
Bromide of potassium (10 per cent. solution)	

About two grains of the latter to the ounce of solution.

This will probably begin to produce an image in from two to four minutes. The highest lights should appear first (although they are in the lower films), and density and detail should grow steadily. The important point to keep in mind is that the high light should be developed by the first solution, rather than the detail. If detail comes freely, the developer may be considered too energetic, and the remedy obvious. If detail comes but little, it is of no importance, for being within the topmost film it can be readily acted upon and drawn out by a more energetic solution, and that without there being time enough for the stronger solution to affect the density-giving sub-film. Should detail grow faster than density, then, as we can only attack the density-giving sections of the plate *through the top film*, we are forced to resort to the first method of development, viz., the use of restraining citrates and bromides to enable the solution to get down into the lower films without overdoing the top layer. But by this procedure we risk making a thicker negative than by cautious development by the second method. In developing abnormal exposures in multiple films, if there be any error, let it be on the side of a too dilute developer to commence with.

The manifest simplicity of Mr. Sandell's method should, I think, commend it, and I suggest it as the easiest one and the most reliable. In case, of need, however, density can be obtained by the first method with certainty, but it may become a little difficult to watch the action of development. By the second method, the progress of development can be easily followed, and it is not only not necessary for the image to be lost sight of, but it indicates the use of a too strong and energetic solution, or an insufficiently restrained one. The notion that with a multiple film development must be a closed book I ask you to remove from your mind. There is no such necessity, and, should the image be lost to sight, it is the clearest indication of injudicious procedure. I never expect to see any indication upon the back of a triple film of the image, and when I lose sight of the progress of development I know that it is because I have been impatient or unfortunate in my judgment. In such a case, however, with the reserve force of the multiple film a negative will be the result, where with a simple emulsion extreme flatness would be expected.

I have not mentioned pyrogallic acid development, nor do I propose to advocate any particular developing re-agent. Whichever be the reducing agent with which you are best acquainted, will be for you the right one to use. It is not the developer (the reducer), but the developer (the individual), which makes the negative. For pyro development, however, I think there is nothing better than the following:—

A.

Neutral sulphite soda	55 ounces.
Boiling water to make	10 ,,

B.

Pyrogallol	1 ounce.
Nitric acid	20 minims.
Water to make	10 ounces.

C.

Bromide potassium	1 ounce.
Water to make	10 ounces.

D.

Carbonate soda (anhydrous)	1 ounce.
Water to make	10 ounces.

E.

Citrate soda	1 ounce.
Water to make	10 ounces.

B, C, D, and E are not exact ten per cent. solution. I prefer the sulphite in a separate solution, and concentrated.

Normal Developer.

Pyro solution	20 minims.
Bromide solution	10 ,,
Sulphite solution	60 ,,
Carbonate solution	40 to 80 ,,
Water to make	1 ounce.

Tentative Developer.

Pyro solution	5 minims.
Bromide solution	5 ,,
Sulphite solution	60 ,,
Carbonate solution	10 ,,
Water to make	1 ounce

In place of this latter, the normal developer may be diluted from one quarter to one-tenth strength, although I prefer to have a larger proportion of bromide than is in the normal, and an equal strength of sulphite. The latter because, whilst doing no harm by its presence, it enables one to add stock pyro and carbonate to form a more energetic solution, without discolouring the film.

Fixation.

There is only one other point to which I need call attention, and that is, that the fixing bath should be new and strong—eight ounces of hypo to a pint of water, and fixing should not be performed on white light. An acid fixing bath works well with multiple films, both hardening the gelatine and brightening the negative at the same time. The best form is:—

Hypo	8 ounces.
Acid bisulphite soda	2 ,,
Water	1 pint.

With such a fixing bath, complete elimination of the soluble silver salts is quickly performed unless the solution is unduly cold. In this case the remedy is obvious. Warm the fixer to 55° to 60° Fahr.

SOME POINTS IN CONNEXION WITH DEVELOPMENT.

By C. H. Bothamley, F.I.C., F.C.S.

At a meeting at which so many papers on the all-important subject of development are to be read, it is difficult to deal with the matter without in some way encroaching upon the ground covered by the other writers. Apart from the introduction of new developers, few photographic questions of late have attracted more attention or excited more discussion than the relation of the gradations of a negative to the time of exposure on the one hand and the mode of development on the other. At present it cannot be said that any final decision has been arrived at as between the theory that the gradations depend only on the intensity of the light and the time of exposure, and the theory that the gradations may be modified by the mode of development.

One of my scientific friends rarely troubles himself about any energetic scientific controversy whilst it is still going on. He generally says that he will go into the question "when the dust has settled a little." He is a busy man, and his attitude in this respect is quite intelligible. It is clear, however, that if every one were of the same mind the dust never would settle, for the dust of a scientific controversy, heavy though it may be, does not as a rule subside by its own gravitation. The views that I have the honour of submitting to this Convention you will, perhaps, with your usual indulgence, be good enough to regard as a small attempt to act the part of Aquarius, and to help a little towards the settling of the dust of the controversy that is now being waged over the relation between exposure, mode of development, and the gradations of negatives. I cannot, I regret to say, lay before you any new facts; but I will venture to ask you to look at some of the old facts in a way which, if not new, has, at any rate, not received the attention that it seems to merit.

The controversy, in its present aspects, has been excited by the remarkable papers of Messrs. Hurter & Driffield, and the no less able papers of Captain Abney.

Now, in the first place, it has not been sufficiently recognised that Abney, and Hurter & Driffield are quite agreed on the main point, that the amounts of silver reduced at different parts of a negative are determined by the amount of light action, and not by the mode of development. The question between them is really limited to the precise form of the equation that connects the two quantities, Hurter & Driffield holding that the deposit of silver may be regarded as homogeneous, whilst Abney holds that it must be regarded as heterogeneous, and consisting of solid particles distributed in accordance with the "law of error."

Many photographers, however, on the basis of their accumulated experience, contend that they have the power, by altering the mode of development, to alter the gradations of their negatives, &c.

It will not be very difficult to show that both of the parties may be right. To a great extent the confusion and misunderstanding arises from the use

of the same words in different senses; it is the old story of a difference in language and not in facts.

Not a little of the difficulty arises in the first place from the fact that Hurter & Driffield use the word density in a sense that is quite accurate and justifiable from a scientific point of view, but which unfortunately is not the sense in which the word is commonly used by the photographer. By "density" Hurter & Driffield mean the absolute quantity or mass of silver in the film at a given point; the photographer means the *opacity* of the film at that point. The two are intimately connected, but they are by no means identical, and one cannot but regret that photographers should have adopted the word density when the correct word, opacity, was already coined. It is an important example of the folly—I ask no pardon for using so strong a word—the folly of which the practisers of any art whatever are guilty, when they use in a loose and inaccurate sense words which already have a definite and recognised meaning in any of the sciences on which the art in question may happen to be based.

Hurter & Driffield's fundamental result is that the ratio of the densities corresponding to different amounts of light action cannot be altered by changes in the mode of development. So far as any quantitative evidence goes, that statement must at present be accepted as correct. Photographers say that they *can* alter *the gradations* of their negatives. There is really no *necessary* antagonism between the two statements.

At the outset you will probably admit that the way in which photographers, as a rule, estimate the gradations of their negatives is, at the best, somewhat rough-and-ready, and cannot claim any special degree of accuracy. What a photographer has in his mind when he talks about gradations is, in ninety-nine cases out of a hundred, *printing qualities*. Of course, this is the all-important point in actual practice, seeing that the negative is but a means to an end. Now, the printing qualities depend on the ratio of *the opacities* of the different parts of the negative, and it is quite possible for the ratios of the densities to remain constant, as Hurter & Driffield say they do, whilst the ratios of the opacities vary widely. It is not necessary to enter into a detailed explanation of the law that governs the relation between the quantity of an opaque substance, such as the silver in a negative, and the quantity of light that it absorbs; the law is a simple one. May I ask your attention to the following table:—

First Case.				Second Case.			
Thickness of the Silver Layer.	*Ratios of the Densities.*	*Quantity of Light Transmitted.*	*Ratios of the Light Transmitted.*	*Thickness of the Silver Layer.*	*Ratios of the Densities.*	*Quantity of Light Transmitted.*	*Ratios of the Light Transmitted.*
1	1	$\frac{1}{2}$	4	2	1	$\frac{1}{4}$	64
2	2	$\frac{1}{4}$	3	4	2	$\frac{1}{16}$	16
3	3	$\frac{1}{8}$	2	6	3	$\frac{1}{64}$	4
4	4	$\frac{1}{16}$	1	8	4	$\frac{1}{256}$	1

It appears that in the two cases the ratios of the densities are the same, but the ratios of the opacities, or, in other words, the printing qualities, differ widely, because the *absolute values* of the densities are different. The two cases represent the same negative, development in the second case being carried on longer, so that the quantity of silver deposited at any part of the negative is, in the second case, just twice as great as in the first.

What it seems to come to, then, is this, that according to Hurter & Driffield we cannot in development alter the *ratios* of the densities, but, by stopping the processes at different stages, we do alter the *absolute values* of the densities, and thus very considerably alter the ratios of the opacities, that is to say, the printing quality.

It may be asked, however, how this explains the apparent effect of the usual modifications in the composition of the developer. The reply in the first place is, of course, that some of these modifications simply have the effect of making development slower, and thus making it easier to stop the process at any desired point.

It is, however, for a full discussion of the problem, essential to take into consideration a point that is often neglected: Is any one prepared to contend that sufficient attention has hitherto been paid to the influence of general fog—a uniform deposit of silver all over the negative—in modifying the "gradations" and altering the printing qualities of a negative? We frequently meet with or hear the statement, "beautifully clear in the shadows;" but how often is this an accurate statement of fact—how often does it represent inaccurate observation? It is very easy to be deceived by contrast, but, if the plate is put in contract with white paper, it will in the great majority of cases be found that there is really an appreciable deposit where there seemed to be no silver at all upon the negative when it was examined by transmitted light. The term "general fog" is here used in the ordinary sense to denote a uniform deposit all over the negative, produced by the action of the developer independently of any action of light.

Then comes the question, What is the effect of general fog on the ratios of the opacities, or, to use the common phrase, the "gradations?"

Since to add a constant quantity to the terms of a ratio diminishes the ratio, it is clear that the fog will lessen the ratios of the opacities, and thus tend to make the negative flatter or softer. The greater the amount of fog, the smaller and smaller will the ratios become, or, in other words, the flatter or softer will the negatives be.

In all Hurter & Driffield's experiments the influence of fog was eliminated by subtracting the value of the fog from all the measurements before calculating the ratios. It is noteworthy that in almost all cases the fog value was altogether too distinct to be negligible. In actual practice, however, whatever fog there may be is not eliminated or removed, but exerts its influence all through the various uses to which the negative is put.

As a matter of fact, very few of the developers commonly used can be allowed to act upon ordinary plates for four or five minutes without producing an appreciable amount of general fog. The amount of fog is increased by—

(1.) Increasing the proportion of alkali.
(2.) Increasing the concentration of the developer.
(3.) Reducing the proportion of bromide.
(4.) Prolonging the time of development.

Whilst, on the other hand, the amount of fog is reduced by—

(1.) Reducing the proportion of alkali.
(2.) Increasing the proportion of bromide.
(3.) Shortening the time of development.

The proportion of pyro does not seem to exert any marked influence in this respect. Diluting the developer acts in two ways; the dilution of itself tends to reduce the amount of fog, but the prolongation of development, necessitated by dilution, tends towards the production of fog.

When the photographer endeavours to compensate for over-exposure, he reduces the amount of alkali, and increases the amount of bromide; but, as we have just seen, these are modifications which tend to prevent the production of general fog, and consequently increase the contrasts of the negative. When, on the other hand, the negative is under-exposed, the proportion of alkali is increased, the proportion of bromide is reduced, and sometimes the developer is diluted; but all these modifications tend towards the production of fog and a consequent reduction of the contrasts of the negative. It is scarcely necessary to point out that so long as fog remains slight there is a tendency to continue development, and thus, as pointed out at the beginning, to increase the ratios of the opacities, that is, to increase the contrasts by increasing the absolute values of the densities. When, however, fog makes its appearance, there is a tendency to stop development at a stage when the absolute values of the densities are comparatively low, the ratios of the opacities are low, and the negative is "soft" in its gradations.

To sum up, it would seem that, so far as present experimental evidence goes, the photographer cannot by modifications in development alter the ratios of the densities of the silver deposit at different points; these are determined by the amount of light action. He can, however, and does, alter the ratios of the opacities, or, in other words, the printing qualities: (1) by stopping development at a particular stage, (2) by making such modifications in the mode of development as tend either to reduce the general fog and thus increase the contrasts, or to increase the amount of fog and thus lessen the contrasts. The two kinds of modifications are designed respectively to meet over-exposure and under-exposure.

A discussion followed.

News and Notes.

Manchester Photographic Society.—July 15, Rowsley (ramble).

Northern Photographic and Scientific Association.—July 15, Battersea Park.

Hackney Photographic Society.—July 18, *Metol-Hauff.*

Photographic Club.—July 19, *The Permanency of Gelatine Prints.* 26, *Collodio-chloride Printing.*

Change of Address.—Mr. Redmond Barrett has changed his address to 129, The Grove, Hammersmith, W.

Gosport Photographic Society.—July 15, Chichester, leaves Portsmouth Harbour at fifty minutes past one, p.m.

Birmingham Photographic Society.—July 15, Last day for sending in photographs for the Meriden Excursion Competition. 18, Social evening.

ERRATUM.—In Mr. Hugh Blackwood's letter last week, "F. Darlot & Co.' should read "F. Darton & Co.," the firm's address being 142, St. John-street, Clerkenwell, E.C.

"THE PHOTOGRAPHIC TIMES."—We understand that Mr. W. E. Woodbury is now Editor of the *Photographic Times* (New York). That journal is to be increased in size, and prize competitions are to be instituted.

THE JAPAN PHOTOGRAPHIC EXHIBITION.—It was arranged that Her Imperial Majesty the Empress was to visit on June 23 the Exhibition being held in Tokyo, by the Photographic Society of Japan. To the Exhibition a separate exhibit of Japanese photographs has been added.

NEW PREMISES FOR THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—We understand that the Photographic Society of Great Britain will shortly remove from their present premises at 50, Great Russell-street, to more convenient and less loftily situated rooms at the house of the Institute of Chemistry in Bloomsbury-square.

"FAIR HOLIDAYS."—We understand that, by an arrangement among the principal photographers in Greenock, most of the studios in that town were closed for one week, from Monday last, July 10, thus enabling both *employés* and assistants to have a week's holiday. Some such arrangement may commend itself to professional photographers in other large towns.

METOL-ANDRESEN.—The following new formula is recommended for the use of metol-Andresen:—Dissolve in 8 ounces of water, Andresen's metol, 10 grains; then add, carbonate of potash, 60 grains; sulphite of soda, 30 grains; bromide of potassium, 2 grains. For over-exposure add a few drops of a ten per cent. solution of acetic acid. For under-exposure add a few drops of a ten per cent. solution of carbonate of potash.

PHOTOGRAPHIC EXHIBITION AT HOVE.—In connexion with the sixteenth annual Exhibition of the Hove Industrial and Horticultural Society, to be held at the Town Hall, Hove, on September 20 and 21, 1893, there will be a photographic section under the auspices of the Hove Camera Club. Particulars and entry forms can be obtained of the Hon. Secretary of the Industrial Society, H. Emery, 142, Church-road, Hove, Brighton.

AN OUTING.—Messrs. Adams & Co., of Charing Cross-road and Aldersgate street, inform us that the whole of their factories as well as their retail establishments will be closed on Saturday next, July 15, the occasion being the outing of the staff numbering forty-eight persons. Messrs. Adams say: "In order to cope with a very heavy season the majority have been working from eight a.m. till nine p.m. since Christmas last, and deserve a little relaxation." We trust an enjoyable day will be spent.

SOUTH LONDON PHOTOGRAPHIC SOCIETY'S EXHIBITION.—The South London Photographic Society will hold their fifth annual exhibition at the Peckham Public Hall, Rye-lane, Peckham, S.E., on November 7, 8, 9, 10, and 11 next. In addition to the members' classes there will be open classes for the following: Medalled pictures; medalled lantern slides; pictures that have not received any award; lantern slides that have not received any award. It is understood that the number of pictures and slides which any exhibitor may send in will be limited.

ASHTON-UNDER-LYNE PHOTOGRAPHIC SOCIETY.—July 15, to Chew Brook. Leader, Mr. C. E. Redfern. Waggonettes will leave the Society's Rooms, Henry-square, at 1.30 prompt. Tickets, 1*s.* 6*d.* each, to be had at the rooms, or from the Secretary, up to Wednesday evening, July 12. Mr. Carrodus, from the Technical School, has promised to accompany the party and give the members any assistance he can in the choice of pictures, &c. 29, Ramble to Liverpool, &c. Leader, Charles Lord, Esq. Further particulars later. Robert T. Marsland, Hon. Secretary, 74, Blandford-street, Ashton-under-Lyne.

HOW TO AVOID BLISTERS.—Mr. Williams R. Kennan, of Dame-street, Dublin, writes: "The following I find the best way to avoid blisters in albumenised paper. After toning in the usual way, mix some liquor ammoniæ with hypo bath and fix prints as customary; but when fixed leave the prints in the hypo bath with some of the hypo, and dilute very gradually with water, keeping the prints moving. The secret is in not making a sudden change from the hypo to the plain washing water, giving plenty of time to eliminate the hypo. When this is done, blisters are a thing of the past. I send you this, as it may prove useful to some of my brother professionals who like myself believe still in albumenised paper.

PHOTOGRAPHING AT RAGLAN CASTLE.—"View Finder" writes: "Last week I went to Raglan, in Monmouthshire, for the purpose of photographing the fine old ruined castle. On arriving at the castle enclosure, I found that, in addition to an entrance fee of sixpence, half-a-crown extra for the privilege of photographing was demanded of me. I told the person in charge that it was an exorbitant amount to pay; but he denied this, stating that, having photographs himself for disposal, he had lost the sale of them (so he said) through so many amateurs coming to the place, and remarked, 'people, instead of buying my photographs, now take them for themselves.' This seemed so absurd that I pointed out to him that, on an average, not one person in a hundred was a photographer, taking the population of the country; but all argument was useless, as he only referred me to a notice board, on which was painted: 'Amateur photographers wishing to take photographs of the Castle can do so upon payment of 2*s.* 6*d.*; professional photographers, 21*s.*' Although I had undergone a hot and tedious journey—the light was perfect—and I had come specially to photograph, I determined not to do so, and I hope my example will be followed by others."

*** *With the* JOURNAL *of Friday next, July* 21, *will be presented a group of members of the Photographic Convention of the United Kingdom, taken at Plymouth on July* 5 *last. The picture is reproduced in collotype by Messrs. Morgan & Kidd, of Richmond, Surrey, S.W., the negative being by Mr. R. L. Kidd, and including portraits of* 107 *members.*

Our Editorial Table.

TRAITÉ PRATIQUE DE PHOTO-LITHOGRAPHIE.

By LEON VIDAL. Paris: Gauthier-Villars & Son.

M. VIDAL'S book is an exhaustive treatise on the subject. It deals successively with the various methods of preparing negatives for photo-lithographic purposes, the nature and properties of bitumen, bichromated gelatine, &c., photo-lithographic transfers, collotype, photo-zincography, and cognate processes. Due justice is done to the writings of the principal experimentalists, and the work is freely illustrated.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,991.—"Improvements in or relating to the transfer of Photographic Pictures." Communicated by C. F. Joze. A. J. BOULT.—*Dated July* 3, 1893.

No. 13,063.—"Improvements in Magazine Cameras." Complete specification. Communicated by E. R. Andrews. A. J. BOULT.—*Dated July* 4, 1893.

No. 13,288.—"An improved Shutter for Photographic Purposes." A. PHILBURN.—*Dated July* 8, 1893.

SPECIFICATION PUBLISHED.

1892.

No. 23,378.—"Photographic Lenses." GOERZ & VON HOEGH.

IMPROVEMENTS IN OR IN CONNEXION WITH PHOTOGRAPHIC CHANGING BOXES

No. 1385. ARTHUR SAMUEL NEWMAN and JULIO GUARDIA, trading as "Newman & Guardia," 71, Farringdon-road, London, E.C.—*June* 2, 1893.

THIS invention relates to photographic changing boxes—*i.e.*, to apparatus such as that for which the said Arthur Samuel Newman received the grant of British Letters Patent, No. 8329, of 1886, and similar changing boxes (whether same be formed as separate detachable boxes from the camera or whether same be formed integrally with the camera)—our present improvements being specially applicable to those changing boxes in which the sensitised surface (such as a glass plate or film) is held in a carrier or sheath, and such plates or sensitised surfaces passed round successively from front to back or back to front, as the case may be, without lessening the number of plates or sensitised surfaces in such pack.

Hitherto, in "changing boxes" of such character, a spring or springs has usually been arranged on the inside of the back of the changing box or chamber containing the plates, &c., so as to constantly push forward the whole series or pack of plates, &c., towards the front of the chamber, and thus bring the front plate up to the register, or, as it is termed, "up to focus."

This arrangement has many drawbacks which need not be here detailed; but, according to our present invention, we obtain all the spring pressure that is necessary by arranging and mounting a spring or springs on a partition or dummy carrier, or sheath, or it may be an ordinary sheath sufficiently strengthened, and its partition, &c., carrying the springs thereon is placed either on the back or front, or in any desired position, in the pack or series of plates to be exposed, and passes round just the same as each of the sensitised plates, &c.

The springs on this partition or dummy sheath press forward those plates in front of it, so as to cause the front plate to come up to the focus while the plates behind this dummy sheath are pressed backwards against the back of the chamber, and this condition obtains whatever may be the position of this dummy sheath, save when this sheath is at the front position, it will then press backwards on the plates only when it is placed in the rearmost position, it will then press forward the whole series of sensitised plates, &c.

The springs on this dummy sheath or partition may be arranged and mounted in any suitable manner, subject to the following conditions:—

(1.) The spring or springs must be so arranged as to permit the dummy sheath being raised at the back and placed into the "pack" again at the front or *vice versâ*.

(2.) The spring or springs must be of such a form and so arranged and mounted as not to injure or cause any injury to the sensitised surfaces.

* * * * * * *

The form of the sheath alone forms no part of our present invention, and may be of any suitable shape and construction to suit our purpose; but, for the purpose of carrying our present invention into practice, we may mention that we find it advantageous to use all the sheaths (both those for holding the sensitised surfaces and the dummy) constructed according to Newman's Patent, No. 20,299, of 1890; but we do not, of course, wish to limit ourselves to this particular construction.

It will thus readily be seen that by placing one of these dummy sheaths amongst a pack or series of plates arranged in a chamber, and capable of being changed in the manner described in Newman's said Patent, No. 8329, of 1886, all shake in the chamber will be taken up; and, while the front plate will be always brought up to register (*i.e.*, come up to focus), this arrangement will also ensure the rearmost plate always coming exactly over the lifting device by which each plate is raised into the light-tight bag to be changed from back to front or *vice versâ*, as the case may be.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—A partition, or dummy sheath, or carrier, having springs of any suitable description mounted thereon and arranged to act in and in

combination with a photographic changing box of the character such as hereinbefore described, in which a pack or series of plates or sensitised sheets are successively passed round from front to back or back to front, substantially in the manner and for the purposes hereinbefore described, and illustrated by way of example in the drawings hereunto annexed.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 17	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 17	Fillebrook Athenæum	Fillebrook Lecture Hall.
,, 17	Hastings and St. Leonards	
,, 17	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 17	Richmond	Greyhound Hotel.
,, 17	South London	Hanover Hall, Hanover-park, S.E.
,, 18	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 18	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 18	Hackney	206, Mare-street, Hackney.
,, 18	North London	Canonbury Tower, Islington, N.
,, 18	Paisley	9, Gauze-street, Paisley.
,, 18	Rochester	Mathematical School, Rochester.
,, 19	Bury	Club Rooms, 13, Agar-street, Bury.
,, 19	Leytonstone	The Assembly Rooms, High-road.
,, 19	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 19	Southport	The Studio, 15, Cambridge-arcade.
,, 19	Southsea	3, King's-road, Southsea.
,, 20	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 20	Glossop Dale	
,, 20	Hull	71, Prospect-street, Hull.
,, 20	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 20	Oldham	The Lyceum, Union-st., Oldham.
,, 20	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 21	Cardiff	
,, 21	Croydon Microscopical	Public Hall, George-street, Croydon
,, 21	Holborn	
,, 21	Leamington	Trinity Church Room, Morton-st.
,, 21	Maidstone	"The Palace," Maidstone.
,, 22	Hull	71 Prospect-street, Hull.

North London Photographic Society.—July 4, Technical Meeting, Mr. J. R. Williams in the chair.—Consequent on the demonstration given at the last meeting, a discussion took place on amidol and metol as developers. Mr. A. E. Smith showed prints from duplicate negatives, one developed with amidol by Mr. Morgan in the course of his demonstration, and the other developed with pyro by Mr. Smith. The prints from the latter were far superior. Mr. Spiller obtained better results with amidol than pyro in developing instantaneous exposures, especially when the light had not been very strong. Mr. Brewer showed some excellent cloud negatives developed with amidol. When required, he had no difficulty in obtaining density, using plenty of bromide. The negatives were on isochromatic plates, one or two yellow screens being used as occasion required. He had had a special lens flange made, with a slot in it to take the screen, a band passing over the slot to keep out light. Mr. Groundwater had used metol for negative work, and, diluting the normal formula with an equal amount of water, obtained satisfactory results. There was a good show of hand cameras, mostly of well-known brands, but Mr. A. E. Smith showed one of his own make with a very ingeniously contrived shutter. Two wooden drop pieces, actuated by springs, work in a rebate; they are released by a lever attachment in succession, and more or less quickly according to the length of a toothed catch adjusted to the lever. Mr. Douglas had one made by Turnbull, of Edinburgh, which had focussing screen, and would rack out far enough to allow the use of one combination only of the rapid symmetrical lens with which it was fitted. It was considered a matter of great regret that the word "detective" should ever have been applied to the hand camera. It had given the dog a bad name, and the public now looked upon any one carrying a hand camera with suspicion, which, moreover, recent advertisements in the photographic press had tended to accentuate.

North Middlesex Photographic Society.—July 10.—The subject of *Cresco-Fylma Enlarging* was dealt with by the Secretary. He fully explained the negatives, which were most suitable for treatment by this process, and how to go about the actual work of enlarging, and showed numerous examples of successful work, both negatives and positives, opals, transparencies, &c. A discussion followed, which was sustained by most of the members present. The result of the outing to Sewardstone was that Mr. A. J. Golding was first, the President (Mr. J. W. Marchant) second.

Hackney Photographic Society.—July 4, Mr. Puttock in the chair.—Messrs. Rita, Low, Fort, and Dr. Harris were duly elected members. The popularity of the Society was truly demonstrated, as application for membership was made from Burmah. Messrs. T. H. Smith, Dear, Gosling, Hudson, Roofe, showed work. The Hon. Secretary then showed Spratt Brothers' new camera stand. It was easily set up, the principal advantage being that in place of screws at the first joint it automatically locked and fixed itself. Mr. Gosling showed a view finder which he had fixed in a small black box. The image could be seen in any light clearly. Mr. ROOFE asked, Could halation be reduced in any way? Mr. BECKETT thought methylated spirit rubbed on the negative with wash-leather would do it tolerably. Mr. Cross showed a negative which he had intensified, but which was much stained. The general opinion was that it was not thoroughly fixed. Mr. NUNN asked if halation was not sometimes caused by stopping down. Mr. Beckett suggested that halation was not shown so much with a large stop because "camera fog" was more evenly diffused. From the question-box: "How to obtain brown tones on lantern plates?" Various replies were given, such as using printing-out lantern plates, Alphas, using carbonate of ammonia. A good reducer was asked for, and that given by Howard Farmer was recommended. Mr. Roofe asked what to do to avoid metallic deposit on plates? The HON. SECRETARY said methylated spirits would reduce it and advocated for old plates full exposure and less alkali than usual.

South London Photographic Society.—July 3, the President, Mr. F. W. Edwards, in the chair.—Mr. W. J. BELTON gave a demonstration of the manipulation of the Paget print-out lantern plates and opals. He explained the various stages in a very lucid and able manner. For printing the opals in ordinary printing frames he showed a simple cardboard mask and frame which the Paget Company were placing in the market for sale for a few pence. He also showed a frame specially constructed for printing the opals, and gave the formulæ of the toning and fixing bath (both combined and separate) which he used. At the conclusion of the demonstration the results were passed round, and the lantern slides shown in the Society's lantern. During the course of the evening the President, on behalf of the Royal Humane Society, presented Mr. Charles Farrant, one of the members, with a testimonial for saving life. It appeared that on May 25 last Mr. Farrant, in company with another member, were photographing along the banks of the Thames at Greenwich, and noticed some children playing on one of the landing-stages. Thinking they would with but little arrangement make a good picture, Mr. Farrant and his friend proceeded to get his camera ready, when all of a sudden a cry for help was raised, and it was seen that a lad was fast being carried out into mid-stream. Without stopping to divest himself of any of his apparel, Mr. Farrant swam to the rescue, and succeeded in bringing the boy safe to land. Attendance, forty-eight.

Brixton and Clapham Camera Club.—Tuesday, July 4 (Dr. J. Reynolds, F.R.G.S., in the chair).—It was decided to afford members systematic assistance in the more elementary principles of photography. With this object in view the Club elected a Committee of Instruction, consisting of six members, each member of which will give the first half-hour of each general meeting for the purpose of answering any questions on elementary photography that may be submitted to him. A Committee was also formed for the criticism of negatives and prints produced by the less experienced members. Any one will now have an opportunity of submitting his work to the Committee, who will report as to the composition, development, and exposure of the negatives, also on the development, printing, toning, and mounting of the prints. In the event of lantern slides being submitted for criticism, it will be necessary in every case for the member to furnish a description of the scene, the nature of the process by which the slide was produced, *i.e.*, collodion, gelatine, &c., exposure, development, and mode of toning; also to submit the negative from which the slide was produced. As soon as the usual business of the Club had been transacted the President gave a short but interesting description of some of the extinct monsters that inhabited the earth in the pre-historic period. The description was illustrated by some beautiful lantern slides which were very kindly lent for the occasion by the Rev. H. N. Hutchinson, B.A., F.G.S., some of whose Palæontological and geological researches are embodied in his works on *Extinct Monsters*, *The Autobiography of the Earth*, &c.

Birmingham Photographic Society.—July 4, Mr. J. H. Pickard in the chair.—A number of negatives taken on the recent whole-day excursion of the Society to Dovedale were staged on racks on the table. These negatives were inspected with great interest, not only by those gentlemen present, who had gone the excursion, but also by the general body of members, and the display afforded convenient means of comparison of results and notes as to the obtaining of those results. A full and useful discussion was evoked by this means, about fifty negatives and prints being shown.

Bournemouth Scientific and Antiquarian Society.—July 6, Excursion to Beaulieu Abbey.—The party, consisting of about thirty of the members and their friends, including the President and one of the Vice-Presidents of the section, also several ladies, took train to Brockenhurst, and, after a delightful drive by way of Lady Cross Lodge, and Hatchet Gate, reached the picturesque village of Beaulieu. The old Abbey (founded in 1204 by King John), the village and the scenery by the river proved of great interest to the photographers, the weather being most suitable for securing excellent pictures.

Photographic Society of Japan.—A regular Monthly Meeting of the above-mentioned Society was held at the Rooms of the Geographical Society of Japan, Nishikonyacho, Kiobashi, Tokyo, on Friday, June 2, Mr. Edmund R. Holmes in the chair.—Messrs. Bradfish and Pierce had sent in some ready-sensitised paper of two different kinds. One had a polished surface, and appeared to be a gelatino-chloride paper, the other had a matt surface. Mr. K. Arito was able to state that the paper was in no way discoloured, so that there was evidence of its good keeping qualities, and that it printed brightly and clearly. He had not, however, had time yet to tone any proofs. Mr. I. Tanaka was instructed to experiment with the paper, and to report his results to the next meeting. Work done by the anastigmatic lens of Carl Zeiss, of Jena, was shown. The examples showed a most remarkable uniformity of definition from the centre to the extreme corners of the prints. Mr. W. K. Burton explained that these lenses were of large angular aperture, of flat field, and, at the same time, without astigmatism. There were various lenses that combined any two of these qualities; but, so far as he knew, this was the first that combined the three. The form of the Zeiss anastigmatics, even of large angular aperture, was such—being mounted in a short tube—that they could be used as wide-angle lenses if stopped down. He would, however, be in a position to report more fully to the Society on these lenses in a month or two. There was a discussion as to the manner of disposal of the donation made to the Society by H.I.M. the Empress on the event of her visit to the Exhibition, there being a general feeling that this money should not go into the ordinary funds of the Society, but should be used to provide some permanent memorial of the visit. It was eventually decided that the money should be used to pay for the striking of a small silver medal to commemorate the event, and to be presented to each member of the Society. After the regular meeting there was an extraordinary meeting to consider the matter of the Secretaryship. It was proposed, seconded, and carried that Mr. W. K. Burton be elected "Corresponding

Secretary" in addition to Mr. I. Ishikawa and Dr. Augustus Wood, ordinary Secretaries.

MAY 20.—Annual Meeting. Professor D. Kikuchi, M.A., in the chair.—Mr. W. K. Burton was elected Vice-Chairman, and Dr. Augustus Wood, Foreign Secretary. Prince A. Tokugawa, Dr. Professor J. Scriba, Professor John Milne, F.R.S., Mr. O. Keil, and Marquis T. Konoye were elected Vice-Presidents.

FORTHCOMING EXHIBITIONS.

1893.		
August	Welsh National Eisteddfod.	The General Secretary, Pontypridd.
Sept. 25–Nov. 15 ...	Photographic Society of Great Britain, 5A, Pall Mall East, S.W.	Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1–31	Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.	
,, 9–Nov. ...	Photographic Salon, Dudley Gallery, Piccadilly, W.	Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
December	Madras.	The Hon. Secretary Amateur Photographic Society, Madras.

Exchange Column.

Exchange cabinet portrait lens by Laverne, cost 6*l.* 6*s.*, for hand camera, or pair of stereoscopic lenses.—Address, W. H. GEDDES & SON, Applegate, Arbroath.

Wanted a 15×12 camera slide and lens, if out of repair would do; will exchange Harrison's head and body rest, Fallowfield cold rolling press, and Dallmeyer's aluminium No. 3 portrait lens.—Address, J. MULLENS, Geneva-road, Winsford.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

E. J. CAR.—The book has not yet been published.

W. T. M. DAVIDSON.—Wilkinson's book, or Burton's *Printing Processes* Marion & Co.

E. R. C.—The term is quite misleading. The prints are simply collotypes printed in colours after the manner of chromo-lithography, separate plates being used for the various colours.

T. BIGGS.—If upon testing the gelatine with litmus paper it strikes a red colour at once, it should not be used for mounting silver prints in optical contact with glass, as, sooner or later, it will have a deleterious action on the picture.

G. EDWARDS.—The fault is what you were told, the pictures are much out of focus. As the camera is a "fixed focus" one it is clear that the lens is not at the right distance from the plates. The one who supplied the instrument will see that the fault is remedied.

A. J.—We have found no such tendency. If the prints are properly manipulated they should not change colour in the way mentioned. As no details of the method of working or the toning baths employed are given, we are unable to say what is the cause of the trouble.

NOVICE.—We do not make a practice of recommending any particular maker's goods. Consult the advertisement pages of the "Lantern Record," or procure the catalogues there advertised. By indicating your requirements to any one of those firms, you will easily get what you desire.

D. LLOYD.—1. Use a small stop, and give a full exposure—say, six seconds, with *f*-32. 2. Possibly forced development of ammonia-prepared plates, but it is difficult to say with certainty. 3. About 18°, we believe. 4. It would be useless to attempt to obviate "movement" of the head by the aid of retouching.

C. HEARLEY asks how long black varnish ought to take to dry on a negative, as he has some, obtained from a first-class oilman, that does not dry in less than three days.—A photographic black varnish dries in, comparatively, a few minutes. Procure a bottle of Bates' black. It may be had at any photographic warehouse.

T. H. WHARTON complains that the surface of opal glass is very different from what it was some years ago, and is not nearly so nice to work upon with colour. He asks the reason.—Most of the opal glass at the present time is grained by the sand-blast method, formerly it used to be hand ground. It is that which makes the difference in the surface.

C. GRANVILLE WOOD.—Precisely in the same way as prints on albumen paper are washed. The size makes no more difference in one case than in the other.

S. BLAKE.—To make a thin solution of indiarubber, take masticated rubber which may be obtained at such houses as Hancock's or Macintosh's, and dissolve it in benzole. Perhaps the simplest way is to buy a small tin of solution and thin it down, to the consistance desired, with benzole. This is less trouble than dissolving the rubber itself.

T. W.—In publishing photographs like two or three of those forwarded, it would be sailing very close to Lord Campbell's Act. Such works could never be classed as "Artists' studies." They are too coarse and vulgar for that. "Artists' studies," if indecent, will render the producer and venders liable to prosecution. Prints returned as desired.

R. T. F.—We know nothing of the people referred to. Carry out your threat to communicate with the local Superintendent of Police. If you habitually read this JOURNAL, you would have seen that we have, time after time, cautioned assistants against sending original testimonials, and have strongly advised them to write their names and addresses across their specimens.

S. A. G.—The cause of the prints on P.O.P. paper sticking to the glass is that it was not sufficiently chalked, or that the French chalk was not rightly applied. It is not stated whether the prints were alumed or not. But during the very hot weather it is advisable to do so as this treatment, acts as a great preventative of sticking. If the prints are alumed, and the glass rightly treated with the chalk, there will be no further trouble.

X. Y. Z.—If the Postal authorities repudiate liability for the injured photographs, on the ground that they were insecurely packed, we fear you have no remedy. Two thicknesses of stout brown paper is not sufficient protection for 10×8 prints on plate paper. Such pictures should always be protected with thin packing boards or stout millboards. Possibly the photographs can be soaked off and then remounted. This would, to an extent, mitigate the loss.

A. SAYERS.—It is impossible to say if gelatino-chloride prints are more permanent than those on albumen paper, as time has not been long enough to test them. There are many prints on albumen that were produced thirty years and upwards ago, that are as good now as when they were first made. Of course gelatine has only been on its trial for a tenth of that time. Some albumen prints show a yellowness in a year or two, and so have some on gelatine. Time is the only reliable test.

H. SPODE.—Several formulæ for carbon tissue have from time to time been published, all of which will yield good results, but they require a certain amount of judgment in applying them. As a beginner, we should recommend you to abandon the idea of making your own tissue, or at least until you have gained some experience in working the process. It will save you a lot of trouble and facilitate your mastering the process. The advice proffered will apply equally well to the idea of making transfer paper.

DRUID says: "A friend of mine has a lens bearing the name of a London firm, bearing also the word 'Caloscopic,' but no one can tell us what it is for. The front lens is about two and a half inches in diameter, and like a single landscape lens, or the front glass of a portrait lens, while the back is much smaller—less than an inch. This is composed of two lenses, but seems to have no focus, yet the thing seems complete as it is. Can you enlighten us on the subject?"—The lens is simply the old orthoscopic lens under another name—that adopted by its maker.

KNOWLEDGE IS POWER writes: "I should be very much obliged if you would inform me the best thing to put the card backs on opalines with. It must be free from anything that would act on the prints as the glue I used did, but it wants to set as hard and quickly, so as to hold the back in position without being weighted separately. Gelatine is not tenacious quickly enough."—Gelatine is quite as tenacious as glue, and sets quite as quickly—some kinds much quicker. Evidently our correspondent has tried an unsuitable sample. Nothing will answer so well as good gelatine.

A. Z., who encloses a cutting from an advertisement they are issuing, offering to make "splendid likenesses" from inferior pictures, writes as follows: "As you will see by enclosed, we are making rather a speciality of copying and enlarging. Of course we should not knowingly meddle with anything copyright, but, as we often receive commissions by post from strangers to us, we might without knowing it happen to get hold of something in this way that was copyright. Should such occur, could you inform us whether we should be liable for the infringement, or the party that employed us? Everything we send out not from our own photographs bears our name and address, and is stamped 'Copy.' If you will kindly give us your opinion on this point, you will greatly oblige."—If our correspondents reproduce a copyright picture, they must take the consequences of their act; the mere stamping of a piracy "Copy" does not relieve them in any way. The only way to protect themselves is to have a proper agreement for indemnity from those for whom they execute the commissions.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1733. Vol. XL.—JULY 21, 1893.

FALLACIES CONCERNING PHOTOGRAPHY IN THE PAST.

The ideas so freely expressed in the paper read at the meeting of the Photographic Convention by Mr. J. Guardia, with regard to the alleged shortcomings of photography anterior to the introduction of dry plates and hand cameras, are but a reflex of those entertained by many others who have only enlisted in the ranks of photography during the last few years The new recruits are too often given to referring to what they glibly term the dark ages of the art, without knowing anything at all of what used to be done in them, and what is still possible with what are now classed primitive means.

On former occasions we have found it requisite to direct attention to the fact that long prior—say, twenty or five-and-twenty years, or even longer ago—to the bulb-squeezing and button-pressing era, results, both as regards artistic merits and instantaneous effects, were obtained that have not yet been surpassed. But the recent paper by Mr. Guardia, reiterating that all the present excellence of photography is due to modern appliances, coupled with the prominence given it through its being read at the Convention, where, of course, the discussion upon it was brief, and even that not reported in full, renders it once more requisite to point out what was actually the case, and what was done, daily, long before their introduction. In doing so the prevalent idea with many will, to an extent at least, be dispelled, that all the good work now produced is only possible with modern resources.

The author of the paper, referring to the aspects of nature as recorded by photography before hand cameras were invented, says it was a "dead maze of trees, and fields, and buildings. The rivers and lakes showed no ripple, they were merely a mass of glaring white. The streets were deserted, and tenantless houses were but a mockery without reason. The beauty of clouds and atmosphere was unknown—was represented by acres of white paper. Here and there a group of soulless caricatures of human beings were, indeed, to be seen, all stuck up in constrained attitudes; not breathing, and moving, and palpitating with life and energy; but either blurred out of all recognition, or fixed in unnatural poses, like wax dolls glaring at nothing, puppets without muscles, and silhouettes without substance." This is how photography is described as depicting the world before the introduction of the hand camera. Now, it is perfectly true that hundreds of bad photographs were taken before the advent of the hand camera, and it is equally as true that thousands, nay, tens of thousands, of bad ones have been taken since; also that some of the early workers, like many later ones, were ill advised enough to show their inferior work, and even, like many at the present time, to send it to public exhibitions.

Most of our older readers will remember the excellent sea and cloud studies of Le Gray, taken something like forty years ago, and those by Colonel Stuart Wortley at a later date. The waves in these were not a mass of glaring white, neither were they devoid of cloud and atmosphere. These pictures were not of hand-camera sizes, but fifteen by twelve, or larger, and what is more, if we remember rightly, the former were from paper negatives. Sky and atmosphere, even at that remote period, were not necessarily represented by "acres of white paper." Clouds were frequently printed in, and usually with discretion. It was seldom then that a landscape was seen lighted from one direction, while the clouds were illumined from another. Clouds were then, as now, obtainable in the negative with the subject.

Apropos of this point, and the neighbourhood in which the paper was read, we have now before us a couple of stereoscopic negatives of Saltash Bridge, each of which contains excellent natural clouds. The bridge is not here depicted, as it is familiar to the members of the Convention, but is shown with one tube *in situ*, and the other about midway between the ground and its final resting-place, while the piers of the viaduct portion of the structure are seen in course of erection. Therefore the negatives must have been taken in the late fifties. But examples like these were common enough even at that period.

Old apparatus is condemned wholesale, and is charged with being designed by incompetent persons such as carpenters and cabinet-makers, and credited with many of the shortcomings (?) of photography before the hand camera. However, many will remember the instantaneous stereoscopic pictures of breaking waves by the late Mr. G. W. Wilson, which have not yet been excelled. The "instantaneous" shutter Mr. Wilson employed was nothing more than his Scotch bonnet deftly used. We have in our mind, while on this topic, a fully exposed 12 × 10 instantaneous view of Regent-street, taken about 1858, which showed the wheels of vehicles, and the feet of pedestrians crossing the road sharply defined. The exposure, we were told, was made by one person uncapping the lens while another immediately thrust a black cloth over it.

Those who have seen Mr. Frank Haes' photographs of the animals at the "Zoo," taken something like thirty years ago, and those of Mr. York, of a somewhat later date, are fully

aware that they will hold their own against any of the modern work. With regard to street scenes, and the like, we have the instantaneous views of Paris by Mr. William England, and those of London by Mr. Blanchard, and others, produced a quarter of a century ago, that still have to be excelled. These workers, it is true, had not the advantage of more or less complicated arrangements for making their exposures, and they worked the "messy" wet-collodion process. The earlier photographs of Muybridge, and which obtained for him his reputation were also by this, by modern workers, much-decried process. In whatever direction one may look, it is difficult to see, in modern work, anything that has not its equal in what was done years ago. It must, however, be admitted that, to accomplish that, much greater skill was necessary than is the case now; consequently the greater credit should be accorded to those who were successful.

There is no gainsaying the fact that modern dry plates, with their extreme sensitiveness, have conferred a great boon upon photography by enabling it to be worked with greater ease and comfort than was possible with any previous process. They have also permitted the use of more convenient appliances. But for this it must be conceded that the majority of those who now produce excellent work would not have taken up photography at all.

This article is not intended in any way, even for an instant, to disparage the ability of modern workers, but simply to dispel some of the fallacies that are constantly being promulgated by many, that the quality of the present work is entirely due to the introduction of modern processes and appliances, and that, prior to their introduction, good pictures were an impossibility.

EXPOSURE, DEVELOPMENT, AND FOG.

There can be little reason, after the most recent contributions to the discussion of the question of ratio of gradation, to doubt the correctness of the views held on either side when considered from their respective standpoints, the apparent discrepancies being rather those of expression than of fact. In other words, while Messrs. Hurter & Driffield are, there can be little doubt, correct in their contention that the gradation in a negative is produced by the action of light alone, regardless of the composition of the developer—so far at least as normal conditions prevail—still the practical man is equally accurate in his claim that he can modify the character of his negatives in development by departing from those normal conditions.

The extreme care with which the researches of those gentlemen have been carried out is not more strongly evidenced than by the fact of their recognising the necessity for making due allowance for the effect of the fog, or abnormal reduction invariably present under even the most favourable circumstances. Such fog, unless varying in the same ratio as the image itself —in which case it can scarcely be abnormal reduction—must necessarily alter the gradation, and Messrs. Hurter & Driffield in all their experiments have made allowance for the fog inherent in the film as measured from an unexposed portion of the plate.

In making this allowance, they have necessarily looked upon the fog as equally pervading every portion of the film, irrespective of the additional effect of light; but, as was pointed out by Mr. G. Watmough Webster in the discussion following Mr. Bothamley's paper at the Convention, it is questionable whether that view is the correct one. Mr. Webster's contention, as a practical man, is that fog is more likely to show itself in an unexposed plate or in the unexposed portions of a plate than where light has partially acted, while Mr. A. Cowan, an equally practical man, dissents from this view. Possibly even here, as we shall endeavour to show, both gentlemen are in a measure accurate from the particular standpoint each takes.

It is now some twelve or fourteen years since we first saw an example of this in connexion with a gelatine plate. In the dark room of a well-known professional photographer—afterwards a plate-maker—we witnessed the development of a whole-plate upon which two cabinet exposures were supposed to have been made; but by some accident one half of the plate had received no exposure at all. For a considerable time no sign of any reduction whatever was visible upon the unexposed portion of the plate, but towards the close of the development when the solution was finally strengthened for the production of detail and density, the blank half of the plate began to veil, and, by the time the negative on the other portion was complete, dense fog had obscured the otherwise clear glass. At the same time, the shadows of the negative and the rebate of the dark slide on that portion of the plate were perfectly clear, or as near it as the best negatives usually are.

It was at first assumed that the one half of the plate had been fogged by the admission of light into the camera by some means but that was negatived by the fact of its remaining clear for so long a time, and also by the portion protected by the rebate of the slide being equally veiled, no less than by the impossibility of such an occurrence on one half only of the plate. Upon due consideration there seemed no possibility of escaping the conviction that the unexposed portion of the plate had succumbed under a greater strain than the other half was subjected to.

Collodion workers will, no doubt, remember similar effects, more especially with dry plates and silver development. The latter form of development, in fact, was particularly liable to abnormal action under the least suspicion of under-exposure, since the soluble silver salt it contained would only remain in that condition for a limited period dependent on the restrainer present; and when it was deposited, if the exposed portions of the plate did not exert a sufficiently powerful attractive force to draw the metal to themselves, it had to deposit itself uniformly over the surface of the negative, whether exposed or not This was notably the case with negatives exposed in a bad light, or with subjects possessing but little contrast, for if the reverse conditions prevailed, although the plate might have been insufficiently exposed to make a good negative, the brilliantly illuminated portions of the image attracted to themselves more than their due portion of silver, and thus kept the shadows free from fog, at the same time producing the effect of harshness.

It has occasionally been our misfortune in these days, when working with a binocular camera, to find on development that one half of the stereogram had not been exposed, and in such cases the unexposed portion was invariably more or less fogged, as in the case quoted above, although the shadows of the other half might be perfectly clear.

It seems clear, then, that there is a tendency for fog to appear in inverse ratio to the action of light that has touched the plate—that is to say, if there be any inherent tendency in the film to produce fog, for it is here where we think Messrs. Webster and Cowan differ. If the plate be a good one, and quite free from latent fog, and the development be carried on in a "safe" light, there appears to be no reason why it should

not stand the application of a developing solution of reasonable strength for an unlimited time. But the case is different where a tendency to fog exists, for the application of a developing solution of any strength is bound to bring it out if allowed sufficient time. That the fog may not make its appearance in the case of a fully exposed negative may depend on different circumstances, it may be that the negative image is complete before the fog has had time to develop, or it may be held in check by the bromine given off by the reduction of the adjacent portion of the image. At any rate, a foggy plate will undoubtedly often give a clear negative, when it will not remain clear when entirely unexposed.

To test the matter, a plate of a brand known to work in a remarkably clean fashion was exposed in the camera, one half being covered with a sheet of opaque paper. The exposure was such that a developer of full strength had to be applied for a rather prolonged period; in fact, it may be said to have been under-exposed. After fixing, however, there was no more sign of veil on the covered portion of the plate than in the shadows of the exposed parts, and the same result was obtained on repeating the experiment with variations.

Another plate, of a different make, which usually requires very careful treatment, was submitted to the same test, but in this case the unexposed half of the film was unmistakably and badly fogged. With this make of plate the experiment was varied by exposing one half of a cut plate fully—that is to say, sufficiently to ensure that it was not under-exposed—and the other for half the time. The two were then developed in the same dish, and for the same period, being removed when the longer exposed half was sufficiently developed. After fixing, while the latter was perfectly clear in the shadows, the other half, although not showing any great lack of exposure, was distinctly veiled, although submitted to exactly similar treatment.

In another experiment one of the cleaner, working plates was intentionally fogged by a brief exposure to artificial light with a view of testing whether light fog pure and simple was amenable to the same law. Upon exposing a part of the plate in the camera, and developing in the same manner as before, the exposed portion came out with slightly less veil than the other, though we were unable to so accurately time the preliminary exposure as to produce a really clear negative.

From these experiments, and for other reasons that might be adduced did space permit, we think it is quite possible, as Mr. Webster suggests, that it is a mistake to reckon fog reduction as a constant, though, perhaps, in actual practice, the difference it makes is not of very high importance.

The Photographic Society's Exhibition.—In view of the near approach of the Exhibition season, it may be opportune to remind our readers that the Exhibition of the Photographic Society of Great Britain opens in the Gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall East, on Monday, September 25 next, and will remain open until November 25. The Exhibition will be inaugurated by the usual *conversazione* and reception by the President (Captain W. de W. Abney, C.B., F.R.S.) at the Gallery on Saturday, September 23. Forms of entry and all necessary particulars are obtainable from Mr. R. Child-Bayley, Assistant Secretary, 50, Great Russell-street, W.C.

Volatility of Silver.—We recently referred to the experience of one of our correspondents who believed he lost a large quantity of silver by volatilisation when reducing residues, and in connexion with this subject, in a recent number of *Comptes Rendus*, M. Moissan gives an account of some remarkable experiments in the melting of metals by the aid of electricity. Whether our correspondent was right or not in his belief in the manner of his loss, it has long been known that silver is volatile, and some of these experiments we refer to consisted in bringing the silver to a state of ebullition, which was done in a few moments, distilling the vapour, if we may use the expression, and then condensing it in the form of small globules, varying in size from small shot to microscopically small spherules. Gold also was distilled, the condensed product being in the form of powder exhibiting a beautiful purple sheen.

Refractory Metals for Photographic Use.—M. Moissan's paper contained also accounts of experiments with other metals which were pregnant with interest. Taking, for example, molybdenum, by the electric furnace he obtained an easily detachable regulus of the metal combined with carbon which was of extreme hardness. This molybdenum carbide is so hard that it scratched glass and steel, and it was not attacked by moist air. If it were possible to face the steel plate of a rolling press and burnisher by some such material as this, the plate would be invaluable, for there can be no doubt that many an imperfectly glazed or surfaced print can be traced to the use of a steel plate, which, through long use or accident, has lost its original burnished surface. Possibly, also, zirconia cylinders for the optical lantern might be obtained by means of the electrical furnace; for M. Moissan was able to reduce this earth to vapour, and condense it into a fine white powder, the individual particles of which were hard enough to scratch glass.

Action of Light on Cobalt.—Messrs. Auguste & Louis Lumière are continuing their experiments in this direction, and, in the journal above quoted, describe a process founded on their previous discovery that cobaltic oxide is rapidly reduced to a cobaltous salt when exposed, in presence of organic matter, to the action of light. They impregnate paper with a cobaltic compound, expose to light under a negative, and by means of certain reagents—preferably potassium ferrocyanide—bring out an image.

Assistants and Their Specimens.—Numerous complaints of the detention, by photographers advertising for assistants, of the specimens and testimonials submitted to them by applicants are again reaching us. We should scarcely have been surprised at this had we not previously dealt with the matter on several occasions, denouncing the dishonesty shown on the one hand, and the stupidity and carelessness on the other. We again strongly advise operators or assistants when submitting specimens to write their names and addresses on some prominent part of the photographs. This will prevent improper use of them by unscrupulous persons. Again, copies of testimonials only, and not the originals, should be sent. In neglecting these precautions assistants are largely to blame in not securing the return of their specimens and testimonials. As for those photographers who make a practice of wilfully not returning specimens, &c., submitted to them, we may remind them that we have a black list in which their names are entered, and which we use in the interests of defenceless assistants.

Photographic Study of Sources of Light.—M. Janssen first made a special study of this subject by photographing the solar surface with exposures of gradually diminishing length. M. Crova has applied the same method to the standard Carcel light and the electric arc. The true proportion of the constituent parts of the flame to one another is only seen when reduced exposures are given, four such photographs having lately been shown at a meeting of the French Academy. The flame was shown thus to be divided into several zones, separated by distinct lines of demarcation, and similar photographs of flames of a candle, an amyl-acetate burner, and a batswing jet exhibited similar phenomena. Most interesting phenomena were observed when the image of the electric arc was examined on the ground glass of the camera. The positive carbon showed a

surface riddled with dark spots, and granulated like the surface of the sun in M. Janssen's photographs, the granulations being distinctly observed in a state of violent motion on the ground glass. The important deduction is drawn that, in estimating the potency of these light surfaces, it is not admissible to screen off all but a very small portion of the luminous source in order to reduce the amount of light in the same proportion as the area of the luminous surface. With very small surface elements, both the amount of light and the temperature, and hence, also, the tint of the light, may be constantly changing.

New Focussing Arrangement.—The advances made in the construction of the camera proper and the mechanical motions in connexion with its working have apparently entirely displaced the rack and pinion in lenses of very long focus. Few photographers of the present day have ever seen, for example, the once-used Hook's Universal handle for turning the pinion of the lens when the latter was placed at a considerable distance from the ground glass. It was a very useful addition, the pinion projecting through the milled head to form a square head on which the handle fitted, and the joint itself was a most ingenious piece of mechanism, which might with advantage be utilised for modern work. There has, however, been recently invented a focussing device which is capable of advantageous practical application to the huge portrait cameras so much to the fore of late years. The first practical application of the device has been to the eyepiece of a five-inch telescope belonging to Mr. Beach, one of the proprietors of the *Scientific American*, and it has been found to answer its purpose most admirably. Briefly, it consists of an attachment to be applied to the sleeve of the rack and pinion of the lens, to be moved to and fro for focussing, and when not in use does not interfere with focussing in the ordinary way. An ingenious and not too complicated mechanical arrangement works two levers, which are actuated by a pneumatic pear, and the motion is so communicated as to work the pinion in a forward or backward direction as required. We have not yet heard of the device being applied to photographic lenses: but, as it appears to possess such advantages over ordinary means for large instruments, there seems every probability of the adaptation taking place.

CONVENTION NOTES.—I.

It was feared by some that, owing to the geographical situation of Plymouth, the Convention would be but sparsely attended this year; but, although its distance certainly prevented some hitherto regular frequenters of its meetings from being present, yet, all things considered, it was well attended, several having come from Belfast, Dublin, Glasgow, Liverpool, Manchester, Chester, Derby, and localities not less distant, not to speak of London.

The kindness of Plymouth, in which we include Stonehouse and Devonport, could not possibly be surpassed, and the attention bestowed upon the visitors by the brethren there will not readily be forgotten.

Plymouth and its environs team with delightful subjects for the camera, but those who go there for pictures alone have not the same chance of obtaining them during a busy Convention week that they would have were a quieter time selected, when they could go wherever they pleased and stay as long as they preferred.

There is much of historical interest that centres in Plymouth. None now need to be told that it was in this port—at that time the chief naval arsenal of the kingdom—the English fleet lay in waiting for the appearance of the Spanish Armada; that it was from Plymouth the great colonising expeditions set out, one of which annexed Newfoundland; that from here, over 270 years since, sailed the *Mayflower* with the Pilgrim Fathers who founded the American Republic; much less do they require to be told that in the Hamoaze, an important estuary in the immediate vicinity, lie peacefully slumbering at anchor a mighty navy, replete in every respect with everything that can conduce to destruction—formidable ramming warships of the latest construction, numerous torpedo vessels—all reposing side by side with specimens of the "wooden walls of England"—the once formidable *Téméraire* among them—spending the evening of their existence as training ships.

The town of Plymouth is neat and clean and its streets are busy. In several druggists' shop windows are seen the inevitable camera, mainly of the "hand" genus, with announcements as to photographers, requirements being procurable within. The windows and interiors of two photographic establishments in George-street, those of Mr. Heath and Mr. Hawke, are worthy of examination on account of the real excellence of the numerous portraits—largely of members of the Royal Family—there exhibited. Mr. Yeo, too, who lately obtained a medal at the Pall Mall Exhibition, has a fine exhibit at his gallery. Indeed, all through the town the works exhibited by photographers are equal to any we have elsewhere seen and are superior to those in many large towns.

The group which we issue with the present number was taken by Mr. R. L. Kidd. Mr. Kidd deserves special commendation for the enterprise displayed by him on that occasion, for after developing and drying the negative it was despatched by him to his works at Richmond, where it could not possibly have arrived till the forenoon of the day following (Thursday), and yet on the morning of the succeeding day (Friday) numerous copies, printed on bromide paper and mounted with a sunk plate mark, were on exhibition in Plymouth ere the members of the Convention had breakfasted. The print we give, however, is not a bromide one, but is printed by the firms' collotype process.

Apropos, the members of the Convention portrayed in the group do not by any means represent all who were present at the meetings, nor, for that matter, all who were present when the group was taken, for the temptation to have a "shot" at their fellow-members proved too great for resistance by several who had their cameras, and who "blazed away" regardless of the fact that they themselves would inevitably be left out in the cold. At the Convention dinner on Friday, a large, and what may be designated the official, group, taken by Mr. W. Heath, was placed on exhibition. We had only a hurried look at it, but it seemed to us as being absolutely faultless.

Is it not a mistake in the Council to receive such a large number of papers to be read? It is altogether impossible that every one of these can be brought before the notice of the meeting. Imagine three or four, or even half that number, of long papers on topics more or less important being brought before a *séance* which can last at most but an hour or an hour and a half; and this, too, after a day pretty actively spent in other Convention duties! A President would be something more than human if he could curtail discussion on any one of these to, say, half an hour, and then what is to become of the other papers yet in store, and down on the programme for that evening's proceedings? The system usually adopted is, doubtless, the best, viz., when the usual hour of separation has come, to take those papers *as read* the authors of which are not themselves present. In our last issue we gave all those that were really read: in the present and succeeding numbers we shall give all those which, not having been actually read, were taken as such.

GELATINO-CHLORIDE NOTES.

Much doubt and difficulty appears to exist in connexion with the mounting of gelatino-chloride prints, though why it should be so, if the instructions were carefully followed, is not clear. The new paper,

of course, requires some little different treatment from that given to albumenised, but those who have become accustomed to the latter refuse to change their habits.

The most important point is, of course, the use of the alum bath, which should never be omitted, however little tendency to softening the film may show, but it should always be used last thing after fixing and well washing. When so applied it forms, in addition to hardening the gelatine, a safeguard to the permanency of the print, and the trouble involved is not worth counting. It should never be used before toning, as recommended in some of the instructions, for it not only leads to irregularity of tone, as mentioned in a recent leading article, but, to my idea, spoils the tone, or, at least, renders it difficult to get the rich tones otherwise obtainable.

But I would go further than merely insist on the use of alum, and would make a point of invariably drying the prints before proceeding to mount them. This completes the hardening process, and removes any last traces of "stickiness" their surfaces may have, and even when rewetted they are no more difficult to handle than albumen. Instead of mounting the prints direct from the last washing water, blot them off and lay them out to dry in a warm room, which will not take very long at this time of year, and they may be finished off at the fire. If they are properly alumed, there is not the least danger of their sticking to the blotting-paper or of "fluff" adhering to them. Then, before mounting, soak them in water again to soften and swell them, and proceed.

The drying before mounting is, of course, a necessity if the prints are not trimmed to size before toning, and even in the case of cut sheets the operation of trimming has to be performed at some stage It puzzles me to know why the manufacturers send out cut sheets the exact size of the negative instead of a quarter of an inch smaller each way. The margin has to be trimmed off in any case, unless the finished prints are to be improved by being mounted with a black margin, representing the rebut of the dark slide. There is, however, one advantage, namely, that the edges of the print are cleaner after trimming before mounting than would be the case if cut sheets the exact size of the final prints were used, for then the handling in the course of manipulation is liable to loosen the gelatine and cause ragged edges.

As to the style of mounting, let those who like the "bon-bon-box glaze continue to use plate glass, and allow the mounted prints to dry before stripping. But, for ordinary purposes, ebonite or ferrotype plates will be found better. The latter, indeed, if of the best quality, have a surface little inferior to glass. Some of the papers on the market now, however, require no squeegeeing on to glass or anything else, but dry with a surface equal to superior albumen prints when mounted in the same manner, though they are improved by burnishing, which is an operation beyond the reach of most amateurs.

Celluloid, however, is my favourite where a squeegee support is used, and either sort of surface—matt or polished—can be got, according to the side of the celluloid used, the prints stripping as easily from the smoothed or grained side as from the polished. The transparency of the celluloid is also an advantage, especially when the plan of mounting to be described is adopted, and it is one I have found very convenient.

I have sheets of celluloid cut to the exact size of the prints when ready for mounting, and the damped prints are squeegeed on to these. The celluloid sheets may, in fact, be utilised as trimming shapes, the untrimmed print being squeegeed in contact, and then cut to the exact size with a pair of *sharp* scissors; in fact, this is the more convenient plan. This having been done, the back of the print is starched or gelatined, and together with the celluloid placed on the mount and left to dry. There is no danger of the prints sticking together if placed in a film under pressure; indeed, they are all the better for such treatment. When quite dry, the celluloid comes away easily, and is ready for another batch of prints after polishing with talc or wax.

If I might make a suggestion to the dealers in photographic goods, it is that they should send out cut sheets of celluloid prepared for this purpose with rounded corners. If put up in packets of a dozen, I should think they would be appreciated.

W. B. Bolton.

MY FIRST DAGUERREOTYPE.*

In process of time my lessons came to an end and I was supposed to be ready for operations on my own account. I had done a great amount of buffing and had seen the rest of the operations very frequently, but had actually never completed a picture without assistance. I had not money enough to build a studio, but my friend assured me that the Americans preferred a large window to the top light of a glass roof, and he had been fortunate enough to secure a large room with a few windows, and in this ready-made studio he produced portraits the lighting of which could not be surpassed even now.

I searched far and wide for a suitable locality, but found not one with the much-desired bow windows, and finally had to be content with a large upper room over a shop. There were two windows, but by darkening one I thought I might be able to manage with the other. I had a north light, and that was at any rate something in the right direction.

For many days I was busily employed in fitting up my dark room, and in other ways getting ready for the serious operation of admitting the public, who would without doubt rush in with the money in their hand eager to pay in order to be practised upon, and this eager anticipation and active work made time go like lightning. At length I deemed the place ready for work, and proceeded to try my apparatus. I had no trouble with the buffing, and the faultless plate, with its black polish, was first put over the iodine vapour, and then slid on —when the right change of colour had been obtained—to the bromine compartment. Apparently all went well, and the plate had successfully passed through the various changes of colour then deemed necessary for the highest state of sensitiveness, and I exposed my first plate on a plaster copy of the "Greek Slave," for in her I had a model I could trust not to move. I gave what I judged to be the right exposure, and with great eagerness watched the dawn of my first picture. Alas, there was no dawn for all remained night, and the fair slave was still captive, hopelessly imprisoned within the fair film of the sensitive plate. Surely, thought I, a white subject must make some impression if every operation had been correctly carried out, and I proceeded to prepare another plate. I felt certain I had removed the cap of the lens, but doubtless I was in error on that point and must therefore be more particular next time.

Needless to say that, at the next experiment, every possible precaution was taken to ensure success; but, alas! it did not come. The plate was lifted from the mercury bath more times than I can count, but still no trace of an image whatever. In my lessons I had been taught that something dreadful would happen if I exceeded the regulation time in the bath. I became desperate, and dared everything. The time was doubled, and again doubled, but still no picture. I had been told that something equally dreadful would result if I increased the temperature beyond the fixed limit. As desperation increased, I recklessly pulled up the wick of the spirit lamp, and ended by bursting the thermometer. It was not made for very exalted temperature, so what could it do when the mercury filled the tube to extreme limit but crack its sides? Clearly there was nothing more to be done that day but rush off to my tutor and cry out for help. He could offer no explanation, but promised to come over at the close of the day and examine matters for himself. I rushed off to buy a new thermometer, but found I could get none of the pattern needed that would record very high degrees of heat. When I explained my difficulty, the assistant assured me that the instrument was more than sufficient for my requirements. When I reached home—for my studio was "kitchen, and parlour, and all"—I made the patient slave submit to three more exposures, varying in duration, and this she did with stony indifference.

In due time my friend appeared, and, after a careful examination of all my arrangements, he proceeded to develop the exposed plate. Failure attended his first and second efforts, and then he declared that it was absolutely impossible that I could have exposed the plates. I might have taken off the cap of the lens, but I had failed to pull up the slide. I assured him that I had pulled the slide entirely out, and shut down the lid of the camera, and had held the metal slide in my hand as well as the cup of the lens, in order to be perfectly sure of my proceedings. He scratched his head at this, and then an idea struck him. The mercury was oxidised, and wanted filtering. Had I a piece of chamois leather? I rushed out, and in a few minutes had procured a piece, and then the mercury was duly filtered and replaced in the bath. The last plate was tried with the mercury, as recorded by the thermometer, far above the extreme regulation limit, but with the same negative result, so my instructor in turn was hopelessly beaten, and was compelled to admit he could offer no explanation of the mystery.

* Concluded from page 424

He departed, and I was left alone with my own gloomy thoughts Was this, then, to be the end of all my efforts—ignoble failure? Were all the bright anticipations that had buoyed me during all my exertions to be submerged in this "Slough of Despond?" Surely this was a fitting reward for my overweening conceit; for, like many other beginners, I never for a moment doubted myself, and though I had not been furnished with as much practical work as fairly belonged to me during my period of tuition, I felt that, once started and left entirely to my own resources, I should find no difficulty whatever. The veil was removed from my eyes—indeed, torn from them by this utter collapse. The next morning I was at work before breakfast, hoping against hope that my luck would change. The Greek Slave once more endured the audacious gaze of the lens, but the plate remained proof against her charms. I left it in the mercury bath, and tried to drown my trouble in a cup of tea. I could not eat, but tried to forget my troubles for a moment by reading. The subject of the book caught hold of my mind, and held it for how long I cannot say; but all at once the remembrance of the plate in the bath came back, and I rushed eagerly into the dark closet. The lamp had flared up unusually high, and the thermometer was again broken. With fear I lifted up the plate, but, oh, joy! there was my first Daguerreotype. There was the fair Greek delineated with a purity and beauty I had never seen before. Surely such a Daguerreotype had never before been offered to the gaze of man, for to my gladdened eyes it was indeed beautiful.

The key to the enigma was at length furnished. The mercury baths of American manufacture were wonderful examples of fine iron casting. Mine was a clumsy imitation, and almost a furnace was needed to get up the necessary heat to properly vapourise the mercury; the bottom of the bath was cut down to the necessary thinness, and my first great photographic trouble was at an end.

VALENTINE BLANCHARD.

JOTTINGS.

I SEE that the next meeting of the Convention will be held in Dublin. Writing on the subject twelve months ago, I suggested that, in the event of the Home Rule Bill being carried, the title, "Photographic Convention of the *United* Kingdom" would stand in need of alteration. The Bill seems to be in a fair way of becoming law before long, and I therefore hope the Convention Committee are prepared with a new title.

Reading through several accounts of the Royal Wedding and its incidents, as published in the daily papers, I came across the now stereotyped references to the "inevitable" photographer, the "ubiquitous" Kodaker, and other sneers of a similar nature. Why the photographer should be singled out for reference in this manner on all festive occasions passes my comprehension. To my thinking, photographers taking views of great historical gatherings, &c., are placing posterity under an obligation to them, and be the results never so poor, it is to be hoped that, in the interests of historical accuracy, as many of them as possible will go down intact to future centuries. Ridiculous writers in daily papers, however, do not think of this; in trying to be funny or smart in their references to photography, they too often only succeed in being foolish, as witness their sempiternal denunciation of process reproductions of artists' drawings, process illustrations in magazines, &c. On that point I am glad to notice that Mr. Henry Blackburn emphasises the fact that the faults so loudly complained of by the daily press critics are not those of photography, but of the artists themselves in not preparing their work according to the requirements of photo-mechanical workers.

It is singular that topics such as those headed "Depression in Photography," and "Amateurs and Professionals," which are just now in course of discussion in your pages, should crop up at a period of the year when one would imagine professional photographers wanted all the time they could get for looking after their businesses. Apparently, however, a great many of them have no business to speak of to attend to, so that they take advantage of your kindly columns to proclaim that fact to the world, to assign causes therefor, and to discuss more or less plausible remedies for bettering their condition. Chief among the causes generally assumed for the undoubted depression in professional circles is the growth and influence of amateur photography. There is, I fear, no denying the fact that there are thousands of amateurs who do landscapes, groups, architecture, copying, printing, toning and fixing, mounting, &c., quite as well as the average professional, and whose work, being gratuitously distributed, is bound to act as a deterrent on the general public patronising professionals. Do we not all prefer something for nothing instead of paying for it?

Then as to portraiture, the professionals' chief buttress and support. It is all very well to sneer at the portrait productions of amateurs as being crude and poor, but this does not apply in nearly all cases, for in this branch of work there are undoubtedly large numbers of men who, in posing and lighting, provoke and justify comparison with an average professional, and whose productions, be they good or bad, please and satisfy their friends, and so prevent the latter from going to a professional. All this, and more, tells against the professional, who, I am bound to say, in a great many cases is either too ignorant, too careless, or too poor to keep himself abreast of the times in taste, novelties, new processes, and all reasonable means for attracting and retaining public patronage. What wonder, then, as one of your correspondents neatly puts it, that he should "suffer through the laws of political economy?" The struggle for the survival of the fittest is going on in photography as in everything else, and at present it looks as if the lower grade professional, the man of limited capital and limited knowledge, will have to go under. The "tin-type" man and the "large direct man" seem to flourish well enough; the middle-class man is apparently being squeezed out of existence.

All the talk about licensing and boycotting amateurs, making them pay more for material, &c., is simple waste and nonsense, and to think that any considerable number of them will refrain from photographing their friends, their oxen, their maidservants, and their other belongings because it might injure some professional unknown is nearly as bad. I take too pessimistic a view of the matter to suggest any remedies. Professionals might combine—but they won't; they might abstain from cutting each other's throats in the matter of prices—but they don't; they might, as a rule, turn out better work—but they won't. They will not help themselves, so how can anybody else help them? The only hope that I can give them is a poor one, and that is time! Time rights all things—or some of them. In course of time the great amateur craze may die down, and then the poor professional will come to his own again. But pigs might fly if they had wings. In the meantime I should like to say that I and many of my friends and thousands of others have for years grown our own potatoes, our peas, our lettuces, and other succulent vegetables, and still the greengrocer's remains a flourishing trade. The greengrocer usually is a good man of business, and—must I say it?—your photographer usually is not.

It is a pleasure to note from time to time, among the lengthy commonplace records of the commonplace doings of the photographic societies, little items of news indicating the existence of a desire to impart to their members objective photographic knowledge. The Birmingham Society, for instance, set an example at its last reported meeting which merits imitation on account of its undoubted practical value to photographers, especially amateurs of limited experience. A series of negatives taken by the members on an excursion were staged for examination, and appear to have had instructive effects on those present. If particulars of plate, exposure, stop, developer, &c., are given, no better method of imparting a lesson in development could be given, and it is in the hope that the Birmingham Society's lead will be followed that I venture to applaud it. Different methods of intensification, reduction, and other processes might also be demonstrated in the same way.

COSMOS.

STEREOSCOPIC PHOTOGRAPHY.

A REPLY TO "TECHNIQUE."

[Read at the Stereoscopic Club, July 5, 1893.]

SINCE the last meeting of this Club there have been many things done and published on photographic matters that might well occupy our attention as fit subjects for discussion. At the present time I

wish to call your attention to an article on "Stereoscopic Photography" published in the April number of *Photographic Scraps* over the name of "Technique." As most photographers are aware, *Photographic Scraps* is a private journal, published monthly, under the control of the Britannia Works Company, and "Technique" is their editorial contributor. No doubt many of our members have read the article in question, but by this time may have forgotten much of the particular statements it contained.

First of all, "Technique" is of opinion that the heading of his article—"Stereoscopic Photography"—would have given "greater gratification" to readers of photographic literature thirty years ago than to readers of the present day. If he infers, as I presume he does, that there were more amateur photographers interested in the stereoscope, or more stereoscopic cameras in the field, at that time, then I must beg to differ, since I believe there are more stereoscopic photographers (amateurs) to-day than there ever were, and I shall be prepared to submit some particulars and to argue my own case before a committee of three gentlemen, and to back my opinion to the extent of a very good dinner for the committee, "Technique," and myself.

Next we are told that the stereoscope did give a great impetus to photography at the period alluded to (thirty years ago), and that "there were abundant reasons for this; not the least was the apparently wonderful character of the pictures, which it was imagined were only possible as photographs, whereas in reality very good stereoscopic pictures can be made by pen or pencil by any one understanding the principle of the stereoscope and of perspective drawing."

Now, if a tyro in photography had made such a statement, it would have been excusable, from the fact that he had not studied the subject: but when a professional scribe, one who writes on scientific matters for the guidance of others, and who sets himself up as an authority, displays such total ignorance of the subject, then I say there is not much room for excuse.

As a matter of fact, there has never been an artist clever enough to make "a good stereoscopic picture by pen or pencil," and nobody who understands the principles of the stereoscope would be so foolish as to try. It is quite true there are outline designs—geometrical figures in white lines on a black ground—made for the stereoscope, but to call these "good stereoscopic pictures, drawn by the pen or pencil," would be a deliberate intention to mislead. If we leave out of the question the absolute impossibility of making two pictures stereoscopically dissimilar, and therefore ignore the whole principles of binocular vision, I say again there has never been a man born who could make two pictures so near alike as not to have their differences detected by the stereoscope.

The stereoscope is used as a test for suspected forgeries in bank-notes, a photograph of a genuine note being placed in the instrument along with another photograph of the suspected note, and a difference in the engraving so slight as not to be detected in any other way is at once made manifest by the stereoscope.

Next we are treated to some historical matter which is equally incorrect; and, as "Technique" would have been a very little boy at the time alluded to, I must remind him that dry plates were not introduced commercially at 2*s.* 2*d.* per dozen for half-plates, I remember paying 12*s.* per dozen; so that the price of commercial dry plates had nothing whatever to do with either the popularity or the decline of the stereoscope.

Next we are told that "one great complaint that always clung to stereoscopic pictures was the smallness of the view and the extreme minuteness of the object, not all subjects being alike suitable subjects for the stereoscope."

With respect to size, it has been demonstrated in this Club that when these small pictures are viewed by properly constructed instruments we get the apparent natural size of the object, and there were properly constructed instruments even so far back as twenty-five years ago.

I admit that thousands of improperly mounted pictures have been placed upon the market, and long-focus stereoscopes were introduced with a view of meeting the defects in the slides; but because this was done for commercial gain, or by those who do not understand the principles, is no sound argument against the stereoscope. To say that "all subjects are not alike suitable for the stereoscope" just amounts to saying that all subjects are not suitable for binocular vision, or that, to look at certain subjects in nature, we should close one eye, which everybody will admit to be ridiculous.

A comparison is then drawn in favour of the "pleasure of turning over the leaves of an album and the efforts and the trouble of twisting about to peer into a stereoscope."

This is rather funny, for, as a rule, amongst my photographic friends I don't often find many albums worth looking at; but I have taken some trouble to produce a decent one, and I have tried the experiment scores of times by giving my friends first the album, which they usually finish with in about ten minutes. After this I give them the very same pictures by the stereoscope, and these excite their admiration for an hour.

But, continuing, we have another comparison between the "selfish stereoscope" and the "popular lantern slide." Well, as regards selfishness, the same argument might be used against the microscope, but it would not detract from the merits of the instrument. I remember reading somewhere that a stereoscopic slide was always in season, daytime or night, winter and summer, in company or alone, and we cannot say so much for a lantern slide; besides, I wonder if it ever occurred to "Technique" that from stereoscopic negatives lantern slides were just as easily made as from quarter-plate negatives, and very much easier than from half-plate or larger-size negatives, or did it ever occur to him that a stereoscope could be passed round amongst a few friends, or that two or three stereoscopes were possible to be in use at one time when friends were present?

Next we are told that "the majority of stereo slides are printed on paper and mounted on cards," and another comparison unfavourable to such stereoscopic slides is given by showing the rapidity and conveniences of printing lantern slides. Now, here again, "Technique" has overshot the mark, for, so far as amateurs are concerned, only a very few make paper slides, because stereo transparencies on glass are so much easier to produce. Quite recently I had the honour to adjudicate upon a stereoscopic slide competition organized by the editor of the *Amateur Photographer*, and out of twenty-three competitors only four sent paper slides. The other nineteen sent glass transparencies; but, apart from that competition, I happen to be in perhaps the very best position to know what amateur photographers are doing in stereoscopic photography, and I do not think that more than five or six per cent. of them make paper slides.

But now we come to some *personal experience* of "Technique," who tells us that he has made stereo pictures by a quarter-plate camera at two operations, "the camera being placed upon a simple arrangement known as Latimer Clark's parallel bars, which permitted a side-to-side motion of the camera in order to obtain the requisite angle for stereoscopic effect." In reply to this, it must be said that Latimer Clark's "parallel bars" do not permit any *angle* at all, they keep the axis *parallel;* some modifications of this arrangement were made in years gone by, and these did permit *an angle*, but they were wrong in principle and in practice too, and the difficulty complained of, by the two halves of the negative being unequal, is just what might have been expected by anybody who had studied the subject. But "Technique" concludes his "personal experience" by his observance of these and some other defects in a number of slides published in the *Stereoscopic Magazine* of 1862.

The next paragraph treats of "the number of people who cannot see pictures stereoscopically because there is something wrong with their eyes."

This is a tale I have heard hundreds of times, and in at least ninety per cent. or more I have had the pleasure of proving that it was not their eyes that were wrong, but the badly mounted slides or the defective stereoscopes that caused all the trouble. Here is a case in point. Just a little time before this article from the pen of "Technique" was published, Mr. John Howson, the managing director of the Britannia Works Company, called upon me, and, in the course of a very pleasant chat on general photographic matters, he told me that he had never in his life been able to see a stereoscopic slide stereoscopically by a stereoscope because there was something wrong with his eyes. "They are not of equal foci," he said. "Oh, is that all?" I replied, and I examined his eye-glasses. Seeing they were about like my own, I picked up a stereoscope from the table, and the first stereoscopic slide I could put my hands upon. After adjusting the instrument to my own sight, I handed it to Mr. Howson, saying, "You ought to see that;" and "I do," he replied, "I never saw anything more beautiful; show me another," &c. In conclusion, Mr. Howson paid me a very pretty compliment.

But "Technique" has a most wonderful control over his optic axis that leaves both Mr. Howson and myself in the shade, for he states that he can not only see slides stereoscopically without a stereoscope, but that he can "look at them from top to bottom of a window in Cheapside or Regent-street, and see every one stereoscopically at six inches to ten feet distant."

I admit there are a few people who can see slides stereoscopically without a stereoscope, but, out of a good many people who state that they can do this, at least ninety per cent. are mistaken. Instead of seeing the right-hand picture with the right eye, and the left-hand

picture with the left eye—which, with slides mounted at three inches centre would entail a considerable divergence of the optic axis—they really see the right-hand picture by the left eye, and the left picture by the right eye; this is done by converging the optic axis (squinting). Thus they see the very opposite to stereoscopic, viz., *pseudoscopic*.

But, in either case, stereoscopic or pseudoscopic, pictures viewed in this way—without a stereoscope—look very much smaller than they really are, and by the stereoscope they look larger than they really are. But to be able to see slides stereoscopically at six inches or ten feet distance, as "Technique" says he can, is a most extraordinary performance; and, if the proposed committee and the dinner be arranged, I should like to have *something extra* on that.

Finally, "Technique" sums up the "essence of his remarks" by advising his readers to put their money in monocular cameras, and get as much solidity and relief as they can.

Now, allow me to sum up the essence of his remarks. I could do it best in two words, but will manage it in one word—PREJUDICE

W. I. CHADWICK.

SOME POINTS IN CONNEXION WITH DEVELOPMENT.

THE tables given by Mr. Bothamley (page 445, July 14) are well calculated to show the power of control in development, but are misleading when the effect of fog is considered.

From the following paragraph it seems to be assumed that, because in the second case an alteration in column 1 has produced an alteration in column 4, that therefore any other alteration will produce a similar result. "Since to add a constant quantity to the terms of a ratio diminishes the ratio, it is clear that the fog will lessen the ratios of the opacities."

Now, it is quite possible to alter column 1 without making any difference whatever in 4, but this can only be done by adding equal amounts to column 1, exactly what is done by adding fog, and the ratios of light transmitted remain unaltered.

Tables 1 and 2 are as given by Mr. Bothamley (correcting the misprints in column 4), and 3 and 4 are the same with fog added.

1.				2.			
Thickness of the silver layer.	Ratios of the densities.	Light transmitted.	Ratios of the light transmitted.	Thickness of the silver layer.	Ratios of the densities.	Light transmitted.	Ratios of the light transmitted.
1	1	$\frac{1}{2}$	8	2	1·0	$\frac{1}{4}$	8
2	2	$\frac{1}{4}$	4	3	1·5	$\frac{1}{8}$	4
3	3	$\frac{1}{8}$	2	4	2·0	$\frac{1}{16}$	2
4	4	$\frac{1}{16}$	1	5	2·5	$\frac{1}{32}$	1
3.				**4.**			
2	1	$\frac{1}{2}$	64	3	1·0	$\frac{1}{8}$	64
4	2	$\frac{1}{16}$	16	5	1·66	$\frac{1}{32}$	16
6	3	$\frac{1}{64}$	4	7	2·33	$\frac{1}{128}$	4
8	4	$\frac{1}{256}$	1	9	3·00	$\frac{1}{512}$	1

From the above we see that the only effect of fog is to reduce the amount of light transmitted in a given time, the gradation remaining unaltered.

J. STERRY.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.*

The following papers were taken as read:—

LATITUDE IN EXPOSURE AND SPEED OF PLATES.

BY F. HURTER, PH.D., AND V. C. DRIFFIELD.

IT is generally assumed, because our researches have led us to pronounce exposure and not development to be the determining factor in photography, that therefore the production of similar prints from a series of negatives which have received widely varying exposures, and have been submitted to widely different treatment in development, totally upsets the whole of our conclusions.

Our attention has been called from time to time to such series of negatives, and, in all the instances which have come to our notice, there has been no difficulty whatever in arranging the negatives in the order of their exposures, nor has it been much more difficult, by mere inspection, to so arrange the prints. If, however, such negatives be measured, and their density ratios ascertained, the order of the negatives, with respect to duration of exposure, is readily decided beyond all possibility of error.

As an instance of such a series of negatives we give our measurements of four plates, sent to us two years ago by a gentleman in Ireland, as an illustration of the latitude in exposure obtained by appropriate treatment during the operation of development. The subject was the same in all four plates, and consisted of a field bordered by trees. In the middle distance was a grey house, one side of which was illuminated by the diffuse light of the sky, and the other side by the sun. We measured the densities of the sky, the two sides of the house, the most transparent shadows in the trees, and a spot in the grass. In order to ensure the measurement of precisely the same spots in all four plates, masks with circular openings were fixed on each negative, so that the circles coincided when the subjects coincided. The four plates respectively received exposures of 1, 10, 30, and 60 seconds, and the resulting negatives yielded prints differing so little in quality that they were deemed to have completely demolished our contentions. The following table gives the results of the measurements:—

DENSITIES.

Exposures.	1″	10″	30″	60″
Darkest shadow in trees ...	·378	·553	·973	1·028
House (shadow side)	·833	·750	1·371	1·315
Grass	·930	1·005	1·706	1·581
House (sunlit side)	1·721	1·571	2·121	1·921
Sky	2·598	2·236	2·578	2·308

A glance at the densities of these negatives, particularly those indicating the extreme range (darkest shadow and sky), shows how widely they differ from each other; whilst a glance at the negatives themselves surprises one by revealing the inability of the eye to readily appreciate these differences. The eye is still less capable of appreciating the great alteration in the density ratios given in the next table.

DENSITY RATIOS.

Exposures.	1″	10″	30″	60″
Darkest shadow in trees ...	1	1	1	1
House (shadow side)	2·2	1·35	1·40	1·28
Grass	2·46	1·81	1·75	1·53
House (sunlit side)	4·55	2·84	2·17	1·86
Sky	6·87	4·04	2·65	·24

These ratios decrease with increased exposure in perfect accordance with all our experiments. The negatives are very different indeed in this respect, and fully bear out our contention that the density ratios are a function of the exposure, and not of modifications in development. We have no hesitation in asserting that such negatives may always be arranged in the order of their exposures by any one acquainted with the subject. In printing quality, as regards time, these negatives also differ considerably.

It is clear, therefore, that these negatives do not illustrate in a very striking manner what they were intended to illustrate, namely, the great latitude in exposure. They do, however, illustrate another point, namely, the great latitude there is in the quality of prints acceptable to the eye, and the curious inability of the eye to judge numerical values of density differences. In this faulty perceptive power of the generality of eyes lies a great deal of the latitude of exposure.

Various authorities give wholly different limits for this latitude in exposures. Professor Burton has given it as 1 : 30, but states that he has succeeded with some plates with exposures ranging from 1 : 80. We ourselves stated in our original paper that the plates which we used in our experiments (Nos. 21 and 22) would have given good pictures of subjects with contrasts varying from 1 : 80, though the exposures had varied from 1 : 2; that is, the plates were capable of recording *truly* contrasts ranging from 1 : 60.

Latitude in exposure depends—

(1) Upon the quality of the plate.

(2) Upon the range of contrasts in the subject.

(3) Upon the degree of truth with which the contrasts are to be presented in the positive print.

* Continued from last number.

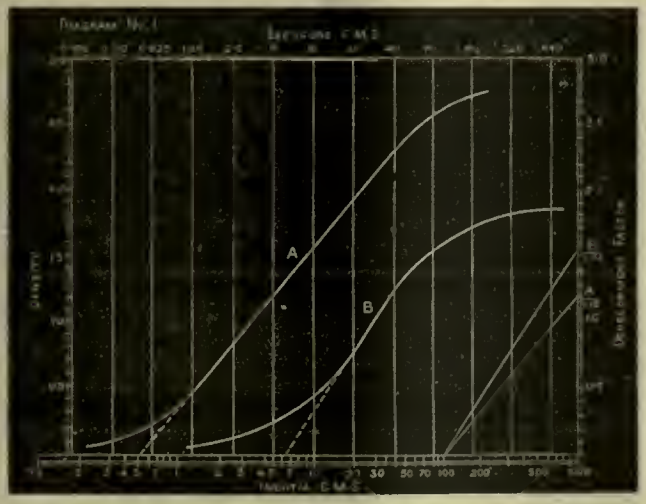
The quality of the plate is the most important question. There are some plates which have no latitude of exposure at all, or which are, at any rate, incapable of rendering any range of contrasts in this subject with any degree of truth, whatever exposure may be given. There are other plates capable of recording *truthfully* a comparatively wide range of contrasts, though exposures may vary from 1 : 5 or 1 : 6, and, if truthfulness of the intermediate tones be not absolutely demanded, such plates are capable of yielding useful negatives within such ranges as 1 : 20 or 1 : 30.

These different qualities of photographic plates are best represented graphically by the curve which we have termed the "characteristic curve" of the plate. The method of obtaining this curve will be presently described. Diagram No. 1 presents two characteristic curves of two well-known brands of plates which we will call A and B. We at once perceive a characteristic difference between these two plates. While the curve belonging to plate A is nearly straight from exposure 0·625 cm. to exposure 80 cm., plate B yields a curve which has hardly any straight part in it. Now, we have shown that, if a plate must truly represent the contrasts of the subject, it can only do so if it possesses a perfectly straight portion within its characteristic curve. The longer this straight part is, the greater is the latitude of exposure for that plate.

Plate A would represent a subject with contrasts varying from 1 : 20 with a high degree of truth, though the exposures varied from 0·625 : 4, from 1 : 6. If several exposures were made upon several plates, the exposures ranging from 1 : 6, they would yield negatives of very different appearance, giving, however, identical prints, though the negatives were all simultaneously developed in the same dish for the same length of time. But, though all these negatives yielded identical prints, the professional photographer would discard them all but one, which to him, at all events, would be the only really good negative. *There is one exposure, and only one, which yields a true representation with minimum density.*

Plate B, on the other hand, would never give a correct representation of any subject. Such plates could not be sold or used if the eye were capable of readily detecting photographic untruth in prints. It is owing to this defect that such a plate can be used at all. But the unsatisfactory nature of the plate, as revealed by the characteristic curve, makes itself evident in practice by the very limited range of exposures which will yield satisfactory negatives. With such plates Professor Burton would have tried his art of altering density ratios in vain.

Next in importance to the quality of the plate is the question of range of light intensities, which have to be recorded truly. Plate A is capable of representing light intensities lying between 1 and 70. If intensities had to be photographed embracing a greater limit than 1 : 70, it could



only be done by sacrificing truth or proportionality to truth altogether. In the case of plate B, the limit would lie between 1 and 2. The question arises, What are the usual variations in light intensities which have to be considered in photographic practice? Many photographers appear to have highly exaggerated ideas upon this subject. We do not exactly know what Professor Burton's opinion is; but it would appear, from his remarks, that the power of altering density ratios by variations in the developers can only be exercised in the case of plates which have received light intensities varying from one to at least several hundreds. From this we are led to assume that he supposed that the two prints he has recently published represent light intensities varying from one to at least several hundreds.

Now, it is an easy matter to ascertain the limits of light intensities which have to be dealt with in any given subject, and the following is the outline of the method we adopt in such an investigation. We cut a plate into two parts. Upon one part we make a series of exposures to the standard candles so as to determine the characteristic curve, the other part of the plate is exposed in the camera to the object of which it is desired to ascertain the range of light intensities. We give such an exposure as will produce a correct negative, but it is not necessary to hit this very accurately. The two parts of the plate are then developed together for the same length of time, and with the same developer, and the highest and lowest densities of the negative, and such others as are of interest are measured, as are also the densities resulting from the candle exposures. It will be evident that this graded plate, produced by exposure to the candle, serves as the scale wherewith to measure the light intensities actually at work in the camera, and which produced the densities of the negative. For such experiments it is, of course, desirable to select subjects which present sufficient areas of uniform density in the negative. A useful subject, because it comprises the entire range of tone which a paper print admits of rendering truly, is an ordinary folding screen, upon each of two folds of which are fixed a sheet of white cardboard and a sheet of matt black paper. The screen is so placed that one fold is illuminated by direct sun light, and the other by the diffused light of the sky, and so that the sky itself is included in the picture. This subject gives us five densities on the resulting negative, namely :—

Sky.
White, illuminated by the sun.
White, ,, ,, diffused light.
Black, ,, ,, the sun.
Black, ,, ,, diffused light.

The following are the details of such an experiment, and diagram No. 2 illustrates graphically the method of ascertaining the equivalent of the light intensities in candle-meter seconds. A plate was cut into four parts; three of them were exposed in the camera to a subject as just described, and the fourth was exposed to the standard candle, the exposures ranging from 0·312 cm. to 160 cm. The three exposures given in the camera were 0·8, 4, and 24 seconds respectively, and all four plates were developed together in one dish for the same length of time. The densities of the negatives and of the graded plate were found to be—

Densities of Negatives.

Exposure.	0·8″	4″	24″
Sky	0·940	1·695	2·260
White in sunlight	0·940	1·735	2·280
White in shade	0·620	1·360	2·080
Black in sunlight	0·120	0·530	1·290
Black in shade	0·060	0·320	1·025

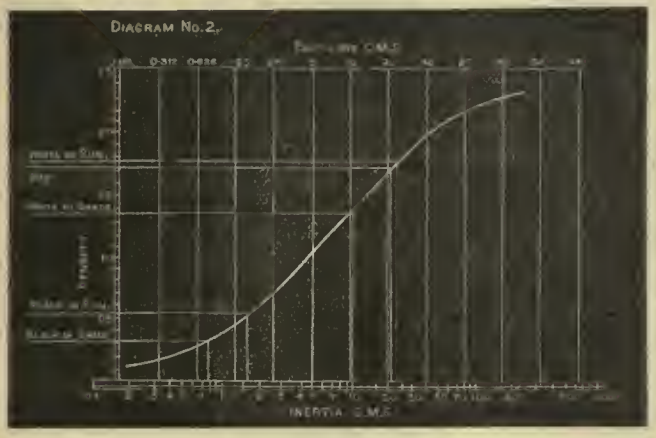
Densities of Graded Plate.

Exposure. cm.	Density.	Exposure. cm.	Density.
0·312	0·150	10	1·360
0·625	0·275	20	1·665
1·25	0·440	40	1·935
2·5	0·700	80	2·160
5·0	1·040	160	2·295

The densities of the gradations obtained by these ten exposures were plotted as a curve, the logarithms of the exposures as abscissæ, and the densities as ordinates. Parallels corresponding to the densities of the three negatives were then drawn, and where they intersect the characteristic curve perpendiculars were drawn through the points of intersection. These perpendiculars indicate at one the equivalent exposures in centimetres which produced the corresponding densities. In diagram No. 2 the densities of the negative which received an exposure of four seconds are thus plotted, and it will be seen that the respective equivalent exposures are—

Negative, 4 sec. exposure.
Sky ..... 20·80 cm.
White in sun ..... 22·50 ,,
,, shade ..... 10·20 ,,
Black in sun ..... 1·62 ,,
Black in shade ..... 0·77 ,,

It will thus be seen that the whole range of light intensities, from matt black in the shade to the sky or white cardboard illuminated by the sun, is as 0·77 : 22·5, or as 1 : 29. Similar results were obtained with the



other two negatives, and the following table gives their equivalents, the highest light being put = 30.

Relative intensities of light emitted by	As shown by negatives exposed.			Mean.
	0·8″.	4″.	24″.	
Sky	30	27·7	29	28·9
White in sun	30	30	30	30
,, shade	15	13·6	13·0	13·8
Black in sun	1·83	2·1	1·78	1·90
,, shade	1·16	1·02	1·01	1·06

We learn from this experiment that an object illuminated by direct sunlight is about twice as bright as the same object in the shade; and that the whole range between a matt black object in the shade and a brilliantly illuminated sky is about as 1 : 30. It will also be seen that the exposures given in the camera vary as 1 : 30, and yet the same relation as to light intensities is revealed by the shortest, as by the longest, exposure.

If we now examine Professor Burton's statements in the light of this, to him, evidently new knowledge, we have to point out that, according to his own confession, he cannot alter density ratios between limits of exposures 1 : 10; and he would not, we presume, undertake to seriously alter density ratios between such narrow limits as 1 : 30, since he says that "it is necessary to have ranges of exposures of at least several hundreds to one to be able readily to vary the density ratios."

Now, assuming certain conditions, *actually never present in photographic practice*, it seems, according to Professor Burton, true that it is possible to vary density ratios when the exposures vary between at least several hundred to one. Such variations do not occur in ordinary subjects; the light intensities vary between limits of 30 : 1 at most. Professor Burton's faculty of producing negatives which yield similar prints is not due to his mode of development; it lies wholly in the latitude of the plate and in the narrowness of the range of light intensities in his subject. He could have obtained identically the same result, and possibly a better, by means of *one* developer, and by simply varying the time of development for the shortest exposures.

Two negatives are alike in their printing quality when the density differences are alike throughout, whatever the density ratios may be. Two negatives may have totally different density ratios, and yet be equally true to nature and yield identical prints, whatever printing process may be employed, so long as it is the same in both cases. Thus, so long as the light intensities of a given subject lie within a certain limited range, and the time of exposure is such that the densities produced fall within the straight part of the characteristic curve, so long will the density differences for the same subject be independent of exposure, and alike.

Suppose the length of the straight part of the curve cover a range of exposures 1 : E; and the light intensities to be photographed lie between the limits 1 : I, the latitude of the exposure would then be $1 : \frac{E}{I}$; and within these two limits any exposure would produce negatives which, developed in the same developer for the same length of time, would yield negatives giving identical prints. Take the case of plate A. The straight part of its characteristic curve may be taken as extending from exposure 1 cm. to exposure 80 cm., *i.e.*, 1 : 80. If a subject had to be photographed which was illuminated by diffused light only, and in which the light intensities varied from matt black to white or even more, say a range of 1 : 20, the plate would yield negatives, with exposures varying from 1 : 4, almost identical in printing quality, though they were all developed together. If a little deviation from truth is permissible, and the portion of the characteristic curve lying between exposures 0·312 cm. and 160 cm. (a range of 1 : 512) be considered as sufficiently accurate, the same subject would permit a latitude of exposure of $\frac{5}{2}1^2 = 25$, and there would still be very little differences in the negatives, particularly if development be prolonged in this case of the shorter exposures. For a sunlit landscape the latitude would be $\frac{5}{3}1^2 = 17$.

The experiment we have described was made on a plate, the straight part of which only extended from an exposure of about 1·5 cm. to one of 50 cm. For an ordinary sunlit landscape its latitude of exposure is, therefore, small, namely, $\frac{50}{15 \times 30} = 1{\cdot}1$; and consequently, if a correct negative be required on such a plate, the latitude of exposure would have to lie within ten per cent. of its own value. The negative which was exposed for four seconds is the truest of the three; the one which received one-fifth of this exposure renders the high lights correctly, but not the shadows; and the one which received six times the exposure of the first-named negative renders the gradations as far as white in diffuse light correctly, but not the highest lights. The following table shows the density differences for the various parts of the negatives, which would have to be all alike if the negatives must yield identical prints :—

Exposure ...	0·8″	4″	24″
Density of clearest spot ...	·060	·320	1·025
Density difference—Black in shade and black in sun	·060	·210	·265
,, ,, Black in sun and white in shade	·500	·830	·790
,, ,, White in shade and white in sun	·320	·375	·200
Total range of negative—Black in shade and white in sun	·880	1·415	1·255

It will be seen that the negative which received four seconds, the correct exposure, gives for all parts of the subject, with the exception of the highest lights, practically the same density differences as the one which received twenty-four seconds' exposure. In prints from these two negatives all gradations lying between black in shade and white in shade would be exactly alike, though the exposure was, in the case of one negative, six times as much as in the other. The negative which received one-fifth the correct exposure only renders the high lights with equal truth. If, however, this negative had been developed for a longer time than the other two, its range could have been considerably improved; the ratios remaining the same, the density differences would have altered, and it could easily have been brought to the following :—

Exposure	0·8″	4″	24″
Density of clearest spots	·100	·320	1·025
Density difference—Black in shade and black in sun ...	·100	·210	·265
,, ,, Black in sun and white in shade ...	·830	·830	·790
,, ,, White in shade and white in sun ...	·530	·375	·200
Total range of negative—Black in shade and white in sun	1·460	1·415	1·255

In this case the resulting prints would have differed little from each other, since all the main gradations lying between black in shade and white in shade would have been represented by the differences :—

0·8″	4″	24″
0·930	1·040	1·055

which are so nearly alike that the eye could not detect the difference.

Only in the highest lights, beyond white in shade, would the difference be at all apparent. The three negatives differ, however, very materially in the time they require to yield prints of equal depth in the shadows. The last of the series (twenty-four seconds exposure) requires six times, and the second (correct exposure) nearly twice (⅓ the time which is needed for the first to print to the same depth.)

From these experiments it is clear that latitude in exposure is not inherent in modifications of the developer, but in the plate itself, and in the comparatively narrow range of intensities which are ordinarily met with, combined with the inability of the eye to judge of the more or less truthful rendering of the various gradations.

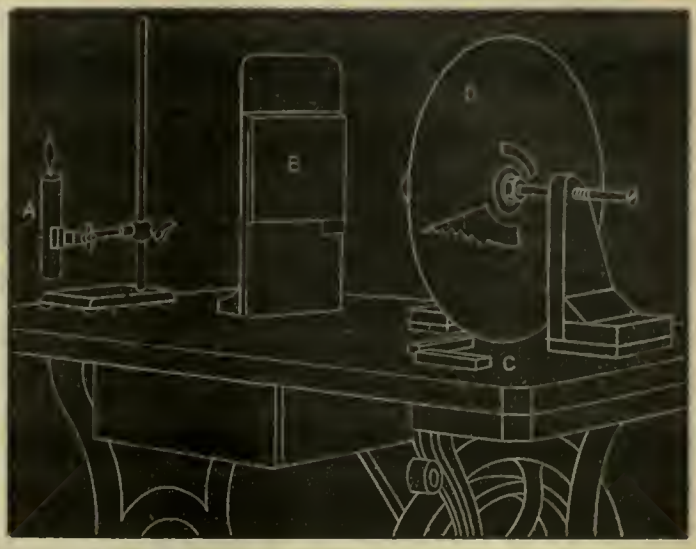
As already pointed out, among the many negatives which may be produced by mere variations in exposure, there is only one which combines truthful rendering of tone with minimum density; and it is this one which the practical photographer aims to secure. For the more accurate and certain production of this particular negative, it is necessary to ascertain the speed of the plate with tolerable accuracy; and we now propose to give a short practical description of the method we have adopted for this purpose. We believe that many amateur photographers would be glad to be in a position to determine speeds for themselves, and to obtain that knowledge of the properties of their plates which can only be derived from a study of the characteristic curve.

The course we pursued in our original investigations was to expose portions of the same plate consecutively to the light of a standard candle, doubling each successive exposure as we proceeded, and we naturally adopted this course when we came to make our first determinations of speed. The errors to which we found the candle liable, however, when we had not the experience in its use which we have since gained, showed that much was to be desired in order to secure a constant ratio of illumination between the different exposures, and, in order to secure this, we adopted the plan of making our exposures which we are about to describe, and which we believe to be the most satisfactory. By this method the whole of the exposures are made simultaneously, so that any fluctuations taking place in the light of the candle proportionally affect all the exposures, and the determination is consequently more decisive and less liable to error than if fluctuations in the light were to take place during one or more of the individual exposures. Moreover, the possibility of error arising from the difficulty of accurately timing very short exposures is wholly eliminated.

We will, in the first place, make a few remarks upon the standard candle as a unit of light. While we candidly admit that the candle is by no means an ideal standard, we must say that we are not at present aware of any satisfactory substitute. We adopted it, in the first instance, because it was ready to our hand, well known and recognised as a standard, and easily obtained. And we may perhaps be forgiven for entertaining a somewhat higher opinion of it than some of our friends, inasmuch as it was, at any rate, reliable enough to lead to the discoveries we have made. It is asserted that the amyl-acetate lamp is a better standard than the candle, but the practical difficulties in its use are such that we can only say it has not proved itself so in our hands. Altogether, we know of nothing, as yet, better as a standard than the candle, and, if the suggestions for its use which we are about to make be adopted, we do not think it will lead to serious errors. Two determinations of the inertia of this same plate which we have just had occasion to make, on two different evenings, differed only by 0·04 cm., a discrepancy of absolutely no practical moment. We have unquestionably found that the standard candles of different makers do vary, and for this reason we think it well to say that the candles we have used throughout our investigations were supplied by Messrs. Sugg & Co., Vincent Works, Westminster. The normal height of the flame of these candles, measured from the lowest point at which the wick blackens, is about forty-five millimetres.

Our method of using the candle for the purpose of speed determination is as follows. We will assume that the candle we are about to use has been used before. We light it, and then, with scissors, snip off the hardened tip of the wick; the flame of the candle will now be found to grow steadily in height, and as soon as the distance from the tip of the flame to the lowest point at which the wick blackens has reached forty-five millimetres the exposure may commence. The candle flame may now be relied upon to remain sufficiently constant for about ten minutes, and this is amply long for our purpose. If after this time, for any other purpose, the light is required, it will be well to again trim the wick, and start *de novo*. The height of the flame may be measured by a strip of cardboard, upon which two marks are made at a distance of forty-five millimetres apart. It is, of course, obvious that these experiments should be made in a room free from draught, and it is often a wise precaution to place the candle in a tall box, open on one side and well blackened inside. We are strongly in favour of keeping the candle well in view during the entire exposure, so that, should any fluctuation in light take place, we may be aware of it. If the candle be used in the open room, all white or bright surfaces capable of reflecting light should be removed.

If a plate be examined by placing it between the eye and the red lamp,



it will be found that the opacity of the film falls off at the edges. The edges should, therefore, be scrupulously avoided, and the strip should be cut from the centre of the plate, or, at any rate, well away from the margin. The operation of cutting the plate should be conducted as quickly as possible, and as far away as possible from the red light, so as to avoid all fogging action of the light upon the plate. The width of the strip may conveniently be made about one inch. When the plate is securely placed in the dark slide, the latter is placed in its position behind the disc. The distance from the candle to the place occupied by the plate is carefully adjusted, and the candle is lighted and trimmed. When the flame has reached the requisite height, the exposure may commence.

The disc is caused to revolve, and, at a given moment, the slide protecting the plate is drawn, and the exposure continued for the requisite length of time.

Now, as to the best range of exposures to decide upon in the case of a plate of the speed of which we know nothing, we should advise a series commencing with 80 cm. down to 0·312 cm. This range will be found to include as much of the characteristic curve of the majority of commercial plates as is required for a speed determination. A little consideration of the revolving disc, however, will show that, in order to give

an actual maximum exposure of 80 cm., it will be necessary to continue the exposure for twice 80, or 160 seconds, the candle being placed at a distance of one metre from the plate. The reason of this is that the actual maximum exposure only proceeds during half the revolution of the disc, the light only reaching the plate during the passage across it of 180° out of the 360°. Though we prefer to work with the candle at a distance of one metre from the plate, it may be brought nearer to it if it be desired to curtail the exposure. At a distance of 0·707 metre, the light of the candle is equal to 2 cm., and at a distance of half a metre it is equal to 4 cm.

Having exposed the strip, we next proceed to develop it; and here we must say a word or two upon the subject of the developer. We do this knowing perfectly well that we shall meet with considerable opposition; but we, nevertheless, again assert that, for all ordinary photographic work, there is no developer superior to ferrous oxalate. We prefer it because of the uniformity of the colour of the silver deposited by it, a point of very great importance when we come to the operations of printing and enlarging by developing processes, in which the exposure is arrived at by calculation: we prefer it because we never yet found a plate with which it disagreed, and this is more than can be said of other developers. It will also develop an old plate which may have been carelessly laid by for years; while, with another developer, it would be hopeless to obtain a passable result. We prefer ferrous oxalate because, of all developers, it is least liable to attack silver salts, which have not been acted upon by the light, and because it will not lend itself to the production of foggy messes. We do not wish for a moment to imply that other developers may not have their special uses; on the contrary, for example, we have found rodinal of the greatest value in the case of certain plates, when dealing with extremely short-shutter exposures, and also in flash light work.

However, to proceed with the operation of development. It is advisable that this operation be conducted at a fixed temperature, and we find 65° Fahr. the best to adopt, as it is easily obtainable both in summer and winter. The developer itself should be brought to this temperature, and maintained at it by placing the developing dish in a water bath of the same temperature. The constituents of the developer are intimately mixed by stirring, and, at the moment of pouring on to the plate, the time is noted. The dish should only be rocked for a few moments, in order to expel any air bubbles from the surface of the plate, and should then be covered up, so as to expose the plate no more to the red light than is absolutely necessary. Examination of the plate during development should be avoided as far as possible, as no red light whatever is safe in the case of even a fairly sensitive plate; and we believe that too frequent examination, prompted by curiosity or impatience, is to some extent responsible for alleged alterations in density ratios. About five or six minutes will, as a rule, be found the best length of time to continue development, in order to obtain that range of gradation most suitable for subsequent measurement. But, however long development may be continued, the time occupied should be carefully noted. The object of the fixed temperature, and the exact time a given plate takes to reach a certain development factor, is of the utmost importance, if we afterwards desire, upon a similar plate, to produce another negative having a different range of density gradations.

After development, the strip is fixed and washed in the ordinary way, and, after washing, it is well to wipe the surface of the film gently with a plug of wetted cotton-wool. The plate may be treated with alum if desirable, and both the alum and fixing baths should be fresh and perfectly clean. As the films of some plates are liable to loosen from the glass when submitted to the heat of the lamp in the photometer, it is sometimes well to soak the plates for a few moments in a weak solution of glycerine after washing and before drying. When the plate is dry—and this may be hastened by means of alcohol if desired—the back of it should be thoroughly cleansed, and the film wiped with a silk handkerchief. It will now be found advantageous to define the dividing lines of the smaller densities with a pen and ink on the film. This will materially assist when we come to measure the plate, which operation may now be carried out. We do not here propose to enter into any description of our photometer and the method of using it; this will be found in our original paper in the *Journal of the Society of Chemical Industry*.

The nine different densities and the "fog strip" having been measured, and having deducted from each exposure density the density of the incipient fog of the plate and that due to the glass and film as given by the "fog strip," we proceed to plot the characteristic curve on one of the skeleton diagrams supplied for the purpose by Messrs. Marion & Co. Assuming that our actual maximum exposure was 80 cm., we mark on the ordinate corresponding with this exposure this density, minus fog, due to the 80 cm. exposures; and so on till we reach the ordinate corresponding with exposure 0·312 cm. Having thus plotted all the nine densities, we take a piece of black thread and stretch it along that part of the curve which practically forms a straight line, and which indicates the position and extent of the correct period. This enables us to decide upon the position of the straight line before we actually draw it on the diagram. We now draw the line, and continue it till it intersects the inertia scale at the bottom of the diagram. The point at which the intersection takes place gives the inertia of the plate, which is then converted into the speed by dividing it into the constant 34. For example, inertia 1 = speed 34. We may now join up to either end of the correct-period curves passing through the remaining points of the determination. The curve at the upper end will represent a portion of the period of over-exposure, and that at the lower end of the period of under-exposure, the whole representing the most important features of the characteristic curve. The details just described will be better understood by a reference to diagram No. 1.

We should here like to express the importance we attach to obtaining, in every speed determination, distinct evidence of all three periods. It is only by so doing that we can be quite certain as to the position of the correct period. It would be quite possible for the higher densities in a series of under-exposure gradations to be mistaken for a portion of the correct period in the case of a high development factor—in fact, we have known this mistake to be made when, had there been evidence of the three periods, mistake would have been rendered impossible.

We generally have some idea whether the plate we are about to examine is a rapid or a slow one, and after a little experience it is easy to decide upon that range of exposures which will most probably yield evidence of the three periods; but should we, in the case of a plate, of the speed of which we have no idea whatever, find that the exposures we have chosen yield a series of densities which leave room for doubt as to the position of the correct period, it will be necessary to make another determination, a more suitable range of exposures being chosen. The first determination will indicate whether a longer or a shorter exposure be desirable.

We must here call attention to a difficulty which may possibly arise; but its occurrence is fortunately so rare as to speak well for the perfection of the machinery used for coating the plates. If, on plotting the densities, they are found to lie irregularly, so as to preclude the possibility of drawing through them a regular curve, there is serious reason to suspect an unevenly coated plate. In such a case as this, the best thing to do is to cut another strip from the plate from which the first was taken, and running in the same direction of the plate as the first strip. The second strip should now be uniformly exposed to the candle and developed the exposure and development being so timed as to produce an easily measurable density of, say, 1·0. If the plate have been unevenly coated, the density of the second strip, when measured in different places, will be found to vary. As an example, we have been able to lay our hands upon the record of a case which occurred in our own experience. The irregular series of densities obtained in the first instance led us to make a second exposure as described, when we found that the density measured in different parts of the strip varied from 1·335 to 0·820. When we remember that this means that one part of the strip transmitted more than three times as much light as another, the serious nature of such a fault as inequality in the thickness of the film will be apparent.

Reference has been made several times to the development factor. It is beyond the scope of this paper, however, to enter fully into this subject; but, as the numerical value of this factor is one of the data to be derived from every speed determination, we will state how it is graphically ascertained. From the point 100 on the inertia scale of the skeleton diagram, a line, parallel to the straight portion of the characteristic curve, is projected till it intersects the development factor scale. The point of intersection gives the factor which expresses the extent to which the development of this particular plate was carried. It is best for the purpose of speed determination to aim at reaching a development factor of 1·0, or a little more. It will be seen, on referring to diagram No. 1, that the development factors of the two plates A and B are 1·18 and 1·52 respectively.

We believe we have now explained the method of making a speed determination in sufficient detail to enable an amateur to carry out the operation. We trust, however, that any amateurs who take the matter up will not content themselves with plotting the characteristic curve of a plate for the sole purpose of ascertaining its speed, but will take an interest in tracing, in the conformation of the curve, the results which they obtain in their photographic practice. It is a knowledge of this curve alone which can give the photographer complete control of the materials

he employs. On some other occasion we hope to show more fully than heretofore the part which the characteristic curve plays in the calculation of the exposure for transparencies and printing processes generally, as also in the production of negatives and positives having a special range of gradation.

ON THE POWER OF COMPENSATING IN DEVELOPMENT FOR VARIATION IN EXPOSURE.

By W. K. Burton.

The experiments I am about to describe were certainly suggested by opinions expressed by, or at any rate commonly attributed to, Dr. F. Hurter and Mr. V. C. Driffield some three years or so ago, but I wish to make it amply plain that I do not intend this paper to be taken as a refutation of any opinion that they hold—at the present time at any rate. In the first place, I admire so much the method of investigation that these gentlemen have pursued, that I should be very sorry to write anything that might tend to lower the estimation in which these investigations are held, even if, as may be the case, the conclusions arrived at are not exactly in accordance with fact; and in the second place, because, if there is any refutation to be done, there are plenty of people on the spot much more able to undertake it than I am.

As far as I have followed them, Messrs. Hurter & Driffield at first stated that it was impossible, by development, to alter either the density or the opacity ratios in a negative. In other words, that were the thing represented graphically, with light as abscissæ, and one of them having density and the other having opacity as ordinates, then, the abscissæ remaining constant, the ordinates might be altered by variation in the developer, but that their ratio to each other could not be altered. It is, however, as a matter of fact, very easy to so alter the ratio by variation in development that two curves, representing either density or opacity, would intersect each other, in which case the ordinates would, of course, not be proportionate. I understand, however, that Messrs. Hurter & Driffield have considerably modified their views since their first statement was made, and it may be that I do not here represent fairly even the first position that they took up.

Be all this as it may, it is undoubtedly the fact that, some year or two ago, it was the general impression that it had gone out on high authority—with a sound of trumpets almost—that it was impossible to compensate for variation in exposure at the time of development, and that with the same exposure it was impossible to control in any way the result, except in so far as density was concerned.

Now, I hope to be able to demonstrate that we have power, by variation in development, to compensate for enormous differences in exposure, and that with the same exposure we have *enormous* control over the results.

The experiments that are to be described were begun some two years or so before the time that this paper is likely to be read, but were interrupted by work of one kind and another that seemed more important, the truth being that I felt no great enthusiasm to prove a thing that was a matter of every-day experience.

It was like proving, by the aid of a shokojimeter, that if you got no dinner you were likely to be hungry, if you had enough to eat your appetite would be appeased.

When I got thoroughly into the experiments, however, I found them of the greatest interest, because I began to find that our power of compensation is even greater than I had ever supposed, and I found it possible to work out at least an approximate rule for the variation in development that had to be made for a given variation in exposure.

I wish to state my very strong opinion that experiments on gradations of density (or of opacity) are not of any real value, as throwing light on the probable result of exposure in the camera, unless they include such a range of gradation as is commonly met with in actual camera work. I find this range to be generally, at least in ordinary cases, as several hundreds to one, often as a thousand to one, and sometimes as several thousands to one. What I mean is, that the plate has received at the time of exposure several hundred, or a thousand, or several thousand, times as much light at one point as it has at another.

In this connexion it is to be noted that the range of light reflected by the object photographed is always greater than the range of light that reaches the plate; that it is often much greater. Thus it is practically possible to have the nearest possible approach to absolute black in the object photographed, otherwise an approach to zero of light, in which case the range approaches infinity. In the case of the light actually reaching the plate this cannot be the case, on account of the unavoidable diffused light in the camera.

For the preliminary experiments a sensitometer on the principle of that of Messrs. Mucklow & Spurge was made. The areas of the apertures varied in the ratio of 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, and 2048. The holes were bored by a watchmaker, the largest being one inch in diameter, and, as far as I can make out, the diameters are very nearly what they ought to be. The instrument is a convenient one, using quarter-plates, and many experiments were made with it. It was, however, considered that these could not be taken as conclusive, because plates could be exposed only in succession, and no standard light was available. Moreover, it was found that a gradation varying from 1 to 2048 was not sufficient for a thorough investigation of the subject.

It was, therefore, decided to construct a sensitometer in which plates could be directly exposed to light, each half having the same exposure. The plates were then to be cut in two, and the two halves were to be developed in any two developers, the effects of which it was desirable to compare.

This sensitometer is shown in the two photographs, I. and II. It is of very simple construction. Photograph II. shows a back view of the sensitometer. It has a door A, which is shown open. Through this door a plate $12 \times 2\frac{1}{2}$ (one quarter of a 12×10 plate), B can be introduced. The plate is held in a brass frame or carrier, D, that can be raised or lowered by the bar E, having a toothed or serrated edge. This bar is pressed by a spring in the direction of these teeth so that it will remain at any of fourteen different heights, holding, of course, the plate with it. The spring, F, presses the film side of the plate very nearly into contact with the front of the sensitometer. In fig. 1 will be seen a slit, G, two inches in length and a quarter inch wide. This slit is covered by the flap, H, unless the same is held open by hand, as seen in the photograph. The apparatus is designed to give exposures to different transverse strips of the plate of the size of the slit, G, in the ratios of 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, and 8192. Many of the results of experiments will show that this range is not at all too long for investigating the effects of different developers on the two halves of the same plate, though the range is far greater than can be registered correctly. With any plate so exposed and developed, the strip having the shortest exposure is visible.

It was found by experiment that the shortest exposure that could be given with the flap varied very little, and was nearly exactly one-quarter second. A half-second could be guessed with some approach to correctness, one second with more, and two seconds could be measured roughly with a stop watch, four seconds with but a small percentage of error—all this after some practice, of course. It was, therefore, decided to make the exposures begin with a quarter-second, and work up doubling. It needs, however, only a very little arithmetic to discover that, even beginning at this short length of time, the last exposure must be considerably over half an hour, and to make hundreds of exposures of plates, in which the last item alone came to more than half an hour, was not to be thought of. For this reason the first exposures were all made a quarter-second each, but the distance of the plate at the time of the first exposure, 10 feet, was made 7 feet for the second, 5 feet for the third, 3 feet 6 inches for the fourth, 2 feet 6 inches for the fifth, and 1 foot 9 inches for the sixth and all others. These distances vary very nearly as 1, $\sqrt{\frac{1}{2}}$, $\sqrt{\frac{1}{4}}$, $\sqrt{\frac{1}{8}}$, $\sqrt{\frac{1}{16}}$, and $\sqrt{\frac{1}{32}}$. That is to say, the quantity of light was doubled at each approach of the sensitometer to the source of illumination, all the exposures at 1 foot 9 inches from the light needed only $\frac{1}{32}$ of the time they would have needed at 10 feet, and the longest exposure was reduced to 64 seconds.

It is not pretended that the successions were really actually those mentioned above, and it is of no consequence that they should be. Whatever irregularity there might be was bound to effect one half of the plate exactly as the other; and, as the after-process consisted in cutting the plate in half longitudinally, and developing the two halves in different developers, the only thing essential is that the two halves of the plate should have exactly the same exposures.

Nevertheless, I venture to state that the exposures of all those strips that were exposed at different distances gave very nearly the ratios mentioned, as the rapidest possible opening of the flap was found to remain very uniform, and a dead black screen was placed behind the light to prevent reflection, which would considerably modify the law of the quantity of light varying inversely as the square of the distance, at any rate considering our light as the centre of illumination. The exposures $\frac{1}{4}$ and 1 second are, of course, the most uncertain. From two seconds on, it may be considered that the acceleration is that stated within very narrow limits of error. In no case did the light vary more than about ten per cent. during the making of one set of exposures. The result of one set of exposures might thus be roughly compared with each

other, even comparing different slips, but the necessity for this has been avoided by always developing together, in a developer that will be stated, one half of each slip, so that any difference in exposure can be detected.

I have signed my name across each slip, before it was cut in two, that there should be no mixing up, and lest any should doubt the genuineness of the results. These plates would form a confirmation, were any needed, of the recent statement by an expert in handwriting, that no one can sign his name exactly the same twice, and that, if two supposititious signatures that exactly superpose each other are discovered, it may be concluded that one is a forgery.

To return to the plates, however, as the vendors of various sauces and other goods remark, "Without this signature none is genuine."

As a light an oil lamp was used. I have found a common oil lamp, with burner in good condition, well trimmed, with a fairly large reservoir, and with a good quality of mineral oil, to be much more constant for several hours than any candle that I have been able to find, if it is first allowed to burn till all parts that heat have become hot. Of course it is not so good for making comparisons on different days, because the light of a lamp is very liable to vary from day to day. I wish, however, here to remind you again that the results of my experiments are in no way dependent on either the intensity or the uniformity of the light.

It was found that, using a well-known brand of commercial plate, sold as "ordinary," a small lamp of five to six candle power was just capable of giving a developable image with an exposure of one quarter of a second at a distance of ten feet.

I have certainly at times worked exceptionally rapid plates that needed only one-fifth to a sixth of the exposures of these. We may, therefore, deduce the fact—by no means bearing on these experiments, but of some interest—that the most sensitive plates made will be visibly affected by an exposure of a mere fraction of a second at ten feet from a candle.

The greater number of the exposures were made with such a lamp as this; but, in some cases, where it was considered advisable that the first figure in the sensitometer, in the sense of the first exposed, should develop out quite markedly, the exposure was made to a lamp with a burner giving a nearly spherical flame (called, I think, a "rose burner") having a power of some twenty to twenty-five candles.

Where numbers of strips exposed are stated, it is to be understood that No. 1 is the strip that was first exposed, and that had the shortest exposure. The "first four strips," or Nos. 1, 2, 3, and 4 means, for example, these strips that received each quarter-second exposure at distances of ten feet, seven feet, five feet, and three feet six inches from the lamp.

I wish to state here that nearly all development was done by my assistant, Mr. K. Arito, from written instructions given to him by me, without comment. I had distinct reasons for this. In the first place Mr. Arito is a very careful operator, much more careful than I am—though that may not be saying much. In the second place, although, of course, he knew the general drift of the experiments, he knew nothing of what had given rise to them, or of the exact lines that I was working on. He was, therefore, much less liable to be carried into the inaccuracies that I distinctly state most of us are liable to be carried into unconsciously, or nearly so, when we wish experimentally to prove a particular fact. Still farther, it enabled me to make sure that the experiments could be repeated by any intelligent operator from briefly written descriptions.

Wherever "normal pyro and soda" developer is referred to, it is to be taken as referring to the developer that the writer has most commonly used for several years past, that is to say, one compounded as follows:—

To each ounce of developer—

Pyro (either dry or freshly mixed, without preservative)	2 grains.
Sodium carbonate (crystalline)	12 ,,
Sulphite of soda	12 ,,

This generally works without fogging, but sometimes, not always. When a new batch of plates is bought, a sample is tried, and the quantity of bromide needed to prevent any hurtful amount of fog is determined This never exceeds half a grain to the ounce of bromide of potassium with any plate that would generally be pronounced workable. In all these experiments a quarter of a grain of bromide of potassium was used to each ounce of "standard pyro and soda developer."

I do not wish to reopen the old discussion as to ammonia against other alkalies for development with pyro, but shall merely say that I have, for some time, considered that it was possible to get more out of a short exposure with soda, considering not detail only, but the whole of the negative, than with ammonia, and that the present experiments confirm this; that, moreover, I thought till recently that there was greater latitude of exposure with soda than with ammonia, but that these experiments have made me change my mind in this respect, as I have been able to get greater latitude with ammonia than with any other alkali that I have tried.

Here it may be mentioned that a set of experiments incidental to the main experiments was made to discover the relative quantities of bromide of potassium and of bromide of ammonium that were necessary to have the same retarding effect. It was found that, for unit quantity of bromide of ammonium, it was necessary to use that quantity multiplied by between 1¾ and 2 of bromide of potassium. Probably, the exact multiplier lies very nearly half way between these two—perhaps 1·875. It is near enough for all practical purposes to state that it takes nearly twice as much bromide of potassium to do the same restraining work as any given quantity of bromide of ammonium. It will be seen that the difference is much greater than the different weights of actual bromide contained in the same weights of bromide of ammonium and bromide of potassium.

After a somewhat random set of experiments, conducted to decide on the best lines to work on, more systematic experiments were undertaken. I here give the results of the most interesting of these, not by any means necessarily in the order in which they were carried out.

In all cases the temperature of the developer was kept at as nearly 65° Fahr.

A.

The instructions were:—

"All plates to be developed with a developer containing two grains pyro, twelve grains carbonate of soda, and twelve grains sulphite of soda."

"One-half of each plate, to be marked 'A,' to be developed without bromide, till the last figure is distinctly visible, till there is fair density, but development to be stopped before there is distinct fog."

"No. 1. Develop the B half with a developer containing one-half grain of bromide of ammonium per ounce, but stop when strip 2 only is of the same density as strip 1 in the A half."

"No. 3. One grain of bromide of ammonium to the ounce, stop development when No. 4 only is of the same density as No. 1 in the B half."

"No. 6. Eight grains of bromide of ammonium to the ounce, stop development when No. 7 only is of the same density as No. 1 in the A half."

There were intermediate numbers, and also numbers up to and including No. 8. I select, however, and send you the results of these three only, as being typical.

These were exposed to the large lamp, and the results must be taken as illustrating those of over-exposure. In the case of all other results sent, exposures were to the small lamp.

It will be seen that, in the case of No. 1, the density of the first few strips is, to all intents and purposes, the same in A and B, but that the density rises, after a little, more rapidly in B than in A. Farther than this, the opacity reaches a maximum at about the ninth or tenth strip in the case of the half A, whereas it keeps increasing till nearly the end of strip B. At the end the opacity of B is much greater than that of A at any part.

It will be seen that the compensation for over-exposure here has been considerable, and that the curves, both of density and of opacity, cross each other, so that the density ratios are changed.

In No. 3 the same thing is to be remarked, and, besides that, the first strip or two of B are less opaque than the corresponding strips of A. Here there is greater compensation for over-exposure, and the curves of both density and of opacity cross each other, so that the density ratios are changed.

In No. 6 the same thing is to be noticed, with the complete suppression of the first four, and nearly the complete suppression of the next two strips of the B side. It must, however, be explained here that intensification was resorted to. The reason for this was that, with the large quantity of bromide here mentioned, corresponding, say, to fifteen grains of bromide of potassium to the ounce, the image was white by transmitted light. I mean the deposit. It had no printing value at all, and I had not time to discover even if it was of silver. At any rate, it blackened, or rather browned, under intensification. It will be seen here that, at any rate, the curves of opacity cross, and that the opacity ratios are very much changed. This is, however, by the use of an intensifier. The next plate, with double the quantity of bromide in the developer, showed the same peculiarities even more strongly than the last, and it was found impossible even to "brown" the image.

A great number of experiments here intervened, having for their object the investigation of the effects of varying the quantity of pyro as well as that of the restraining bromide, and also to discover to what extent compensation for variation in development can be carried by combined variation in the developer with the after-application in the intensifiers. The results of all these experiments being summed up in those got with ammonia as an alkali (the experiments just referred to were all carried on with carbonate of soda), I therefore prefer to leave them out, as the recounting of them would be tedious, the more especially as I found the results, in the matter of compensation for variation in exposure, much better in the case of ammonia than with soda, in great measure on account of the whiteness of the deposit with soda, when much bromide was used, that has been already mentioned.

A set of experiments was now made to compare what I have called the "normal pyro and soda developer," in its results, with those of pyro and various proportions of bromide and ammonia. As I have said, I came to the conclusion that, vary the ammonia developer as I would, I could not get out as much with it as with soda without fog, and it is to be observed that the advent of fog is the limiting line of the action of any developer. The developer that is the most powerful reducer is not by any means of necessity the most efficient developer. It is that developer that can differentiate the most between bromide of silver that has, and that has not, been affected by light that is the most efficient.

B.

This series of experiments is intended to show the power of varying the effects of a uniform exposure, in a manner that would correspond to compensating for variations in exposure, with the ammonia developer, varying the quantities of each of the three constituents, and intensifying in certain cases. I think these experiments are conclusive as to the enormous control that we have over our results by variation in development.

The instructions were:—

"Develop all halves A with a developer containing half a grain of pyro, half a grain of bromide of ammonium, and two and a half minims of ammonia to each ounce. Develop either till slight fog shows itself or till all action has, for some time, ceased."

"Develop all halves B with a developer containing four grains of pyro, four grains of bromide of ammonium, and four minims of ammonia to each ounce."

(It is to be observed that these quantities had been determined on from the results of previous experiments.)

"No. 168B, restrain one figure (*i.e.*, stop development when the density of No. 2B is the same as that of No. 1A)."

"No. 169B, restrain two figures (*i.e.*, stop development when the density of *No. 3B* is the same as No. 1A)."

"Nos. 170, 171, and 172B, restrain three figures."

"Nos. 173, 174, and 175B, restrain four figures."

"Nos. 176, 177, and 178B, restrain five figures."

"Nos. 179, 180, and 181B, restrain six figures."

"Nos. 182, 183, and 184B, restrain seven figures."

"Intensify Nos. 171, 174, 177, 180, and 183 with bichloride of mercury followed with ammonia."

"Intensify Nos. 172, 175, 178, 181, and 184 with bichloride of mercury, followed by sulphite of soda."

Prints from the whole of this series are sent. It should be remarked that, in making all prints from these long sensitometer-exposed plates, the effect of fog is, so far as possible, eliminated where it is present, by shading the unfogged half of the plate during development, so that the most transparent part of each half is, as nearly as possible, represented by the same tint.

It will be seen that, except in the case of No. 182, the curves of opacity more or less distinctly cross. The meaning of this, in the particular case referred to, is that, whereas the first strips of the A halves show greater opacity (and consequently print lighter) than the corresponding strips of the B halves, the last strips of the A halves show less opacity (and consequently print darker) than the corresponding strips of the B halves. In many cases the first strips of the B halves are not visible at all, whilst they are even printable in the A halves; nevertheless, the opacity of the last strips of the A halves is greater than that of the B halves.

It will be evident that, even in the case of No. 182, the curves of opacity would cross were the gradation of light longer. On account, however, of the fact that seven strips have been restrained in the case of B, the gradation of light capable of giving a developable result is only 1 to 128 in B, as compared with 1 to 8192 in the case of A.

Certain irregularities will be readily noticeable in these results. They arise from the difficulty in following exactly such instructions as "restrain 4, 5, or 6 strips." On this account the whole system of compensation in development, for variation of exposure, and of varying the results with constant exposure, may be condemned by some. I shall only remind those who incline to do so that it is always a difficult matter in photography for even the most skilled to get the exact result they wish.

I considered that the last set of experiments described indicated powers to compensate, in development, for exposures varying as one to considerably more than 100 without resort to intensification, as one to several hundreds having resort to intensification, hence experiments to be described presently.

C.

These experiments were undertaken as introductory to a set of experiments with the ferrous-oxalate developer. The instructions were as follows:—

"Prepare a saturated solution of oxalate of potash, and another of ferrous sulphate (each at a temperature of 65° Fahr.), and make each acid enough, with sulphuric acid, to turn litmus paper quickly red."

"Develop all A halves with normal pyro and soda developer."

"Plate No. 17B, develop with one part iron solution to three parts oxalate solution."

"Plate No. 18, one part iron solution to four of oxalate."

"Plate No. 19, one part iron solution to six parts oxalate."

"Plate No. 20, one part iron solution to ten parts oxalate."

"All plates, both A and B, to be developed either till slight fog appears, or till all action seems to have ceased for some time."

One result of these experiments is to show the very slight difference in the action of this developer, by variation in the ingredients, except in so far as time of development is concerned. As the developer becomes more diluted, the opacity throughout is slightly increased; but this is really because the fog point came comparatively earlier with the concentrated than with the dilute developers, and in each case development with oxalate had to be stopped because the fog point was reached.

Another thing it shows most strikingly is the inferiority of ferrous oxalate, at any rate without the addition of bromide, in the rendering of gradation. A print from plate No. 18 is sent to illustrate this. It will be seen that, in the half B, the greatest opacity is reached at about the eighth strip, after which reversal takes place, whereas in the case of the half A (pyro-developed) opacity increases nearly to the end of the line. Here both the opacity and the density curves cross, and the density ratios are not the same.

D.

"Develop all halves A with 'normal pyro and soda developer.'"

"All oxalate developers to be made up of one part of the iron solution already mentioned to four parts of oxalate of potash solution."

"No. 87B to be developed with the above normal ferrous oxalate solution, without bromide, till slight fog appears, or till all action appears to have ceased for some time."

"No. 88B to be developed with ferrous-oxalate developer having one grain of bromide of potassium per ounce."

"No. 89B to be developed with ferrous-oxalate developer having two grains of bromide of potassium per ounce."

"No. 90B to be developed with ferrous-oxalate developer having four grains of bromide of potassium per ounce."

"No. 91B to be developed with ferrous-oxalate developer having eight grains of bromide of potassium per ounce."

"No. 88B to have one strip restrained."

"No. 89B to have two strips restrained."

"No. 90B to have three strips restrained."

"No. 91B to have four strips restrained."

Prints are sent of the results of all these exposures. It will be seen that, by stopping development before it is complete, in cases where bromide has been added, we have the power of compensation for variation in developing, or of varying the results of constant development, as in the case of the pyrogallol developer, though I am not prepared to say that the curves of either opacity or density actually cross in the cases under consideration.

E.

So far all experiments described have had for their object the alteration of the results with fixed exposure. The next experiments were intended to investigate to what extent it was possible to get identical results with varying exposures. It was decided to rely on exposures in the camera for this, although some preliminary experiments were made with the sensitometer, using the long plates of glass.

It was soon found possible to produce, with exposures varying as much as ten to one, or even twenty to one, negatives so nearly identical that they were both pronounced, by experienced photographers, good negatives, neither over nor under-exposed, and that, moreover, were of such a nature that these photographers would not undertake to state which of the two negatives had had the longer exposure.

This was not enough, however. The experiments already described indicated the possibility of compensating for a variation of at least one to 100, and an attempt was made to systematically investigate the variation in the developer that was necessary to compensate for a given variation in exposure.

In the first place exposures were made on a well-lighted landscape varying in the ratios of 1, 2, 4, 8, 16, 32, 64, and 128, and attempts were made to discover the variation in the constituents of the developer that would give similar results with all these exposures.

For various reasons it was decided to keep the quantity of alkali—for reasons already stated ammonia was preferred—constant, whilst the quantities of pyro and of bromide were varied.

The first thing to do was to find the best relative quantities of pyro ammonia, and bromide for the production of a normal negative by a normal exposure. A normal negative I can only define as the kind of negative that an experienced photographer wishes to get. This, I consider, must remain a matter of opinion or even of taste. A negative with opacities directly proportional to the light reflected by the different parts of the subject would be a perfect negative (apart from the rendering of colour values) if all printing processes were such that different parts of prints made by them reflected quantities of light proportionate to the opacity of the negative. This is not, so far as I know, the case for any printing process through any great range, and is far from being so in the case of many of them.

There is a still farther objection to the above definition of a perfect negative, namely, that no plate that is made has the power of producing such a negative with ranges of light nearly as great as are common in landscape work. We must of necessity make up our minds to sacrifice something either of the shadows or of the high lights, and it is purely a matter of taste which we prefer to sacrifice. A close examination of the photographic pictures recently sent from the Camera Club to Japan, for exhibition in the latter place, and representative of the most artistic work done in the Occident, seems to show me that workers of the most advanced school tend to turn out work that would have been spoken of as "under-exposed" some few years ago. That is to say, they see fit to abandon that so-called "golden rule"—in any way supremely idiotic—"take care of the shadows and let the high lights take care of themselves,' and often, at least, prefer to sacrifice something in the shadows for the sake of the high lights.

Normal exposure I shall define as the shortest exposure that will give the negative that the photographer wants to get. Normal developer might perhaps be defined as the best developer for producing this normal negative with normal exposure, but it looks rather like giving definitions in a circle.

Let me state here, parenthetically, that the prints you are to see just now are not by any means from negatives of the kind that I like to get. The negatives are altogether too hard. This was because I assumed that the developer that was "normal" for certain quarter-plates that I had been using would also be normal for 12 × 10 plates of the same brand, but a different number. This was not so, however. Of course I ought to have repeated the experiments, but I had already exposed over a gross of 12 × 10 plates, besides innumerable quarter-plates, and the time was getting short for putting my material in form, so I let the negatives slide as illustrating my point quite well enough.

To return, however, to the plates exposed in the ratios mentioned above, the ammonia was kept constant, and various multipliers of bromide and ammonia were tried for each doubling of the exposure.

My first impression was that the bromide ought to be increased in a rapider ratio than the pyro, but this seemed to be a mistake. It appeared that better results—that is to say more uniform—were to be got by increasing the pyro and the bromide in the same ratios.

At first I tried using half as much again more pyro and bromide for each doubling of the exposure, that is to say, multiplying the quantity of pyro and of bromide each by $\frac{3}{2}$ for each doubling of the exposure. It was found that with this increase of the quantities of chemicals mentioned the contrast increased greatly with the increased exposures, and the negatives from those that had had the longest exposures appeared actually under-exposed as compared with those that had had the shorter exposures.

Next was tried using one-third as much again more pyro and bromide for each doubling of the exposure, that is to say, multiplying by $\frac{4}{3}$. The result was the same as in the last case, but to a less marked degree. This entirely knocked on the head a theory I had formed that the proper multiplier was probably $\sqrt{2}$.

Next was tried using one-fourth again more pyro and bromide for each doubling of the exposure, that is to say, multiplying $\frac{5}{4}$. It was found that this multiplier was somewhat too small. That is to say, the negatives that had had the longest exposures were thinner than those that had had the shorter. The falling off in density was not, however, perceptible through the first five negatives.

It is evident that the proper multipliers, if a constant multiplier is what is correct, and it is evident that such is very nearly being the case, must lie somewhere between $\frac{4}{3}$ and $\frac{5}{4}$, or $1\frac{1}{3}$ and $1\frac{1}{4}$; between, that is, 1·2 and 1·25. Let us say it is 1·3, the thing might be put in the form of an equation, as follows:—

Let C = quantity of pyro (or of bromide) used for right exposure.

Then, if exposure = 1 ..... Pyro = C
" " = 2 ..... " = C × 1·23
" " = 4 ..... " = C × $(1{\cdot}23)^2$
" " = 8 ..... " = C × $(1{\cdot}23)^3$
" " = 16 ..... " = C × $(1{\cdot}23)^4$
" " = 32 ..... " = C × $(1{\cdot}23)^5$
" " = E ..... " = C × $(1{\cdot}23)^n$

∴ When 2^n = E

Therefore, $n = \frac{\log. E}{\log. 2}$

∴ Pyro = $C\,(1{\cdot}23)^{\frac{\log. E}{\log. 2}}$

Then, since $(1{\cdot}23)^{\frac{1}{\log. 2}} = 2$

Finally, pyro = C × $(2)^{\log. E}$

From which equation a curve, or a table, might be made for practical use.

This law is, at least, approximately true for several brands of plates, for sundry initial variations of developers, at least, within limits of the normal exposure, and this multiplied by 100 or so.

Your attention is now asked for a set of prints from negatives that have had exposures varying as 1, 2, 4, 8, 16, 32, 64, and 128, the same brand of plate being used, and the exposures being made about mid-day—as a matter of fact, from a little before till a little after, as quickly one after another as was possible, the weather brilliantly clear.

I should like to know if any one, seeing these prints, will undertake to place them in the order of their exposures. I cannot myself. I cannot, in their present form, even tell which is the first and which the last. They are, however, cut from 12 × 10 prints, and it was pointed out to me by a very "cute" friend—he is from the United States of America—that it was possible, in the original condition of the prints, to tell the two that had had the longest exposures, on account of the effect of the motion of the overhanging branches of a tree that gave a little beauty to the otherwise very uninteresting little bit of landscape—uninteresting, unless it may interest some old friend to know that the vehicle in the foreground (put there to get a bit of really dark shadow, to help the judgment in development) is that in which his humble servant is ignominiously trundled about the streets of Tokyo by a blue-coated, bare-legged coolie!

I cannot tell the first six negatives one from the other by inspection, but the last two I can tell from the others, and from each other, on account, not only of the yellowness of the image, but on account also of a yellow deposit (I do not know what else to call it) in the shadows, or rather, all over the plate, including those parts of the plate protected by the rebate of the printing frames. This discolouration is one of the only two reasons that I know of why compensation for variation in exposure should not be indefinite. It makes the time taken for printing very long. I have, in experiments with quarter-plates, got results without this stain and objectionable colour of image, with exposures varying more than those mentioned, and thought, at one time, that I had got to the bottom of the matter. I find, however, that I have not. Its appearance is uncertain. Perhaps it is due to impurity in some one or more of my chemicals acting for a long time. I somewhat suspect the sulphite I am using.

Another reason why compensation must be limited in practice is the outrageous length of time that development takes when the exposure is much above normal, and is compensated for by variation in the developer. The plate of the eight, from which the prints that are shown were made, that took the longest exposure, took two hours to develop.

It may be urged that the prints are not identical; it is quite true that they are not. I only point out that there is no uniform variation, and remind you how very difficult it is to make even two really identical

negatives (assuming that the conditions are such that it is possible), if only one factor varies, say, the rapidity of the plate. I should like to see any one make eight identical negatives on eight plates, varying in sensitiveness as 1 to 128 at the first attempt, and it must be borne in mind that this was the first experiment made after I had concluded that the formula given above represented approximately the variation in developer necessary, that the brand of plate used was somewhat different from any we had been using before, and that the only instructions Mr. Arito had were, "Use these developers for the different plates, and make eight negatives as like each other as you can." I am sure it would have been possible, by several trials, to get negatives practically identical.*

As to the actual developers used, I must confess that to avoid the trouble of multiplying the quantity of pyro and of bromide by a much awkward fraction, 1·23, which I had not then arrived at, for each increment in exposure, or of integrating from the initial quantities, by the use of a table of logarithms, I multiplied in the first three cases by four-thirds, in the last four by five-fourths, the result being not much different from what would be got working by the actual formula.

The nearest quarter grain and, towards the end, the nearest half grain was taken in every case.

The following were the actual developers used:—

Per ounce of developer.

1	Pyro, 3 grains, Bromide of ammonium, ¾ grain.
2	Pyro, 4 grains. Bromide ammonium, 1 grain.
4	Pyro, 5 grains. Bromide ammonium, 1¼ grains.
8	Pyro, 6 grains. Bromide ammonium, 1½ grains.
16	Pyro, 8 grains. Bromide ammonium, 2 grains.
32	Pyro, 11 grains. Bromide ammonium, 2½ grains.
64	Pyro, 14 grains. Bromide ammonium, 3½ grains.
128	Pyro, 19 grains. Bromide ammonium, 5 grains.

Ammonia, 2 minims.

The sulphite used was only five grains per ounce in the first six cases, ten in the last two. The reason the quantity was kept so low was that, with the long times of development necessary in the case of the longest exposures, the plates were found to partly fix out before development was over if the sulphite were kept at four or five times the quantity of the pyro. I do not yet know whether this was due to impurity of the sulphite or not.

The exposures actually given were as follows:—

Mins.	Secs.
	1½
	3
	6
	12
	24
	48
1	36
3	12

They were made by myself, by the aid of a stop watch, with such care as I am capable of. There may be an error of a fifth, or even perhaps a quarter of a second, in any one of them, but I think not of more. It is true that this amounts to a considerable percentage in the case of the shorter exposures; but the error is as likely to be in one direction as in the other, and, in any case, it leaves the range of exposures as one to fully a hundred.

In a sealed envelope, which I hope will not be opened till any who have had patience enough to listen to this paper as far as this point have tried to put the prints in their proper order, are given numbers corresponding to letters on the backs of the prints. It is to be understood that No. 1 corresponds with the shortest exposure, and so on.

Conclusion.

I hope I have proved by these experiments that we have power both to vary in development the results of uniform exposures, and to compensate for differences of exposure. I should not have thought it right to trouble you with so long a paper on the matter, but that the possible variations, and the possible compensations, have proved so much greater than I imagined them to be, and so much greater than they are, I think, commonly supposed to be.

It will be seen that throughout these results, in so far as they constitute change in ratio of gradation, are brought about only by stopping development at certain stages before it has gone as far as it would go. I doubt if it is possible to change gradation of density or of capacity at all, if development be carried as far as it will go. At any rate, the change that can be effected is but slight. This is leaving out of the question the reaching of, or approaching to, a maximum possible density.

When some twelve or thirteen years ago I stated that "bromides restrain both the increase of density, and the increase of detail, but the former to a less degree than the latter," I believe I stated, in somewhat crude language, the reason why it is that bromides in the developer give us the power both of varying our results with constant exposures, or of compensating for varying exposures.

Before that time, if I remember rightly, I had found, to my own surprise, that it was possible, if only time were given, to bring out the same figure on plates exposed under the Warnerke sensitometer, however great the quantity of the bromide added to the developer, within pretty wide limits. The results of these experiments were communicated to The British Journal of Photography in one, or I think more than one, article that I have not access to here, and were, I remember, discussed at the rooms of the Society of Arts, probably before the South London Photographic Society.

After that, a more elaborate set of experiments was made, investigating the results of varying each of the three ingredients of the alkaline developer, the results being communicated again to The British Journal of Photography, and the actual plates being handed to the Camera Club, after that institution had been founded.

The results of these experiments are referred to by Mr. H. J. Channon, in a very interesting paper in the *International Annual* for 1891, p. 255. I also received much information from this gentleman, and various papers, all of which courtesy has, I fear, passed unacknowledged, for which omission I crave forgiveness.

I have given the results of only a fraction of the experiments that intended to describe. These include the comparisons of the effects of hydroquinone, eikonogen, rodinal, amidol, and "cristalos," using various alkalies, or, in some cases, none, with what I have called the "standard pyro and soda developer;" but this paper has grown to such an unconscionable length, that I must leave the results of these experiments to some other communication, or to limbo.

I wished to say something about Messrs. Hurter & Driffield's method of determining the sensitiveness of plates, but shall merely now say that it seems to me by far the nearest approach that has yet been made to a perfect means of determining the sensitiveness of plates, taking into account, as it does, the useful densities, instead of the faintest detail, as heretofore—yet not perfect. The reason why I consider it not perfect will be understood from the objection that I have to any definition of a perfect negative that has yet been given, other than that negative that appears perfect to the man who makes it, the assumption being that he is a man of skill, and of something more, and knows what he wants eventually to produce, to wit, a picture.

I wish, finally, to express my gratitude to my colleague, Mr. C. D. West, M.A., Mr. K. Arito, and Mr. O. Kondo, for their invaluable assistance in all the experiments described.

P.S.—Just a word about the re-reversal that we read of as arising from very prolonged exposures. I have tried to get this often enough without success, and determined to make a supreme effort this time. The long sensitometer was used, and plates were exposed to the full blaze of sunshine for times from quarter-second to 34 mins. 8 secs. There was not a trace of reversal, developing either with pyro or with ferrous oxalate. This corresponds to an exposure in the camera, to a brilliantly lighted landscape for many days, with the conditions as they commonly are. I think that, if it is possible to prove a negative, these experiments prove the non-existence of reversal in the case of gelatine dry plates. I should like to know of any one who has had actual experience of re-reversal in the case of gelatine dry plates, or of any other plates, for the matter of that.

Remarks on Professor Burton's Paper by Mr. H. M. Elder.

A great many of Professor Burton's earlier remarks seem to be due to the unfortunate confusion caused by the special meaning given to the word "density" by Messrs. Hurter & Driffield. His opinion as to the range of gradation commonly met with in camera work differs very

* The print marked "9" on the back was from a negative that had an exposure the same as the longest of those mentioned, and that was developed with the first of the developers given. It was removed from the developing dish as soon as marked fog set in. Another plate was exposed for the same length of time, and was developed in the same developer, but was given the same time in the solution that had been necessary for the plate that had an exposure of one and a half seconds—namely, five minutes. The result is almost complete blackness, but with some reversal. If there were a week to spare, and certainty of sunshine all day long on every day, I should make a print from this negative too.

largely from that of Captain Abney, who, at a meeting lately held at the Camera Club, said that as a rule this range did not much exceed intensities of light in the ratio of about thirty-three to one. In the example quoted at the time, it was asked what was the ratio of the light reflected by the white and black in the case of a figure draped in black velvet with a white shawl.

Passing on, however, to the main object of his paper, Professor Burton has abundantly proved in a qualitative manner that the ratio of gradation in a negative is dependent on the time and method of development, and his numerical formulæ for the strength of pyro developer to compensate for increased exposure is a very interesting one. It seems, however, that a mere qualitative proof of this fact is not of very great importance, except in so far that it will tend to reassure those photographic weaklings who have been frightened by Messrs. Hurter & Driffield's much-misunderstood paper into disbelieving the evidence of their own experience. What would seem now to be wanted is a complete quantitative investigation of the whole problem. It is, of course, a long and laborious task, but it may be lightened by working systematically at it. I would point out, that from Professor Burton's paper it is almost impossible to really repeat his experiments, since certain important factors are left almost unnoticed. The prints themselves, as the author has pointed out, show many irregularities, and this was inevitable from the method of work. It is easy to see that in the feeble light of the developing room it is a sheer impossibility to carry out such instructions as were given to Professor Burton's assistant with any certainty, and I think that it speaks very highly for Mr. Arito's care and ability that the irregularities are not more marked than they are. Then, again, it is impossible to draw any very definite conclusions from mere inspections of negatives and prints. It is an absolute necessity, in carrying out such work as this, to make actual measurements of the transparencies of the resulting negatives. No doubt, if Professor Burton had done this, the irregularities would have been more marked than they are, for it has been pointed out again and again, by Captain Abney and others, that the eye is utterly untrustworthy as a measuring instrument by which to judge of the density of a deposit on a photographic plate. If there is any truth in a formula which I put forward at the Camera Club Conference of the present year, to represent the action of light and development upon a photographic plate, it ought to be capable of accounting for such results as those of Professor Burton's; and, if any one will take the trouble to examine the effect of varying the two constants that depend on development in this formula, I think it will be easily seen that it will account in a large measure, and, I believe myself, entirely, for these results, and that even the complete formula of Messrs. Hurter & Driffield fails to do so. Professor Burton's paper is an interesting and very valuable one, and would have been far more so if he had not trusted so much to human judgment, both in making his experiments and in interpreting the results. By this I mean, what is wanted is a series, and a long one, of definite experiments on plates definitely exposed, developed in developers of known constitution for known times (not until a certain appearance most difficult to seize is shown), and then measured carefully, so that the results can all be numerically expressed.

OUR PICTORIAL FAILURES.

By the Rev. F. C. Lambert.

Let me commence my remarks by a confession. In a moment of vanity I was induced by the irresistible suavity of the Hon. Secretary to promise a paper for this meeting on some art topic. Little did I then think how difficult it would be to find a suitable subject. Thus once more the old saw is illustrated, "Pride goeth before a fall.' At the moment of my rash promise I had failed to realise the numerous conditions of the case; and thus more time than I care to tell has been consumed in search of a subject—in a way, too, that has made me feel the force of one who describes his fruitless chase after a certain all-too-familiar, but unmentionable, insect. "No sooner you put your finger on him, but he isn't there at all, and the reason of that same is directly you catch him you miss him." Thus, again and again have I thought I had hit upon something new, only to find it not true; or again on something old and true, but so very *conventional* that it could no longer be held to interest a *conventional* gathering. Or again, if a subject presented *conventional and convivial* features—for the two are in our case somewhat closely akin, if not interchangeable terms—then I grasped it, only to find it was neither new nor true. Hence I reach the crux of my apology. In our "failures," we each may hope to find some conventional, *i.e.*, extenuating or mitigating, circumstances. Our failures are, alas! only too true; their truth is only too deeply driven home by their painful frequency. And yet the cloud has a silver lining. Our failures are ever *new;* their newness and freshness has all the doubtful charm of being very much "up to date."

I shall presume that most of us when visiting a photographic exhibition have at least two objects in view: Firstly, to see and as faras possible enjoy the work of others; secondly, to gather hints and information from the work which has most favourably impressed us. The second of these only concerns us for the present moment.

I venture to think that I am speaking for many others as well as myself, when I say the general impression, after visiting an ordinary photographic exhibition, is one of failure rather than success. To put the matter in other words, the number of pictures that one thinks about afterwards, or would care to possess for constant companionship on the walls of our living rooms, is exceedingly small. Would half a dozen out of every hundred exhibits under or over-state the mark? Leaving a liberal margin for personal taste, the nett result is that the majority—a saddening majority—are, if not failures, certainly not definite successes. There must be some grave reason for so significant a conclusion. Nor should the inquiry fail to interest, stimulate, and add to the value of the discussions of this gathering. On this point I would suggest the following points as being contributory in varying degrees to the general product of non-successes. The free discussion of the topic, whether leading to rejection or acceptance, cannot fail to draw some attention to the subject, and hence tend to diminish the number of failures. But I am not without hope that the results may be distinctly positive and fruitful in producing a greater number of distinct successes.

Some suggested reasons of our pictorial failure:—

1. *The Commonplace.*—I venture to put this first because it seems to include—in somewhat free-and-easy terms, I admit—the majority of the unremembered. This includes the characterless many, who neither please nor pain—everything about them, selection (save the mark!), exposure, printing, mount and frame, are simply "middling." Hence we are utterly indifferent as to their future fate. Why are they entirely lacking in interest, in the general absence of any positive conspicuous defect, you ask? I reply, the worker in his so-called selection has exactly failed to select. He has taken things as they are. Selection surely implies rejection as well as acceptance. In the cases before us it has been all acceptance and no rejection. Nay rather, may we not say that the general tendency, where it shows any thought at all, points to over-crowding rather than selection? Perhaps collection would be a better word. The "art of leaving out" in many cases, if known, is sternly ignored.

A large element in the commonplace is the presence of so much which is utterly unessential, immaterial, uninteresting, and hence discursive and generally weakening. It acts like a diluent. A teaspoonful of the best and purest and strongest whisky would have but a poor chance in a gallon of the purest *aqua-pumpibus*, negative and innocent as that diluent might be.

2. Next comes *Indefiniteness.*—By this I do not refer in any way to the method of producing the out-of-focus or so-called fuzzygraph method of working. The indefiniteness here indicated is that due to lack of definite aim or intention. This is the man who "aims at *nothing* and hits *it*."

We are assisted to recognise this class of work when it appears with such delightfully bewildering and vague titles as "a study," "a nocturne," "an effect." The only, if any, effect generally produced is that of bewildered inquiry, or perhaps a reminder of some recent puzzle picture subscribed, "Find the dog, the policeman, and the baby."

Impressionism may be all very well in its proper place, provided always that the artist has an impression and some reasonable power of expressing it. But if the would-be-impressioniat desires to snatch applause by feeble imitation, or shelter his incompetence under vague titles, then he is in no way a true friend to the progress of photographic art.

The third place may be assigned to the defects due to *imitation.* The old saw which says that "imitation is the sincerest form of flattery" requires its "teeth setting" more in a line with actual fact. Experience seems to show that it is only those seeking spurious greatness in the cloud of dust they raise who find any acceptable flattery in the mimicry of a tail of followers, who, in turn, having no ideas of their own, are ready and willing to accept such ideas of their leaders as require the least, if any, effort to assimilate or digest.

It may well be doubted if any one who has thoughts, methods, or ideas, of his own of any real value would accept on any terms the fulsome flattery of brainless imitation.

Would Shakespeare, Milton, or Tennyson, Reynolds, Constable, or Turner, have turned aside one hair's breadth to win a following of those who at best could only accentuate the defects of their leaders, and dilute beyond recognition their choicest merits. We may look, and look in vain, for any great artist in form, colour, song, or stone, who has wrought his way to lasting greatness by imitation, such as is not altogether unknown by those who are eager to be dubbed photographic artists. Earnest, conscientious, and laborious study and analysis of the greatest works of the greatest men is no doubt of inestimable service to those who aspire to be

their compeers, but true study points to principles rather than rules, results rather than methods. The student will be as anxious to avoid the semblance of imitation as he is desirous of reaching, if not outstripping, the triumphs of the masters who inspire him, at the same time there will be an equal anxiety to make his work his own beyond the chance of merit it may possess being suspected of having been filched, or even borrowed, from the work of another. Much has been said, sometimes with truth and sense, and sometimes otherwise, on the subject of schools in photography. The pages of the history of painting teach us that "schools" are not to be manufactured at the whim and fancy of individuals. The causes at work were deeper-seated and more fruitful than the passing popularity of an eccentricity or novelty. Furthermore, this difference between painters and photographers seems to lie on the surface, whereas among the schools of painters each and all profess (and practise with varying degrees of truth) to study in and appeal to nature—each school professing itself to be a more faithful exponent of nature than the others, and in that sense all are impressionists—while, on the other hand, photographers with an equally charming candour, one and all profess to study in and appeal to the same great school, nature; yet it would seem as though not a few were content to have their seeing and thinking second-hand, since by their productions, their efforts show an industrious and not always unsuccessful effort at imitating the productions of each other.

4. *An inversion of the means and the end* must be held in part responsible for some misspent energy. An all-consuming anxiety to display to its utmost limits the possibilities of some instrument, the capabilities of some process, is a terrible temptation to many. Microscopic definition, biting sharpness, topographical precision are phrases that have had their day and due regard. The transitional phase of differential focus is passing into further development of astigmatic distortion, or the suppression of definition by diffraction.

In those of an independent or experimental turn of mind, their means may, and do, at times, produce results which are not only extremely interesting, but also have a value as being expressions of a personality, but the counter-balancing disadvantages come *pari passu*. No sooner does one see a success snatched by some pioneer, but it is quickly imitated and diluted to such an extent that its virtues, even though few, are ignored, while its defects, no matter how many, are each and all repeated until the unfortunate founder, or leader, of the school is saddened by finding that the world only sees his excellencies or his multiplied defects.

The "fatal facility" of production tempts the great unthinking crowd to rush headlong down the course of destruction, leaving in their trail "wrecks and ruins" of wasted material. Now do they rush for the pictorial crown through *f*-64 of a highly corrected symmetrical doublet, now through a pinhole, now it is a spectacle lens, now an astigmatic lens. Having tried and found wanting any and every lens, and finally no lens at all, inspiration whispers, "Try a new printing process." Thus, from chocolate-box-lid polish and gloss to roughest sand-paper is but a step In each and every case an anxiety to display the means, rather than use the means according to the end desired, meets us again and again, and accounts for some proportion of the pictorial failures.

5. Lastly, some small place must be found for the failures due to *misdirected rivalry*. That a certain picture obtains a measure of notice is enough to set some at work to outstrip this picture by some slight advance either in subject, pose, lighting, or other method or means employed. The results of such rivalry must of necessity be unhealthy, as being the product of jealousy and imitation. All thinking art workers are agreed that the first quality of success is that the work attempted shall be felt worthy of the effort expended on it for its own sake. In other words, if a man's heart is not in his work, there will be very little art in it. Obviously, then, where one attempts to imitate and rival the productions of another, it is not a case of true affection, but the green-eyed monster that is secretly at work.

To sum up briefly, our inquiry seems to point to a handful of causes tending to produce work which, if not distinctly and definitely failures, are undoubtedly not successes. Let us go, in imagination, five times round the walls of a photographic exhibition. On each journey we shall weed out such pictures (or rather prints) as show the following shortcomings:—

1. The commonplace, due either to overcrowding of entirely extraneous, uninteresting, unessential elements. For the most part, if they are not positively offensive, they are absolutely uninteresting, dull, and characterless. They are "*the jelly-fish order*."

2. The indefinite or meaningless, that have nothing to say, and say it in silent eloquence. Their result, if any, is only to irritate. These are "*the penny puzzle-card order*."

3. The feeble imitation class, wherein what little excellence (often difficult to find) has been obtained by other than honest, straightforward, individual, and personal work. These we may dub the "*petty larceny class*."

4. Means *v.* end, where the worker is anxious to display his dexterity in the use of his tools, perhaps with the hope that, as "fine feathers make apparently fine birds," so, possibly, artfulness may pass current for art. Let us call these "*the conjuring-trick class*."

5. Rivalry, where one worker endeavours to build a fame upon the head of another worker; not because he cares about the subject, but because he is anxious to try and make himself the larger by ungenerously belittling another probably more modest worker. As it is not easy to find a name for these, perhaps we may best pass them over as the "*nameless unworthies*."

Having removed, gently but firmly, the foregoing five siftings, it may be reasonably hoped that whatever, if any, are now left will have suffered no loss, but gain rather, by having passed into "Standard Six."

PHOTOGRAPHY AND THE GREAT BARRIER REEF.*

Mr. Saville-Kent's work is the outcome of an eight years' residence in the Australian colonies in the capacity of Inspector and Commissioner of Fisheries, and he has been fortunate in securing much valuable assistance from scientific and official persons. The scope of the book "is to render an account, in clear and popular language, of the most highly attractive subjects, from a commercial and biological standpoint, that are associated with the Barrier region, and in the former connexion more especially to indicate the lines on which, through the application of scientific methods, more remunerative returns than heretofore are to be realised." It may be explained that the Great Barrier Reef of Australia is an enormous coral region between Torres Straits and Queensland, "built up by the direct and indirect agency of soft-fleshed polyps of multitudinous form and colour, and teeming with animal organisms of myriad form and hue representative of every marine zoological group."

Necessarily the book is largely, although not exclusively, of scientific interest, the general reader being here and there kept in mind in some of the descriptive sections of the volume, while, when Mr. Saville-Kent comes to discuss the potentialities of the fascinating region he has so ably laid bare for us, the commercial spirit of the age will find plenty of food upon which to feed and thrive. After discussing the various theories as to the formation of the Great Reef, Mr. Saville-Kent proceeds to treat of and describe its corals, coral animals, and allied organisms; the pearl and pearl-shell fishery; the Bêche-de-mer or Trepang fisheries; commercial oysters of the Barrier district; turtles and the turtle and tortoise-shell fishery; the Dugong fishery; commercial sponges; food and other fishes, &c.

That which imparts photographic interest to the work is a series of forty-eight large collographic plates illustrating the text. It is safe to say that few, if any, recently issued books are more indebted to photography for the beauty and technical charm of their illustrations than Mr. Saville-Kent's splendid volume. The pictures are from Mr. Saville-Kent's negatives, which have been collotyped by the London Stereoscopic Company and Messrs. Waterlow; and, while paying every tribute to the undoubted excellence of the originals, we are free to declare that seldom have we met with such delicacy, fidelity, finish, and studied carefulness of printing as in the work of the firms named. Views are given of coral structures of various kinds under natural conditions, of the pearl and pearl-shell fisheries, the Trepang fishery, anemones, oysters, the fishing industries generally, marine fauna, &c. Of many of these illustrations it is claimed that they represent the first occasion on which the camera has been employed for the systematic delineation of such subjects. It is only at rare and uncertain intervals that the reefs are uncovered to the extent in which in many instances they are here depicted. Two of the illustrations show Mr. Saville-Kent with his camera, the lens of which is pointed to the object contained either in a small pool or in an improvised aquarium in a bucket, with other objects of interest scattered about. To employ the camera in this manner, it is fitted in a frame to which the stand is attached. In addition to the collotype, sixteen chromo pictures of fishes, &c., from Mr. Saville-Kent's own water-colour drawings are given, these being by Messrs. Riddle & Couchman.

We have no doubt Mr. Saville-Kent's finely got-up work will take

* *The Great Barrier Reef of Australia: its Products and Potentialities.* By W. Saville-Kent, F.L.S F.Z.S. London: W. H. Allen & Co. Limited 13, Waterloo-place, S.W.

high rank in the library of the biologist, and in contributing to this result it is pleasant to note that, both in his own camera work and in the reproductions from his negatives, the part played by photography is conspicuously paramount.

News and Notes.

NORTHERN PHOTOGRAPHIC AND SCIENTIFIC ASSOCIATION.—July 22, Richmond.

HACKNEY PHOTOGRAPHIC SOCIETY.—July 25, *Exposure Meters and Tables*, by Mr. W. F. Fenton-Jones.

GOSPORT PHOTOGRAPHIC SOCIETY.—July 22, Bishopstoke; leave Gosport at twenty-four minutes past two, p.m.

MR. C. CRESCENT, of 20, Paternoster-square, E.C., has sent us a small sample of the "Crescent" sensitised paper, which we have found to be of good quality.

PHOTOGRAPHIC CLUB.—July 26, *Collodio-chloride Printing*. August 2, Report of the Convention Delegates. 7 (Bank Holiday), Outing to High Wycombe.

MESSRS. PERCY LUND & CO., St. John's-street, Bradford, have sent us a sample of gelatine, which retails at 1*s.* 6*d.* per pound, which is intended for collotype work. It appears to be suitable for the purpose.

EAST LONDON PHOTOGRAPHIC SOCIETY.—August 8, *On the Desirability of Suiting the Printing Process to the Negative*, with illustrations, by Mr. Bennett. 22, Demonstration upon *Chloride Printing and Toning*, by Mr. Copping.

"THE PRINCE of WALE'S SMILE."—Mr. F. G. Smith, photographer, of the Quadrant, Richmond, S.W., sends us a cabinet size portrait of the Prince of Wales, in which H.R.H. is lifting his hat and smiling heartily in acknowledgment of a salute. The picture is evidently an enlargement from a small negative.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.—July 25, Social Evening. Members are invited to bring prints and negatives to all the Tuesday evening meetings when no special paper is announced. 26, Last day for sending in photographs for the Charlecote Excursion Competition.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.— On July 25 there will be a Technical Meeting at No. 50, Great Russell-street, when a discussion will take place on *The Use of Uncorrected Microscopic Objectives with Colour-corrected Plates*. Mr. Pringle will introduce the subject, and show specimens.

MESSRS. J. BISHOP & CO., of 19, Princess-road, Regent's Park, N.W., were recently honoured with a letter from Princess Victoria Mary of Teck, accepting a picture, a platinotype enlargement of the Royal Family in Windsor Park, framed complete, as a wedding gift, and they have just received from the Duchess of York a letter thanking them for it and saying that it gave Her Royal Highness great pleasure to receive it.

MR. W. T. WHITEHEAD, of 7, St. Paul's-churchyard, formerly with Messrs. Downey, Mr. Van der Weyde, &c., is making a speciality of designs for the backs of card mounts, headings, initial letters, &c., of which we have seen many artistic and tasteful examples. Photographers who may desire to have designs specially prepared for them could not do better than communicate with Mr. Whitehead, who also undertakes the working up of bromide enlargements, and tuition of the Air-brush, in the use of which he possesses a very high degree of skill.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—The following are the arrangements of the London and Provincial Photographic Association during July and August:—July 20, Members' Open Night. 22, Outing to Totteridge Station, three o'clock; over Mill Hill to Hendon. 22, *Less Customary Orthochromatic Photography*. August 3, Members' Open Night. 7, Bank Holiday Outing to High Wycombe. 10, *Film Working*, by Mr. W. H. Barnes. 12, Outing, the Zoo. 17, Delegate's Report of the Convention, by Mr. W. D. Welford.

MIDLAND CAMERA CLUB.—The first Annual Exhibition of the Club will be held at the Botanical Gardens and College Grounds, Moseley, Birmingham, to open on Monday, October 2, 1893, and close on Saturday, October 14, 1893. It will be under the patronage of Right Hon. Joseph Chamberlain, M.P., Sir John Jaffray, Bart., Sir Walter Foster, M.P., Sir James Sawyer, Right Hon. Jesse Collings, M.P., Austen Chamberlain, Esq., M.P., &c. There will be classes open to professionals, amateurs, and manufacturers. Particulars and entry forms may be obtained of the Hon. Secretary, 4, Woodstock-road, Moseley, Birmingham.

"MANY people," says *Dry Plates* for July, "are greatly in doubt as to the correctness of the H. and D. method of speed readings through a series of densities, instead of the last faint indications of deposit in the feebly exposed portions of the plate. To them we would ask: Why did speed-testing with the Warnerke sensitometer fail to give even an approximate indication unless the last few faint numbers visible were *not* taken into account? Yet such was the case, and this point generally agreed on. Negatives, as a rule, consist of a series of densities extending over a considerable range; surely, then, a system which reads through the whole extent of that range must, as a matter of common sense, be the right one, and to the point."

THE CONVENTION EXHIBITION.—In our notice of this Exhibition last week, the enlargements from negatives by Messrs. Byrne, Richmond, and Messrs. Cox & Durrant, Torquay, should have been included among the exhibits of Messrs. M. & T. Scott, Edinburgh, instead of those of Messrs. O. Sichel & Co.

A PRIZE MEDAL FOR BEE SLIDES.—At the Royal Agricultural Society's Show at Chester, in Class 345, "The most interesting and instructive exhibit of any kind connected with bee-culture," a silver medal was awarded to Messrs. Newton & Co., of 3, Fleet-street, for an exhibit of lantern slides of bees and bee-culture, made from negatives by Mr. T. E. Freshwater. We have before referred to this series of slides as being of great interest, especially to bee-keepers, &c.

THE Imperial Dry Plate Company announce the following awards in the competition for negatives on Imperial plates, which closed June 30:—First prize of 4*l.* 4*s.* to Mr. F. Cherry, Vice-President North Middlesex Photographic Society; second prize of 3*l.* 3*s.* to Mr. P. H. Lamberts, Amsterdam; third and fourth prizes are divided between Messrs. A. H. Duncan, Glasgow, and F. G. Heseltine, Leeds. A series of competitions, closing October 30, will be announced during the month.

MR. J. HUBERT, the well-known photographer, of Mare-street, Hackney, ha become the editor of the *Hackney Record*, a small local sheet from which we extract the following unique obituary notice:—"On Monday, July 3, Mr.—— was solemnly conducted to his last resting-place, accompanied by thirty-five carriages, whose occupants ought to feel deeply grateful to the departed for having been permitted to don their best holiday attire, and pass in state through an admiring multitude."

THE "TALMER" HAND CAMERA.—Messrs. Talmer & Eamer, of Blackburn, have issued an illustrated price list of the various forms of the "Talmer" cameras which they are now manufacturing. These include hand, stereoscopic, field, and studio cameras. An eight-page pamphlet supplies a clearly written guide to the use of the "Talmer" hand camera, from which we make the following extract relative to the means employed to avoid the omnipresent enemy, dust:—"In most hand cameras the plates are contained in roughly blackened tin or zinc sheaths, which, during the operation of changing, are shot up or down, or fall from the vertical to the horizontal, rubbing against each other, raising an incredible amount of dust, and filling the interstices of the camera, and finally settling on the plate. Nor is the amount of dirt reduced by the continual scraping of the sheaths against the bare wood of the interior, nor by the wear and friction of other working parts inside the body of the camera. Comprehending these drawbacks, and following the adage that prevention is better than cure, we have adopted sheaths of thin pen steel of smooth and dull surface. Being made by special tools, they are absolutely uniform in size, and hold plates of any thickness up to register. The inside of the chamber in which the sheaths are contained is faced with brass plates, the sheaths and other metal parts work metal against metal, ensuring absolute freedom from dust and uniformity and certainty in action."

Our Editorial Table.

SNAP-SHOTS AT THE CONVENTION.

J. A. SINCLAIR.

THE hand-camera views taken by Mr. Sinclair at the Convention at once indicate the hand and head of a master—the head to select and the hand to manipulate. These *chefs d'œuvre* of hand-camera work are printed in platinum. The first to claim attention is a small group taken on board the boat the *Princess Royal*, in which, on the memorable rainy Tuesday's excursion, such a large number of members availed themselves of the kind invitation of the local camera clubs to visit the Yealm and Tamar rivers. The scene represents the President of the Convention with a surrounding of ladies, to whom he has been engaged in telling one of his ever-ready, genially funny stories. The amusement depicted on the ladies' faces shows that the humour of the story is being well appreciated. This, we venture to predict, will turn out to be one of the most popular of all the pictures taken during the Convention week. Others represent *Holes Hole*, a landing-stage on the Tamar. In this picture the steamer is seen made fast to the pier to afford the members an opportunity of visiting Cotehele House, a venerable ivy-clad mansion dating from 1485, and its very beautiful grounds. This is the most perfect example extant of the Tudor fortified mansion. Mr. Sinclair's collection includes a charming view of this mansion, which is buried in oak, ash, and chestnut-trees. Other pictures—for they are pictures rather than mere snap-shot photographs—represent Saltash and its famous Bridge, the Pool, Plymouth, and its shipping. These were all taken with an "Ideal," with a five and a half inch lens capable of focussing.

WALTER D. WELFORD.

MR. WELFORD is well known as an expert snapshotist, and he has employed his hand camera with excellent effect in carrying away reminiscences of many humorous groupings. Here we have a group of five members listening to the eloquence of Mr. Birt Acres, who, with

animation, is adducing reasons why this scene rather than that other should be selected for a short walk out. There is a fine view of the steam launch and the little flotilla by which the members were conveyed from Totnes down the Dart to Dartmouth. Another shows one of the most modern men-of-war at anchor in the Hamoaze. Here we have a great concourse of people assembling on the Hoe to secure good places from which to witness the fireworks that are to be let off after dark, and there we have individual specimens of the *genus homo* armed with camera and stand, or of ladies with hand cameras. These are all in Mr. Welford's usual excellent style.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 24	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 24	North Middlesex	Jubilee House, Hornsey-road, N.
,, 24	Richmond	Greyhound Hotel, Richmond.
,, 25	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 25	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 25	Hackney	206, Mare-street, Hackney.
,, 25	Halifax Camera Club	
,, 25	Lancaster	Springfield Barracks, Lancaster.
,, 25	Leith	165, Constitution-street, Leith.
,, 25	Paisley	9, Ganze-street, Paisley.
,, 25	Warrington	Museum, Bold-street, Warrington.
,, 26	Bath	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 26	Burnley	Bank Chambers, Hargreaves-street.
,, 26	Leytonstone	The Assembly Rooms, High-road.
,, 26	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 26	Southport	The Studio, 15, Cambridge-arcade.
,, 27	Glossop Dale	
,, 27	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 27	Hull	71, Prospect-street, Hull.
,, 27	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 27	Liverpool Amateur	Percy-buildings, Eberle-street.
,, 27	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 27	Oldham	The Lyceum, Union-street, Oldham.
,, 28	Cardiff	
,, 28	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 28	Holborn	
,, 28	Maidstone	"The Palace," Maidstone.
,, 28	Swansea	Tenby Hotel, Swansea.
,, 28	West London	Chiswick School of Art, Chiswick.
,, 29	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 13,—Mr. J. S. Teape in the chair.

The Chairman showed results of a recent outing to Fobbing, Essex.

GETTING RID OF HALATION IN A NEGATIVE.

Mr. T. E. FRESHWATER asked the best way of getting rid of halation in a negative of an interior with a large window.

Mr. P. EVERITT would vignette the window in the frame. He had found the use of methylated spirit unsatisfactory for reducing purposes.

Mr. G. W. ATKINS had used emery powder in oil with satisfactory results.

Mr. FRESHWATER asked whether it was essential that the halation should be got rid of. In the photograph to which he referred he got the window just as looked in the subject.

The CHAIRMAN suggested the reduction of halated negatives and working them up with a pencil. He had tried the use of a knife for scraping away parts of a negative, and said that it seemed to make those parts much denser.

Mr. W. E. DERENHAM remarked that varnish restored the parts to their ordinary density.

The meeting was largely occupied in the arrangements for outings and subjects for discussion.

Hackney Photographic Society.—July 11, Mr. R. Beckett in the chair.—A question was asked, "What is the best way to restore old negatives stained yellow?" Mr. HUDSON advised the use of a weak hydrochloric acid bath. Mr. MOORE thought bleaching with mercuric chloride and redeveloping with ferrous oxalate better. The CHAIRMAN said often stains were caused by insufficient fixation. A question was asked as to the approximate exposure for enlarging on slow bromide. The HON. SECRETARY said there were many things to consider, such as stop, rapidity of paper, &c. If for lantern enlarging with slow Eastman paper, aperture *f*-4 for a fairly developed negative, enlarging from a quarter to 10×8, he would give about two minutes as a standard from which to work. Mr. HARVERSON had (by daylight) on rapid paper given one minute with *f*-16, enlarging from a half plate to 15×12. Mr. GRANT advised testing by using one piece of paper and giving varying exposures. Mr. NUNN then read a paper on *Reduction of Lantern Slides*. He preferred always to reduce his slides as grain was lost, and to do them by daylight, as they could be done much quicker. In developing always be clean—have clean dishes, fingers, and filter the developer; dust your plates. He then showed a long tunnel-shaped apparatus which he used for reduction. When using daylight a white reflector was placed so as to reflect evenly on negative. Aim at full exposure and full density; forcing was a mistake. Clearing was advisable. Mr. GOSLING asked if much advantage was gained by reduction rather than contact, and was informed that every defect was reduced correspondingly. Mr. PENRY asked whether thin negatives were better than dense ones. Mr. NUNN said he had found them so. The CHAIRMAN said copying always sharpened up more than when in contact. The HON. SECRETARY thought Mr. Nunn's apparatus too cumbersome, and advised a bellows, as it could be shut up and take less room.

Ashton-under-Lyne Photographic Society.—On Saturday last, July 15, the above Society's ramble was to Chew Brook, near Greenfield, with Mr. C. E. Redfern, J.P., as leader. The party, consisting of twenty-five ladies and gentlemen, left the Society's rooms, Henry-square, a little before two o'clock. The day was not very promising, but a good number of plates were exposed, and the party enjoyed the outing very much.

Leicester and Leicestershire Photographic Society.—July 13.—A number of the members of this Society went, by special train, to Warwick, where special permission had been obtained, through the kind permission of the Earl of Warwick, to photograph the Castle grounds; as, however, the party arrived rather late, the Castle itself was left out of the programme, and the interesting bits in the immediate vicinity occupied the attention of the members, and offered quite sufficient work in the quaint buildings and streets, and the river, and its ancient associations. In spite of the dull weather, some good work was done by time exposures, snap work being out of the question. After the members had exposed their plates, an adjournment was made to the Dale Temperance Hotel, the members being in fine trim for a substantial tea, after which they took the train for Melverton station, about a mile from Warwick proper, and, there taking the train, were soon at home again, after an enjoyable outing and a promise to revisit the place and Castle at an early date. The President, Mr. J. Perritt, was leader of the party, and the next meeting was arranged for Belvoir Castle on Saturday, July 29, and the President cordially invited any members of the sister Societies, who may wish to join the excursion, to this historic mansion.

FORTHCOMING EXHIBITIONS.

1893.	
August	*Welsh National Eisteddfod. The General Secretary, Pontypridd.
September 5	*Royal Cornwall Polytechnic Society, Falmouth. W. Brooks, Laurel Villa, Wray-park, Reigate.
,, 20–21	*Hove Camera Club. Hon. Secretary, H. Emery, 142, Church-road, Hove, Brighton.
,, 25–Nov. 15	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1–31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 9–Nov.	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
November 7–11	*South London Photographic Society. Hon. Secretary C. H. Oakden, 53, Melbourne-grove, Dulwich, S.E.
,, 10–12	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

LIGHT INTENSITY AND CHEMICAL ACTION.

To the EDITOR.

SIR,—After reading in your periodical of last week the law of photography stated by Captain Abney, "that, when the products of the intensity of the light acting and of the time of exposure are equal, equal amounts of chemical action will be produced," it appeared to me this supposed law was directly opposed to the universal law propounded by our best physicists, "that there is a preliminary resistance to be overcome before chemical change of any kind can take place." The experiments of Captain Abney give another illustration of this universal law, and there can hardly be a doubt the luminiferous energy could be so dealt with, that no effect whatever would be produced on the most sensitive recipient surface, however often the interrupted exposures were repeated in the manner suggested by him.

The luminiferous energy is now supposed to be an electro-magnetic vibration, and the rapidity of the vibration which influences the sensitised surface of the bromide of silver is calculated to be five hundred billion times in one second. Thus, in Captain Abney's experiment, where he employed time exposures of one-thirty-thousandth part of a second, there still remained over sixteen thousand million vibrations which were received at every exposure; so it is not to be wondered at that his experiments are still far removed from that exposure which would not suffice to overcome the preliminary resistance to chemical action, although they

appear to have been sufficient to indicate the failure of the supposed law of photography.

The wonderful achievement of Professor Boys in obtaining an image of the shadow of a bullet in its flight was rendered possible by this enormous number of vibrations contained in one second, because, although the time element was even reduced to the millionth part of a second, there still remained the energy from five hundred million vibrations. Professor Boys used the shadow produced from an intense light; if, instead, he had used the light passing through the objective of an ordinary camera, it may so have turned out that, however often the shot was fired, no image would be produced.

Another instance of the influence of the five hundred billion vibrations in a second is shown by stellar photography. The intensity of the vibration often is too feeble to influence the optic nerve, and yet the uninterrupted continuance of the vibration is capable of producing the chemical change on a sensitised recipient surface. It probably would be quite different if the exposures were interrupted in the manner adopted by Captain Abney's revolving sensitised drum.

An element of uncertainty is introduced by Captain Abney using slits and small holes for the introduction of the light to his revolving drum, because the luminiferous energy is changed in a very remarkable manner when so confined, and up to the present time the real nature of the change remains shrouded in mystery; but this much can be safely asserted, luminiferous energy passing through narrow slits and small holes will come under the universal law of a preliminary resistance to the change which is produced. From my own observations upon the luminiferous energy through small holes which give photographic images in cameras, it is perfectly evident there is a wonderful change produced; otherwise how are we to account for the difference of the effects of the energy through these holes, and those so large that no object is delineated in the camera?

A little investigation will indicate that the great difference between the holes is owing to the action of the edge of the small hole upon the axes of the luminiferous vibrations. These vibrations do not pass into the camera upon the same axes as is the case with large holes, but the axes in some way become transferred to new centres ranged round the edge of the hole; but whether this is owing to the molecules on the edge taking up the electro-magnetic vibrations of the ethereal medium, and transmitting them to the recipient sensitised surface inside the camera, yet remains to be proved.

The fact of the change in the axes of vibration is most apparent by the change which takes place in the illumination of the field. Suppose the hole be $\frac{1}{10}$ of an inch in diameter, and the focus of the camera two inches, and the angle of the field 120°, and the object a large sheet of white blotting-paper equally illuminated—then it can be demonstrated that the quantity of light from each point of the object which could enter the hole becomes less and less as the points in the object become further removed from the axis passing through the hole at right angles to the metal plate to the central point of the object. This arises from the plate in which the hole is drilled, and the axes of these cones of light between points of the object and the hole presenting a front at right angles to only one point in the object, that is its central point.

If the quantity of light from the central point be called ten for the maximum, then the points on the extreme edge of the object at an equal distance from the central point only admit four parts of light instead of ten, where the field embraces an angle of 120°. The image of the sheet of blotting-paper with the axes of vibration passing through the hole unchanged would be a circle, white in the centre, and gradually shaded off to more than half between black and white at the margin; but, because all the axes of vibration are changed, the image barely shows a trace of gradation at the edge. No doubt, if the hole be made very much smaller than $\frac{1}{10}$ of an inch in diameter, then gradation becomes more and more apparent as the hole is reduced in size; but this arises from the hole becoming more and more a cylindrical tube rather than from any other circumstance, and, if it were possible to reduce the thickness of the metal plate in the same proportion as the hole became reduced in diameter, there does not appear to be any reason why the field of illumination should be altered with holes even of $\frac{1}{100}$ of an inch in diameter.

The conclusion is thus forced upon the mind that the edge of the hole is the dominant factor, and that this edge has produced an enormous change in the distribution of the luminiferous energy inside the camera, a change so vast that these edges can be so formed as to produce photographs of objects of any degree of texture which may be desired. From these considerations the success of Captain Abney's experiments is owing to the preliminary resistance to change produced on the luminiferous vibrations by the edge of the hole, or the edges of the slits he employed, as well as to the preliminary resistance to chemical change on the sensitised recipient surface.—I am yours, &c.,

Parkstone, Dorset, July 10, 1893. ARCHD. C. PONTON.

PROFESSIONALS AND AMATEURS.

To the EDITOR.

SIR,—A lively controversy has been started in your columns under the above heading, especially the first-named being angry with the second. Allow me to put a question which is a great puzzle to me: What is the percentage of professional photographers, who are only professionals and not amateurs in other business lines, in London or any other given town? Search through your list of photographers, and you will find photography combined with picture-dealing, hair-dressing, teaching, painting, picture-frame making, or newsagent, dealer in antiquities, fancy warehouse, cigar and sweet shop, stamp-dealer, dancing-master, music-teacher, lodging-house keeper, and other more or less artistic or sweet by-occupations; in fact, amateur in any other business beside his own.

I will now give you an idea of how the best-known professional photographer in a town I could mention is carrying on his business. Those persons who can afford to pay, such as members of Parliament, clergy, doctors, &c., are invited for free sittings and presented with one dozen cabinet copies free of charge. Well, if a man like the above-named gets, say, six free sittings a year in this way, what would you call him if he spent his money on it? Outdoor groups 12 × 10 are supplied at 2*s.* 6*d.* per copy, or at a push they are taken free rather than let another photographer do the work; the same business charges 30*s.* per dozen cabinets in the front of the shop, and in the back 8*s.*, or perhaps not even that—all in all, a way of business which is killing not only opposition, but also himself.—I am, yours, &c., AUDACIOUS OPERATOR.

To the EDITOR.

SIR,—About ten years ago it was required to keep a record of certain subjects by means of photography. A professional photographer was employed to do the work at his own studio, but the result was unsatisfactory; the subjects were badly displayed, and the prints, on albumenised paper, showed evidence of early decay. The person employed would be rated as a good second-class professional, he was remunerated according to his own estimate, no bargain was struck. It was suggested that the platinotype process should be substituted for the evanescent silver method, a proposal which was declared to be not practicable, to the request that negatives might be supplied instead of prints a flat refusal was given. The employer then determined to obtain the necessary material and knowledge to do the work himself. About fifteen hundred negatives have been produced, the work is still in progress, the results are being permanently recorded in platinotype; the cost so far has been under forty pounds, the professional's charges would have amounted to over three hundred and fifty pounds.—I am, yours, &c., F. R. C. S.

To the EDITOR.

SIR,—Hurrah for No. 1730 of THE BRITISH JOURNAL OF PHOTOGRAPHY! That is what we call in French "une levée de boucliers." At last the professionals say something in retaliation to the lofty presumptions of amateurs. Let us hope they will keep it up some, and maybe the amateurs will get a little more modest, and not always think that they are the almighties to whom all is due, even the free use of the professional photographer's dark room, which they think they own too. Why, with their knowledge and (superior to all) ingenuity, can they not make up anything portable to change their plates in, &c.? Of course, there are some already made, but they are not above saving expenses and trouble, being satisfied with troubling the professionals they so much despise; otherwise, however, not slow to ask their advice when they are cornered by some trouble.

Some of this sometimes insufferable overbearing of amateurism, you will probably admit, is due to the modesty of some photographers, and not only with the six best professionals in every large city, but also to some of the smaller ones, beginning with the seventh, &c. When speaking of some very fine results obtained, very often the professional will say, "Yes, I am using Mr. So-and-So's plates," and then, "Mr. So-and-So's lens, and Mr. So-and-So's paper," &c., so that he really admits that he is no more than a mere tool, using plates, lenses, and paper, leaving only to him the posing or choice of subject. Not so with Mr. Amateur. If you praise him for some chance good work a professional would probably be ashamed of, nine times out of ten you can see his high satisfaction, but he never mentions the article he uses as having anything to do with it, except perhaps the cheapness of them. To the contrary, he takes not only credit for the pictures he takes, but also it is on his sole account that all improvements up to date are due. Photography has been made by him alone what it is to-day. And to think that the amateur as he is to-day, with his button-pressing, does not exist since ten years. I well remember that, before that time and even well into that time, amateurs used a tripod and ordinary camera, even for instantaneous work.

Time is money, and I advise every professional that is asked to lend his dark room, convenient or not, to charge a fee, and do the same for his advice, and am sure the amateur will have more respect in the future, and find it quite as natural to pay as he does when he uses a wash room or asks the advice of a doctor or lawyer.

By the way, I have read of a certain Club allowing free use of dark room, &c., in Chicago to all visitors. This is very kind of them indeed; but how about the grand generosity of not allowing any amateur, with his little square box, on the Exhibition grounds? Then, what is the use

of dark room, as the principal views to be taken in the windy city are smoke and black buildings, and may be an endless perspective of flat lands on one side and a lake on the other. Perhaps next winter an exhibition of all views taken by amateurs will be interesting, especially those of Chicago, which, if superposed, as is sometimes done with portraits to get a family type, will probably be very successful to show Chicago as it is week days, with so much smoke and dirt that going out fresh and clean at eight a.m. you can return at six p.m. to play minstrel without cork, and linen to match.—I am, yours &c., A. Levy.

July 3, 1893.

To the Editor.

Sir,—I am greatly at a loss to account for the recent outburst of vituperation on the part of a portion of the professional photographers against the amateurs of photography. It is natural, in envious natures, to hate a man who either does better work than theirs, or who has gained a success which they begrudge him; but a little sense of justice would show them that what they complain of is only a proof of their own inferiority in some respect, and that it is the amateur who has always led the way to the improvements in photography, and who has made by far the greater part of the discoveries which have brought it, from the black art it was once—so difficult and uncertain that the masters of it in any city could be counted on the fingers of one hand—to be a process so simple than anybody can practise it; so that probably three-fourths of the professionals, and most of the grumblers, who are the least successful of them, could not have gained a bare living at it if the amateurs had not made the sailing smooth for them. Will any of the grumblers give us a list of the processes, dry or wet, perfected by all the professionals in Europe and America? Did one of them discover photography? Did one of them, before becoming a professional, discover wet collodion? Are not all the dry processes known by the names of amateurs? Did a professional discover the bromide process, the use of tannin, and other preservatives, the collodio-bromide emulsion, the washed emulsion, the gelatine process? Did the professional invent the camera which made outdoor photography a practical affair? I remember well a clever professional, in the days when I was groping about for the perfecting of dry collodion, thirty years ago, and, though not in easy circumstances by any means, spending from 50*l.* to 100*l.* a year in experiments and material to attain this purpose, replying to my question why he did not take up the processes, that "he was not going to waste his time in experiments, but should stick to what he knew;" and he did, but in the course of time, marrying a wife with money, he forgot that he had ever been a professional, and took to working dry plates, not even then making improvements, but, as he could then afford it, buying his plates. I should like to see the brave list of the contributions to the present state of photography which have been made by professional photographers—not those who having been successful amateurs for a time, or artists, finally decided to adopt photography as a business, being unable to spend any more on it with nothing coming back, and being fascinated by it, but those who, having taken it up as a business, had set themselves to perfecting it for the good of the profession. I do not say there have been none, and in the discovery of chemical agents, developers, &c., there have been some I know, but how many? This uproar of indignation at the amateur, because he is supposed, by taking the portraits of his friends for nothing, to be keeping a hypothetical piece of bread out of the mouth of a professional, or because he brings home from his travels some collections of negatives which are absurdly supposed to interfere with the sales of the views of some needy landscape photographer of some quite other views of quite other lands, is not only supremely ridiculous and silly, but it is ungrateful, for what the photographer does in this way to injure the interests of trade is purely conjectural, and, even if actual, is so little that no evidence of it can be found. I can speak with intelligence on this subject, for I have been one of the worst offenders, if offence there has been. I went to Greece some years ago, and amused my idle days with photography instead of sticking to my painting as I ought; but, finding that there was not to be got in all Athens a photograph of the ruined temples there which was taken with the most elementary knowledge of what was needed for the archæologist and architect, I set to work and made a complete set of the ruins on the Acropolis, and presented them to the Hellenic Society. The same I did in Sicily. Now, if I had so interfered with any professional gaining money, it must be on one of two grounds—either I have done better work than any professional had done before me, or I had found a field no one had cared to occupy. In the former case I only interfered with a man who did not know the business, and, in the second, I found a field which interfered with that of no photographer. If my fancy were to photograph my friends, I should come into collision with the local photographer in one of two ways—I should make a better photograph of my friend than he would, or I should prevent him from having the work done by the local by doing it more cheaply. In the former case, again, I should benefit the profession by showing them how to do better work, and should only interfere with them by becoming a professional like the sculptor Salomon, which would be still worse for them. In the second case I should only interfere materially by having a large circle of friends and spending a great deal more on them than they could get the portraits done for by the professionals, for this kind of amateur work costs more than it comes to, and helps the apparatus-makers and dealers more than it injures the photographer. But, in fact, the friends of a man who can afford to waste his time and money in taking their photographs are not likely to be so poor as to go to him to save money, or is he likely to spend a crown for them to save them two-and-sixpence? To compete with a tolerable professional, one must have a good studio and lenses adapted, and there are very few amateurs in this position—not enough to talk about.

No, friend professional, business is dull because it is an easy one to follow, and, if the amateur has done you any harm, it is precisely in making photography easy for you as well as for the others, and this has led too many men into it. Raising your prices will only draw more competitors. If you really love it as an occupation, be content with the sacrifice it demands; if you don't, then drop it, and go to a business where there is less competition. But don't make a fool of yourself by talking about the amateur taking the business away from you, for all he can do is not a drop in the bucket, and my own experience is that I have made twenty times the work for the printer that I have taken from the maker of the negatives.—I am, yours, &c., W. J. Stillman.

Rome, July 4, 1893.

To the Editor.

Sir,—It has amused me to notice, in the recent correspondence on photographic depression, how many despondent professionals trace their troubles to that *fons et origo mali*, the much-abused amateur.

"Find us some process which the amateur cannot imitate." "Put an annual tax of ten pounds on the owner of every twelve-and-sixpenny hand camera." "Let no professional worthy of the name supply either chemicals, apparatus, or advice to one of the hated tribe." "Let all photographers plying for hire be numbered and licensed like so many hackney cabmen.' These are some of the more practical suggestions made by those of your correspondents who abstain from mere ill-tempered and inaccurate diatribes against amateurs in general.

May I, as an amateur who has never poached on professional preserves, and whose productions merely serve, prove—if proof were necessary—the immeasurable inferiority of amateur as compared with professional photographs, offer one or two suggestions.

When your house is on fire, do not begin to abuse the man over the way because his building interferes with your ancient lights. On the contrary, take off your coat and look around for a bucket.

Take the first of the proposals quoted above, the wail for a process beyond the skill of the amateur. I *have* heard that the carbon process of printing is very cheap, very permanent, very artistic, but not very easy, and only suitable for good negatives such as amateur negatives seldom are. Yet look through any photographic album and how many carbon prints do we find? and when we do find them in how many cases were they produced by the man whose name appears on the mount? In nine cases out of ten they are the work of some firm of trade printers, done to the order of some sitter possessed of discrimination in matters photographic.

Here, then, is a process ready to the hand of the photographer who wishes to distinguish his work from that of the run of amateurs. But unfortunately it is a process which requires skill and judgment, and printing cannot be delegated to boys and girls of tender years.

On the other hand, there is a process which the professional would in ninety-nine cases out of a hundred be far better without. How many young girls who could not draw a ball in a saucer well enough to satisfy the assistant master at the Stoke Poges School of Art, are allowed to work their sweet wills with the lineaments of Tom, Dick, and Harry to them unknown. Your photographic retoucher will not hesitate to rush in where Sir John Millais or Mr. Shannon would fear to tread, and with a light heart destroys all trace of character and likeness, at so much per square inch.

Let the professional photographer no longer confine himself to the simplest and most mechanical operations, but take advantage of many beautiful though difficult processes which will lend distinction and character to his work. Let him do away with ignorant and tasteless retouching and hackneyed and unmeaning accessories. Let him adhere less rigidly to accepted canons of posing and lighting, and become a little more unfaithful to the gospel of "sharpness." In short, let his least considered production show evidence of individual thought and taste, and we are likely to hear less about "bad times" and "shammateurs," in the future.—I am, yours, &c., L. C.

54 *Loftus-road, W., July* 17, 1893.

To the Editor.

Sir,—There has been lately a rather long and altogether one-sided correspondence on this subject.

The dark side has appeared long enough; let us look at the bright side. What good has the amateur done for us? Let our memories go back eighteen years or so, when there were no amateurs of the sort we get now, and see what the state of things was. There was pyro, 4*s.* per ounce; half-plates (dry), 6*s.* 6*d.* per dozen; 10×8 dry plates, 23*s.* per dozen nett, and many other things in proportion. There were only two

(or three) dry-plate makers altogether! How times are changed now—how, every reader knows—and I am fully of opinion that we have only to thank the much-abused amateur for all these changes. It is quite true that our prices rule somewhat lower, but when the cost of production is reduced to about one-third of what it used to be we must naturally expect prices to drop.

It is desirable, with so many at work, to strike out in some special line as a specialist, and not mix too deep in the general crowd.—I am, yours, &c.,

SILEX (PROFESSIONAL).

London, July 17, 1893.

Answers to Correspondents.

*** *Several Answers are held over through lack of space.*

SPECIMENS.—We have written to the man.

F. G. SMITH.—No directory of London and provincial photographers is published.

B. O. (Burton-on-Trent).—1. Yes, quite safe, if you can get an even coating. 2. It is better to have the sitter's consent.

R. MICHELL.—Heliotype is simply collotype under another name. This process has probably more names than any other process that is worked.

NOVICE.—A simple way of "matting" the gelatino-chloride prints is to squeegee them on to ground glass, or the matt side of a sheet of celluloid.

FAIRPLAY.—So far as we can see, you will have to do the necessary repairs as you have the premises on a lease, and, presumably, it is a repairing lease, like most leases.

PUZZLED.—The markings are not flare spots, and, indeed, do not seem as if due to lenticular agency. Possibly there is a minute hole in some part of the camera which has escaped observation.

WEST.—If the practice of photography is prohibited in the grounds without a special permit, of course a hand camera will not be allowed. Is not a hand camera for taking photographs the same as any other camera?

T. A. W.—So far as photography is concerned, we believe the labour market in America is quite as much overstocked as it is here. There is really less opening for mediocre work in the States than there is here.

A. H. WILLOTT asks: "Should I incur any pains or penalties by publishing photographs of *The Light of the World*, as I have seen them on sale in stationers' windows?"—Yes, you would render yourself liable to be sued.

E. A. RAY.—A lens with an aperture equal to *f*-16 will do for a hand camera, but it can only be used with very rapid plates, or when the light is exceptionally good. A lens with an opening of *f*-8 will be far more generally useful.

G. R. A.—We should think the print was washed for an excessively long time, and that may have something to do with the yellowness, although we are inclined to think, as the markings chiefly show in the backgrounds, that the mounts may be at fault.

DEVON.—The two groups are decidedly good, and the price charged is very low; indeed, very much lower than would be charged by second or third-rate houses in London. We should say you would have no difficulty in recovering the amount in the County Court.

GLASS.—Your customer is under a misapprehension. The bill, though printed, did not become law. It was crowded out at the end of the session, like many others that are introduced. But is it wise, from a business point of view, to say nothing of the morality of the thing, to exhibit a portrait for which you have been paid for taking against the sitter's protest?

G. S. R.—Surely, as you have supplied the portraits of the clergy, and those taking an active part in the church, as well as local views, to the bazaar, and taken payment for them, although you have only charged a little more than half what the local photographer would have done, you can no longer honestly style yourself an amateur. You are a professional in disguise, and are underselling the established local photographer.

A. MCANDREW writes: "Please tell me why many of my vignettes are stained in the whites like those enclosed. The stains do not show in the unmounted prints, and only show after they are mounted and dried. The mounting is done with the best starch made fresh every morning."—The stains are produced by the mounts. The colouring matter on the surface of the card is soluble in water, consequently when moistened with the starch it stains the paper.

T. BIGGS says: "I have two lenses—the largest stop of each is *f*-8. One is by a London maker, and for which a high price was paid; the other is a cheaper one, has no name, and is, presumably, of foreign make. On working them under the same conditions, I find that, to get the same amount of exposure in the negative, the latter requires quite fifty per cent. more time than the former. Why is this the case?"—Many cheap foreign lenses we have seen, although the largest stop has been marked *f*-8 has really been *f*-9 or *f*-10, and we surmise that is the case in the present instance.

ALEXIS writes as follows: "A few months back I bought some mounts from another photographer here, who was giving up business. They have his name and address printed at the back in gold, and over this I have mounted my pictures. In nearly every case, after the pictures have been mounted two or three months, the imprint shows through in the form of fading; also the prints become very spotty. Why is this, and how can it be avoided, as I have a large quantity of these mounts, and, of course, they are no use to me unless I mount the prints over the other man's name?"—The cause is that the imprint is not in gold but in bronze powder. If it were in real gold it would be inert. The only remedy we can suggest is to paste a piece of thick paper over the imprint, and then mount the print on that. But then this would probably involve more trouble than the cards are worth.

T. A. COLE says: "On adding sulphate of iron to a large quantity of old toning baths (acetate) I can only get a very small quantity of gold, far less than I ought to get, considering the paper I use is said to tone with half a grain of gold to the sheet, and I never get more than a sheet and a half toned with a grain of gold. Is there anything that will throw down more gold than sulphate of iron?"—Sulphate of iron will precipitate any gold there may be in the solution. As one and a half sheets of paper have been toned per grain of chloride of gold, we should say there is no gold left to precipitate. Anyhow, the iron will throw down all there is, that may be relied upon.

H. W. L. writes: "Some two months ago I sent you up a print covered with spots, same as enclosed two, to see if you could give me any reason for them, but then you were not able to account for it. We have not had them so bad since then till this day, when nearly every print is so marked. I have tried everything I could think of, such as fixing longer or shorter time, hypo weakest and stronger, new toning bath, and fresh dishes. I thought perhaps the water running on them all night might be something to do with it, so used to turn it off, but all to no good purpose. You will see also the backs are yellow as well. Any suggestion you can make I shall be glad of, as it is a great hindrance to business."—Whatever may have been the fault with the previous prints sent, though we do not remember them, there is no question as to the cause of the defects in these. It is imperfect fixation. Either the bath was too weak, or the prints were allowed to stick together while in the solution. The spots are due to air bells being allowed to adhere to the paper while in the fixing bath. More care will avoid the trouble in future.

OUR CONVENTION.

AND so the time has come and gone,
Our "eighth" is now a finished story,
There only rests when all is done
The recollection of its glory.

This to us all will surely prove
One of the brightest recollections,
And give us, as apart we move,
Food for the pleasantest reflections.

The kindness of our Southern friends,
Our happy trips by road and river,
Heightened by charms that distance lends,
Will dwell within our mem'ry ever.

And thoughts of friendly faces near,
Now severed by a dreary distance,
Be with us through the coming year,
And haunt us with a sweet persistence.

Though "art" is still its highest aim,
Photography its first intention,
I think not least in "friendship's" name
We greet with pleasure our Convention.

While we who loving Scottish skies,
Breathe native air 'neath smiling heaven,
Remember still with pensive sighs
Your leafy lanes, sweet, sunny Devon.

Good-bye; accept from Northern parts,
Kind English friends, this hearty greeting.
We look with hopeful, trusting hearts
To such another pleasant meeting. LASSIE.

THE CONVENTION GROUP.

With this week's JOURNAL *we present a collotype reproduction by Messrs. Morgan & Kidd, Richmond, S.W., of the group of members of the Photographic Convention of the United Kingdom, assembled at Plymouth on July* 5, 1893. *The negative was taken by Mr. R. L. Kidd.*

We also give a key with names of members. In the cases where we have been unable to identify members, we should be glad if our friends would supply the omissions, for mention in the next number of the JOURNAL.

By an unfortunate error we are made, on the picture of the group, to describe the Plymouth Convention as the "seventh" that has been held, whereas, as will be seen by dating from the Derby meeting of 1886, *it should have been the "eighth."*

CONTENTS.

Collotype—Morgan & Kidd, Richmond, S.W. *Negative by R. L. Kidd, Richmond, S.W.*

MEMBERS OF THE SEVENTH ANNUAL PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

HELD AT PLYMOUTH, JULY 3-8, 1893.

KEY TO THE CONVENTION GROUP TAKEN AT PLYMOUTH, JULY 5TH, 1893.

1. Mr. G. Mason (*President*).
2. Col. R. Barrington Baker.
3. J. Traill Taylor (*Past Pres.*).
4. R. Keene.
5. Mr. Lawley.
6. Mrs. Moore.
7. General Preston.
8. Mrs. Morton.
9. A. Seaman.
10. Jno. Brier.
11. J. A. Sinclair.
12.
13. T. Scotton.
14. W. M. Ashman.
15. E. A. Leblanc.
16. J. H. Walker.
17. J. Guardia.
18. R. L. Kidd.
19. F. W. Hindley.
20. S. Weekes.
21. J. L. Lyell.
22. E. G. Turney.
23. H. Sturmey.
24. W. D. Welford.
25. E. J. Humphery.
26. C. R. Rowe.
27. S. H. Fry.
28.
29. Major Lysaght.
30. A. F. Mowll.
31. P. Ennis.
32. A. Tate.
33. Miss Tate.
34. Miss Aldridge.
35. Mrs. Aldridge.
36. H. Hayman
37. A. Werner.
38. E. J. Appleby.
39. E. Marlow.
40. E. Keeley.
41. G. A. Bickerton.
42. T. C. Hepworth.
43. E. J. Wall.
44. J. Fuerst.
45. N. Alker.
46. H. M. Cornthwaite.
47. Mrs. Mason.
48. F. P. Cembrano, jun. (*Hon. Secretary*).
49. C. H. Bothamley (*Past Pres.*).
50 Mrs. Kidd.
51. R. H. Worth.
52. C. H. Moore.
53. S. B. Webber.
54. Dr. Morton.
55. T. R. Dallmeyer.
56. G. F. Treleaven.
57. W. Scorer.
58.
59.
60. — Rooke.
61. Dr. Russell Rendle.
62. — Lewis.
63. H. M. Cooper.
64. F. York.
65. H. Haussmann.
66. Miss M. Mason
67. Miss Mason.
68. Mrs. Lawley.
69. E. Woodward.
70. Mrs. Hirst.
71. Mrs. Seaman.
72. Dr. Mitchell.
73. H. J. Redfern.
74. H. W. Lewis.
75. E. Lambert.
76. C. Croydon.
77. W. H. Lethbridge.
78. Dr. Aldridge.
79. A. Haddon.
80. J. S. Hawke.
81. A. S. Newman.
82. J. L. Benthall.
83. Birt Acres.
84. J. Coombes.
85. — Woodward.
86. A. W. Rider.
87. J. Martin.
88. J. Birtles.
89. Miss E. L. Birtles.
90 Miss Birtles.
91. A. Cowan.
92. A. Lawrence.
93. J. D. Turney.
94. Miss Worth.
95. G. F. Powell.
96. Miss Taylor.
97. Mrs. Morgan.
98. L. E. Morgan.
99. R. R. Monk.
100. E. H. Micklewood.
101. F. Fitz Payne.
102. C. Phipps Lucas.
103. S. Kerswell.
104. Mrs. Lucas.
105.

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CORRECTING MICROSCOPIC OBJECTIVES FOR PHOTOGRAPHY.

The *American Journal of the Medical Sciences* for this month coutains a paper by Professor Henry G. Piffard, M.A., "On a Suggested Improvement in the Correction of Lenses for Photo-mierography, Photography, and Photo-astrography," a copy of which he has kindly sent to us.

Twenty-five years ago, while mieroseopie object-glasses are admitted by the learned author to have been of excellent construction and well adapted to the revelation of the strueture of minute objects to the eye, yet he says the photographs made by them were greatly inferior in clearness and sharpness to the virtual image appreciated by the retina, this being due to the lack of coincidence of the visual with the actinie focus. Dr. Piffard reminds us that, at the period mentioned, the art of photography was almost exclusively practised on iodised collodion plates, which, while very sensitive to the blue, violet, and ultra-violet rays, were but feebly so to the rays of less refrangibility. But, as these latter are more luminous, they impress the eye so forcibly, that the effect of the more refrangible rays is almost obscured when mingled with the others as in ordinary white light. It follows that, in order to obtain a sharp photographic image, it was necessary to either shorten the anterior conjugate focus or move the plate to a point nearer the lens where the actinie rays came to their posterior conjugate foeus.

Dr. Piffard, who is an expert photo-micrographer, is doubtless well aware of the system that was—nay, still is—practised by some in this country to utilise their objectives so as to ensure their acting both visually and photographically; but, as he does not mention it, we shall, pending the publication of his excellent paper *in extenso* on an early occasion, take occasion here to describe it, in the interests of those who are entering this fascinating branch of photography for the first time.

For reasons deduced from the foregoing, microscopic object-glasses must be slightly over-corrected for colour. We are now referring to such as are constructed of ordinary flint and crown glass, and in which eategory is to be found the majority of those in use at the present time. But under-correction for colour is a condition for obtaining the sharpest photographic image.

It is just forty years since the subject of photo-micrography was brought before the Society of Arts by the Rev. W. Towler Kingsley, and he met the then acknowledged difficulty of the non-coineidence of foci by recommending that a new front lens be made for the objective, so that it might be employed visually with the original one, and photographically with the new under-correeted one. This system is, however, very costly as compared with one which was suggested several years afterwards by Mr. F. H. Wenham, if we remember aright. By it the object-glass itself is not altered; but from its upper end, in which is usually serewed a diaphragm to prevent reflections from the interior of the brass mount of the objeetive, this diaphragm is unserewed, and its place taken by another cell, containing a simple convex lens, usually cut out from the centre of a speetacle glass.

By having a few of these of different focal power it is then easy to select one which, when screwed in, shall, by its non-correction, impart to the objective the requisite amount of under-correetion to ensure the coincidence of the chemical with the visual focus. When onee the correcting glass has by trial been found, it is marked, and is always afterwards used when the special object-glass for which it was selected is employed for photo-micrography. The angular aperture of the latter is very slightly inereased by this adaptation, but no one will consider this as a disadvantage.

The system here deseribed for seeuring the desired coincidence of the foci is, in our opinion, greatly superior to that for attaining the same end by displacing either the anterior or posterior conjugates. Any working optician will, at a moderate cost, supply such a cell as we have described, and adapt to it a variety of uncorrected lenses of sueh variety of focus as will serve to correct, photographically, one's whole stock of objectives.

Dr. Piffard says that the photographs of microscopic objects made twenty-five years ago "were crude and unsatisfactory, and were all made with what we would call low-power objectives." In justice to an eminent worker on this side of the Atlantic, Dr. R. L. Maddox, we must point out that this gentleman had, considerably anterior to that period, achieved great suecess in photographing, with a one-fifth of an inch objective, *Polycystina* from Barbadoes, together with several *diatomaceous* forms which accompany them; several frustules of the *Triceratium favus;* front views of the *Surirella bifrons;* various speeimens of *Coscinodiscus*, and other objects. We mention this *àpropos* of Dr. Piffard's remark as quoted above, for we feel assured that this American scientist would be the last to withhold credit to an equally eminent English brother for what he has achieved in the early days of our art-science.

COMPARATIVE DEVELOPER EXPERIMENTS.

A LARGE number of earnest workers in the field of photography find a pleasure in the class of work indicated by the title of this article; but in too many cases the results are either worthless or too indefinite to be placed on record as serious results. Some hope of remedying such a state of affairs is the motive for the remarks that follow. The causes are mainly to be placed in two categories. First and foremost must be placed that most detestable—no other word is so suitable—method adopted by so many platemakers and writers of instructions and formulæ, of giving the proportions of the ingredients in a manner that renders comparison of one with another most difficult, and wasteful of time to a degree that is most irritating. This is, of course, no new complaint; but, if constant iteration will lead to its destruction, then "Delenda est Carthago" should be the watchword of all who would put an end to its inconsistencies and its annoyances. We have lately set ourselves to try a series of experiments with one of the later developers—metol—and a good share of half an hour was wasted in arranging for ready comparison the various instructions published, either by the makers themselves or in other ways. Percentage formulæ were useful; but, until the metric system is more commonly employed by the public generally, we think that grains per ounce will be understood and felt to be most practical by a larger number of working photographers. The manner in which every formula is set down should show at a glance how many grains per ounce, or per pint, or half-pint if preferred, of the various constituents are contained in the given quantity of developer when mixed ready for use. What a boon this would be, if all makers and formula-producers would adopt it, those only who are in the habit of making comparative experiments can say. To all such it is a familiar experience to find a couple of rival formulæ being argued about which, upon being reduced to a standard, are found to be practically identical.

The second of these two main causes is the hasty and incomplete manner in which conclusions are drawn, or rather jumped at, from the briefest of premisses. An experimenter tries, say, a new developer side by side with the one he usually employs; the new solution flashes out the image at once, the conclusion is rushed at and published that it is a "find," excellent for under-exposed pictures. Another is tried, and the image is only beginning to appear when the plate by its side is finished. The new solution is worthless, requires too long exposure, &c. Yet in each case the ultimate developing power may turn out to be the same, and no more exposure value can be got from one than the other.

Then, again, it must be remembered that the experience of many years has so narrowed down the range of formulæ for pyro that the working limits are well known—strength of pyro, proportion of alkali to same, as also the value of alterations in the amount of bromide permissible. But to obtain such ready command of proportions of the various ingredients and their effect on results when an entirely new substance is used would require many trials, and it is the absence of trials of these variations that may make or mar—for a time, at least—the future of any newly introduced developing agent. Before any decision can be fairly made as to the merits of such new substance, it should be tried in various strengths, with varying proportions of alkali and of bromide, and notes made as to the rapidity or slowness with which the image appears, and of all phenomena varying from ordinary experience. Let us now refer to one of the latest developers, metol. Any one trying it for the first time would be very apt at the outset to think that exposure could be reduced when it is used, for the image will flash out, and the surface of the plate present an appearance to that given by a fully developed pyro negative, while a companion pyro-developed plate has scarcely begun to show the high lights. How very needful to avoid rash conclusions here. Then, taking the published formula, we have been at the trouble to extract the data and reduce to an ounce standard (avoiding complex fractions by giving the nearest small one) the formula sent out by the maker, and those given in the reports of eminent experimenters.

	Formulæ by				
	Agents.	Agents.*	Sexton.	Eder.	Pringle.
	New.	Old.			
Water	1 oz.	1 oz.	1 oz.	1 oz.	1 oz.
Metol	1¼ gr.	3¼ gr.	3⅗ gr.	3⅓ gr.	3⅓ gr.
Carbonate of potash ..	7½ „	15½ „	11 „	11 „	11 „
Sulphite of soda	3¾ „	10⅔ „	33 „	31 „	31 „
Bromide of potassium..	¼ „	None.	⅓ „	None.	1 „

By this means a glance shows the peculiarity of each. In the first formulæ published, the metol is to be used at a little over three grains per ounce, but now the agent recommends only one-third that strength. Messrs. Eder, Pringle, and Sexton give formulæ almost exactly alike, save in the use of bromide. The first-named uses none, the second one grain per ounce, and the third a third of a grain. The new formulæ of the agents in this country give six times as much potash as metol, the others only three times as much. There are two conclusions that might be drawn from these fluctuating and varied formulæ: First, that metol is so valuable that it can be worked almost hap-hazard; second, that its actual value is not yet ascertained, as the proportions of the given ingredients for a particular purpose would not have such wide limits as above shown. Let pyro and ammonia be taken, for example; if the ammonia of some formulæ were doubled, hopeless fog would result; if it were halved, the utmost value would not be obtained.

We conclude by saying these remarks are neither for nor against metol; they are made to show the necessity for care in forming judgments, and for varying the modes of using or mixing the developer before a logical conclusion can be justly formed.

City and Guilds of London Institute.—Our attention has been called to several alterations that have been introduced in the programme of examinations for the session 1893–4, and other arrangements. Some new subjects are added, and others divided into two sections. The honours examination in photography is one of them: (1) pure photography, and (2) photo-mechanical processes. And the practical examinations will be held in connexion with the honours grade only. There are several other alterations with regard to the examinations and regulations. For example, the practice of returning, or giving credit for, half-fees is to be discontinued. Some fees have been reduced while others have been revised. Furthermore, the list of teachers has been revised and rearranged. The Institute is making strenuous efforts with regard to technical education, and it is to be anticipated that the new regulations will strengthen them particularly with reference to the really practical side of subjects taught.

* For ordinary use; variations are given for hard or soft negatives.

Art in Business Centres.—Since Sir John Gilbert gave several of his fine works to the Guildhall Art Gallery, several other presents of pictures have been received. Now Mr. W. A. Murphy-Grimshaw has given his picture of the *Haunted Mill*, at present in the Royal Academy, to increase the collection. The Birmingham Art Gallery has also lately been enriched by the acquisition of some fine examples of art metal and wood work, not in this case by donation, but by purchase at the late Spitzer sale. Manchester, as is well known, owns a large collection of fine works of art. While on the topic of art, *The Academy* says that the famous collection of drawings and sketches by old Masters, formed by the late Mr. John Malcolm, has been deposited on loan by his son in the British Museum, where it will soon be made accessible to students. A present of a colossal cartoon by Michael-Angelo has also been made by Mr. Malcolm's son. If good photographs of such works as these were forthcoming, they would be of inestimable value to students; many are, it is true, but they are usually issued at such a price as to be prohibitive to the ordinary struggling art student.

Discoloured Glass Positives.—Amongst the odd work that photographers are frequently called upon to do is to produce copies or enlargements from old glass positive portraits. If the picture happens to be in a good state of preservation, nothing is easier to copy in camera than a glass positive; but, in the majority of instances, it is not. These pictures, from being carelessly produced, and seldom or never being varnished, after a time become discoloured unevenly by a highly non-actinic tint, which causes camera copying to be very unsatisfactory. Most old hands know, though the new ones evidently do not, that, if the black varnish be cleaned from the back of the glass, the stains show but little, if at all, by transmitted light. Therefore they then use the positive as a negative, though a weak one, to print a transparency by contact on a dry plate, and from that make a negative for the end desired. The other day we were consulted as to the best way to produce an enlargement from a badly stained positive. On removing the black varnish, we found, as we expected, that the stains scarcely showed in the centre of the picture when it was looked through. At our suggestion the positive was placed in the enlarging camera, and an enlargement made direct from it, as a vignette, on bromide paper. The result was a picture quite as good as if it had been made from an average ordinary negative. So good was it, that the method deserves a passing note for the benefit of novices.

Metric Weights and Measures.—The vexed question of weights and measures as regards photographic formulæ seems to be as far off a settlement as ever. Whenever any new formula appears from the Continent, whence, by the way, the majority come, it is given in grammes and cubic centimetres, while English ones are written in grains and ounces. Now, notwithstanding that tables are given in the ALMANACS of the equivalents in one system to those in the other, we, and perhaps other journals also, are being continually asked by correspondents to convert a formula according to one system into that of the other. A few years ago the Photographic Club went to some considerable trouble to get other photographic societies to adopt the metric system entirely; but this has not been generally followed. We were recently shown a set of gramme weights stamped with their equivalents in English grains, but we were told by the owner of them that he had to do it himself. Of course, beyond the gramme weight, for photographic purposes, the nearest whole number is near enough. Fluid measures are to be had at some shops graduated on one side with ounces and drachms, and on the other with cubic centimetres. Thermometers are regular articles of commerce with the Fahrenheit scale on one side and the Centigrade, or Réaumur, as the case may be, on the other. Why, then, should not weights and measures marked with the two systems be universal? The additional cost, particularly with the weights, would be merely nominal, and that would be repaid to many photographers by the general convenience.

Photographs of the Milky Way.—Professor E. E. Barnard, who has recently been on a visit to Europe, has brought with him some wonderful photographs of the Milky Way, which are simply a revelation to many of us. These photographs (says the *Observatory*) were taken at the Lick Observatory with a lens made by Mr. Willard, of New York, in 1859, which is one of large aperture (six inches) and short focus (thirty-one inches). Such a lens tends to compress, as well as intensify, the characteristic features of these stellar clouds, the large field allowing one to embrace any of these forms as a whole, and not in detail, as is the case when they are viewed with a telescope. The first photographs, showing the cloud forms, were taken in August of 1890, the portion of the sky being that situated in Sagittarius, and the exposure three hours fifteen minutes. A most interesting picture is that of a section of the constellation of Cygnus, near γ Cygni; this photograph shows some of those curious and almost weird dark spots and dark lanes the origins of which are very doubtful. Mr. Ranyard supposes them to be due to an obscuring medium between us and that part of the Milky Way, but Professor Barnard's opinion is that they are real holes in the cloud structures themselves. Two photographs, with different lengths of exposures (two hours forty-five minutes, and four hours thirty minutes), of the region about M. 11 in the constellation of Sobeski, raises an important point as regards the different structure of the Milky Way. The second picture exhibits details which considerably altered the configuration, not at all brought out in the first one. Not only in these photographs, but in several others of the Milky Way, this fact has been noticed, and Professor Barnard suggests that there may be different orders or kinds of cloud structure implying distance or nearness, or possibly an entirely different order of stars in point of actual size.

Chicago Exhibition.—A recent telegram informs us that the jurors in the Fine Arts Department have elected an Englishman, Mr. W. B. Davis, as president, and Signor Delnero, of Italy, and Signor Delcampio as first and second vice-presidents, with Mr. Dielman, an American artist. Mr. Thacher's plan of awards has been rejected *in toto*, and the following adopted:—A member of the jury will propose a medal to a certain artist. Then this motion must be seconded and supported by a majority of the jurors before the medal can be awarded. As, however, the French, Danish, Russian, and Norwegian Commissioners were not present when the President of the Committee on awards made these concessions, it is understood that the countries named have decided not to enter their fine art exhibits for the jury's examination. This decision will, of course, to an extent, rob the competition of its international character. This "big thing" among international exhibitions seems to have been a more or less unfortunate affair from the very beginning. There have been the strikes and accidents during its building throughout, its chaotic state at the time of opening, and the allegations of "jobbery." Then there was the irritating monopoly with regard to photography, and the unpleasant friction about the awards. Next, the late lamentable fire. Lastly, and that will weigh heavily with our American cousins, the prospect of a financial failure in proportion to the magnitude of the undertaking. By the way, we learn that the American liner companies are not reaping the harvest they expected from British visitors to the West. Last year, in almost every family circle, some one was going to Chicago; now, it is surprising how many, for some reason or other, have abandoned the idea.

RATIO OF GRADATION ON POSITIVE PAPERS.

THE invaluable researches of Messrs. Hurter & Driffield in connexion with the exposure and development of negatives should stimulate photographers to inquire more closely into the character of the various descriptions of films employed in the production of their prints or positives. Not only do these, as is well known, vary in actual sensitiveness, but also in the way in which they render the gradations of negatives of different densities, some giving the best rendering of generally dense images, others again behaving better with thin or delicate negatives.

With no printing surfaces with which I am acquainted does this difference exist to so great an extent as with gelatino-chloride paper

which can be made by varying the formula to work to perfection with either hard or delicate negatives, though generally it may be accepted that the commercial papers work better with a rather thin negative, and give a good result with negatives too thin to print satisfactorily upon albumen paper. The latter of late years, since the introduction of ready-sensitised papers, has materially changed its character, being both more sensitive and more generally applicable to thin negatives than was the case when the home-sensitised article was in use, the alteration being, no doubt, due to the introduction of new organic salts of silver.

But, though the positive papers are known to thus vary, little or no attempt has ever been made to adapt the paper to the character of the negative. In days gone by, if a man had to print from very thin negatives that were worth the trouble, he would use a stronger sensitising bath than usual, perhaps also employing a more heavily salted paper if obtainable. That was about the only direction in which the chemical treatment was varied, except perhaps in carbon printing, where exactly the reverse means were adopted to produce the same result; in other words, for thin negatives a weaker bichromate solution is employed in sensitising. Beyond this, there were various methods of shading the negatives with tissue paper, or matt, or coloured varnish, when the image was too thin to print satisfactorily; but, though many, myself among the number, believe that improvement results from such treatment, others strenuously deny any advantage.

It is many years since the idea first struck me to apply direct measurements to the printing gradations of various papers, but the more I thought about the matter the more I became impressed with the magnitude of the task and the inutility of only half doing the thing. The accounts of Messrs. Hurter & Driffield's researches, and even of the experiments reported in his paper before the Convention by Mr. W. K. Burton, only prove that I was right, though, what a single individual may not do, photographers collectively might very well undertake, especially as in the case of positive paper the requirements in the matter of apparatus are not so great as for the more sensitive negative films, nor is the task one of such intricacy. In the case of all print-out films, for instance, we are spared the complications surrounding development as distinguished from exposure, while, with developed prints, in all probability the same laws established by Messrs. Hurter & Driffield would be found to hold. In fact, the work might be confined entirely to a study of the relative gradations produced upon papers of different kinds, and by light of varying strength.

For this purpose it would be necessary to establish a scale of gradations representing those of a "perfect" negative—if there be such a thing—but at any rate a scale of some sort by which to compare results; and here again Messrs. Hurter & Driffield have already supplied us with the necessary data upon which to proceed in constructing such a scale, as well as the details of its construction, for which I would refer to the two diagrams given in connexion with their Convention article in last issue. Although no detailed description is given, the diagrams, I think, sufficiently explain the principle, which may, of course, be modified in a variety of ways to suit circumstances.

The apparatus there figured is intended for the exposure of plates to the light of the standard candle, but for use in connexion with paper, and almost necessarily to daylight, a different and much simpler arrangement will suffice. Such a one I constructed some years ago consists of a printing frame or dark slide, with closed front, in which a revolving disc, similar to that in Messrs. Hurter & Driffield's diagram, is fitted, the motive power being a driving wheel and band, attached to the instrument after the manner of a chromotrope slide. The disc is arranged to carry movable masks, having openings representing different series of gradation, so that either the general sensitiveness of the sensitive film may be tested or its capability of rendering gradations, either coarse or delicate. The importance of this power of varying the character of the gradation is more important in the case of paper than of films.

With such an arrangement it is only necessary to place strips of the papers to be tested or compared side by side in the printing-frame portion of the apparatus, and to cause the disc to revolve for a given time, or until a given depth of tint is obtained, as the case may be, when not only the relative sensitiveness but also the relative power of rendering gradations will be shown at a glance. Absolute sensitiveness is of no importance in such an experiment; if it be required, of course a standard light will have to be chosen, and this is rather more difficult for slow exposures on paper than for negative work.

Such an apparatus might be constructed and put on the market at a very small cost, and would prove useful in a variety of ways in connexion not only with papers but with negatives, but more especially would it assist the amateur in selecting the best paper to suit his general style of negative.

W. B. Bolton.

CONVENTION NOTES.—II.

What a blessing it is that Plymouth is not nearer to London than 216 miles! If it were, we tremble to think of the inundation of its streets and surroundings by the metropolitan photographer, who would invade the place in shoals. In the history of Convention outings, there is no one place which can offer, in its immediate vicinity, so many delightful scenes for camera work as can Plymouth.

Contrasted with Edinburgh, the town of Plymouth has so few objects of quaint historical interest as to be nowhere in affording food for the camera of the archæologist; but, unlike Edinburgh, one has only to take a comparatively short walk to reach Sutton Pool—the whilom harbour of Plymouth. This Creek of the Cattewater was formerly protected by having a chain stretched every night across its entrance. In this vicinity the Barbican, with its innumerable fishing boats and other shipping, affords excellent themes on which to practise with either the stand or the hand camera, and during Convention week it was difficult to walk many paces in this locality without running against one or the other of these.

It is, however, outside of the town wherein lies the great value of Plymouth to the photographic tourist. It would be difficult to find a more enchanting place for an excursion than the river Yealm (pronounced indifferently Yem or Yam). On the second day of the Convention the kindness of the local Clubs in providing a steamer enabled some seventy or eighty members to visit this river, the entrance to which is two or three miles outside of the Breakwater, an artificial, strongly built erection which stretches well across Plymouth Sound for more than a thousand feet, and protects its shipping inside from the heavy ocean waves. No sooner, however, had the steamer got inside the Yealm, and realised the placidity of its waters compared with the turbulence of those outside, than rain began to fall, and, although soon this was accompanied by lightning and thunder, it failed to damp the spirits of the excursionists, who, well sheltered from the storm, beheld with admiration the beautiful stream with its romantic turnings and richly wooded banks. Had there come a glimpse of sunshine, if but for a minute, many mementoes of that visit would have been carried away, for there were over sixty cameras on board, and their owners were only too anxious to have a shot at such scenery, but the Fates did not so will it. Having cast anchor, advantage was taken of a stay of over an hour to have a lunch, of which it is enough to say that, in excellence and variety, it surpassed all that could have been expected at any well-appointed hotel on shore. We do not know what local arrangements exist for visiting the Yealm, but our advice to all artistic tourists who find themselves in Plymouth is not to return without seeing this river, and selecting for their visit a day on which there are neither rain nor thunderstorms.

Returning to Plymouth *viâ* the Mount Edgcumbe end of the Breakwater, and being thus afforded an opportunity of seeing the grounds of this far-famed place, which we may remark, *par parenthèse*, are generously thrown open to the public by the Earl of Mount Edgcumbe, we picked up a few who could not, either from business arrangements or anticipated *mal-de-mer*, take part in the forenoon excursion, and proceeded up the Tamar, the mouth of which is contiguous to the town. Here let us pause for a moment to say how

much the excursionists owe to Colonel Barrington Baker for his assiduous attention throughout the day. His intimate acquaintance with the Royal Navy, with which he is officially connected, enabled him to impart valuable and interesting information respecting the numerous war ships through which we threaded our way up the Hamoaze. A temporary cessation of the rain permitted of several exposures being made at some of these ships, and of Brunel's masterpiece, the Royal Albert Bridge, which at Saltash connects Devon with Cornwall. Much rain fell during the passage up the Tamar, but towards evening, after tea, the weather cleared, although too late for much good work.

If the weather was unpropitious on the occasion of the Tuesday's excursion, ample amends were made on that of Thursday. At a moderately early hour a very large party left Plymouth by train for Totnes. The town was *en fête*, and the sun shone brightly. After witnessing local processions in honour of *the* marriage, we embarked on a steam launch in waiting on the Dart to convey the party to the pretty town of Dartmouth at the mouth of the river. The launch proving totally inadequate for the accommodation of the large party, a second boat of like dimensions was provided and also filled, the surplus finding accommodation in a third boat. These were taken in tow by the launch, and a merrier party was never seen on the Dart. When a few miles down still another boat, with a small contingent which had preceded the main party, was seen waiting for us in the middle of the river, and it, too, was taken in tow to swell the goodly procession, which, when we reached Dartmouth, must have presented a singular, if not a semi-formidable, appearance. What numerous pictures may be obtained here! But to secure them one must go alone, or, at any rate, with a much less numerous party than constitutes a Convention outing. On the boat nothing but hand cameras could be used for sheer lack of room in which to erect a stand, but on shore, and with stand cameras, pictures will be found everywhere, lying as thick as the proverbial blackberries.

Plymouth and the adjacent towns have given many good men to the world. Mention has already been made of Robert Hunt. He was one of the early investigators into the photographic properties of several substances. We owe to him the knowledge, *inter alia*, of the developing powers of ferrous sulphate. He was the earliest and most competent historian of things photographic that we have had. His *Researches on Light* is a classical work; so, for that matter, is his *Poetry of Science*, together with other equally charming works. His memory will always be green in the recollection of all photographers worthy of the name. To Plymouth also we owe such early Fellows of the Royal Society as Joseph Glanville and Dr. Yonge; such painters as Sir Joshua Reynolds, Sir Charles Eastlake, James Northcote, Benjamin Robert Haydon, Samuel Prout, Samuel Cook, and others. In fine, in mathematics, surgery, horology, electricity, engineering, and literature, Plymouth, with its immediate surroundings, has produced many gifted and eminent men.

In naming some men of mark belonging to Plymouth, we must not omit special mention of J. T. Towson, subsequently Marine Examiner at the Sailors' Home at Liverpool, and the discoverer of Great Circle sailing. He was early engaged in prosecuting photographic experiments, and in 1838-9, along with Robert Hunt, H. Fox Talbot, and Sir John Herschel, was probably the only one so engaged. Dissatisfied with the slowness of the achromatic lenses of that period, he wrote a paper, which appeared in the *London and Edinburgh Philosophical Magazine* for November, 1839, on the proper way to focus for Daguerreotyping with simple lenses, in which he pointed out the difficulty of using the common achromatic lens, the luminous focus being different from the chemical. Towson was also instrumental in preventing the success of Talbot's application for a patent for photographing on glass; for, in 1838, he (Towson) had produced a photograph on glass which, with the knowledge of Hunt, he had sent to Herschel at the time. This was referred to by both as a proof that Mr. Talbot had no claim to an exclusive enjoyment of the privilege of producing photographs on glass.

TELE-PHOTOGRAPHIC SYSTEMS OF MODERATE AMPLIFICATIONS.

If the positive element of a tele-photographic system have a large angular aperture or a high intensity, say *f*-3 or *f*-4, it is possible to produce a combination of considerable magnification (in a short compass), maintaining at the same time sufficient rapidity for all ordinary purposes. With such a positive element, however, it becomes necessary to introduce a means of correction for spherical aberration when the compound system is used for any but one extension of camera and one particular distance of object. The advantages of this type of lens have already been described, as also the manner in which the necessary corrections referred to have been carried out.

Now, if the positive element have only a moderate intensity, say *f*-8 or less, and the magnification required be not great—in other words, if the focus of the negative element combined with it to form the tele-photographic system is not too small a fractional part of the focus of the positive element—the compactness of the tele-photographic system is maintained; and, further, the amount of spherical aberration introduced for planes other than that for which it is constructed becomes a negligible quantity. Again, with a comparatively weak negative, the latter can be made of considerable diameter, so that there is the compensating advantage of a greater angle than it is possible to include as against the loss of magnification.

I was at first inclined to think that a special construction involving comparatively weak magnification in ordinary lenses of the rapid rectilinear type was unnecessary, as most cameras, for a given size of plate, will permit of sufficient extension to utilise one combination only of the doublet designed to cover that plate, and so obtain an image of double the linear dimensions. Further consideration, however, has led me to think that there are advantages of sufficient weight to merit a special construction. The chief disadvantage of using one-half of a doublet is that it requires stopping down in order to cover the plate properly, and, again, there are, of course, only the two definite focal lengths possible with the one lens, *i.e.*, both combinations or one alone.

By the use of a negative attachment to the doublet lens the full aperture can be maintained, and a wide range of foci can be obtained by the employment of one negative lens only, in conjunction with it, controlled only by the separation of the nodal planes of the two elements (but in practice by the camera extension). Moreover, the one positive lens, used in conjunction with a battery of several negative lenses each of different foci, can be made to give any focus one chooses longer than that of the positive used alone, and to include any less amount of angle that one may choose.

After careful investigation I recommend that the rapid rectilinear type of lens (*f*-8, or even *f*-7) should be combined with a negative lens of half its focus, to form a really useful tele-photographic system. (If the negative is less than half the focus of the positive, there is danger of introducing outstanding aberration for any but one extension of camera, and for other than parallel rays; this aberration is only removed by stopping down the positive lens, reducing both angle included and rapidity.) Negative lenses, in this proportion of foci, can be made of larger diameter than lenses of the positive element, and a considerable angle can be included, and necessarily greater equality of illumination is attained than when the negative lens is of smaller diameter than the positive. With the proportion of foci recommended, the attachment to the positive lens is not inconveniently bulky. Weaker negative lenses can also safely be employed, or, in other words, the focus of the negative lens may be more than half that of the positive; in this case the attachment is shorter, the magnification less, but the angle included greater.

The figure illustrates the combination of a six-inch focus rapid rectilinear combined with a three-inch focus negative combination. When the foci are known, it is only necessary to know, or set the separation of the nodal planes N_1 N_2 to completely determine the equivalent focus and back focus (*i.e.*, the distance of negative lens to screen).

If f and f^1 represent the foci of the positive and negative lenses respectively, a the separation, F the equivalent focus, and BF the back focus, then the following simple *numerical* formulæ give the required information:—

$$F=\frac{ff^1}{a+f^1-f} \qquad BF=\frac{f^1(f-a)}{a+f^1-f}$$

for the case in the illustration;

$$F=\frac{6\times 3}{3\frac{3}{4}+3-6}=\frac{18}{\frac{3}{4}}=24$$

$$BF=\frac{3(6-3\frac{3}{4})}{3\frac{3}{4}+3-6}=\frac{6\frac{3}{4}}{\frac{3}{4}}=0$$

Rule I.—To FIND THE EQUIVALENT FOCUS of the combination: *Multiply the foci of the two elements together and divide the result by the sum of the focus of the negative lens and the separation, after having subtracted the focus of the positive lens from this sum.*

Rule II.—To FIND THE BACK FOCUS: *Multiply the focus of the negative lens by the difference between the focus of the positive lens and the separation, and divide the result* (as in the last case) *by the sum of the focus of the negative lens and the separation, after having subtracted the focus of the positive lens from this sum.*

[Note the importance of the separation as affecting the equivalent and back foci. If, instead of making the separation $3\frac{3}{4}$", we had chosen $\frac{1}{4}$ of an inch more—*i.e.*, 4"—the equivalent focus of the lens would be 18", and the back focus 6" only; and if, on the other hand, we had made the separation $\frac{1}{4}$ of an inch less, or $3\frac{1}{2}$", the equivalent focus becomes 36", and the back focus 15". If the sum of the focus of the negative lens and the separation is equal to or less than the focus of the positive lens, then no focus is formed.]

It is interesting to examine the capabilities of combinations by the above rules, and thereby to determine for one's self the suitability of the ratio that must exist between the foci of positive and negative lenses for any particular purpose. The separation between the nodal planes of the two elements is easily *written* for this purpose, but in practice is more difficultly measured.

The object of this paper is to place the matter in the simplest light possible, and happily there is a simple means of setting to work without any fear of mistake as to the conditions under which the instrument is used.

It reats on the determination of the *magnification* of the image *as compared to the positive lens used alone.*

Calling M the magnification, v *the back focus*, and f^1 the focus of the negative lens:—

$$M = 1 + \frac{v}{f^1}$$

in the particular case

$$M = 1 + \frac{9}{3} = 4$$

So that, calling F the equivalent focus and f the focus of positive lens as before,

$$F = f M$$
$$= 4 \times 6''$$
$$= 24''$$

as illustrated in the diagram.

Rule III.—To FIND THE MAGNIFICATION for any chosen extension of camera: *Divide the distance from negative lens to screen by the focus of the negative lens, and add one.*

Rule IV.—To FIND THE EQUIVALENT FOCUS of the combination for any chosen extension of camera: *Multiply the focus of the positive lens by the magnification.*

Having readily determined the magnification, as also equivalent focus for a given extension of camera, the next step is to find the intensity of the tele-photographic combination. This is measured by the clear aperture of the positive element divided by the equivalent focus, as in all cases. The intensity values or their equivalents are now always marked upon the diaphragm notation of positive lenses, so that the intensity of the compound system is most readily determined by reference to the intensity of the positive system and the magnification. It is expressed thus:—Calling I the intensity of positive lens and M the magnification as before,

$$\text{Intensity of system} = \frac{I}{M}$$

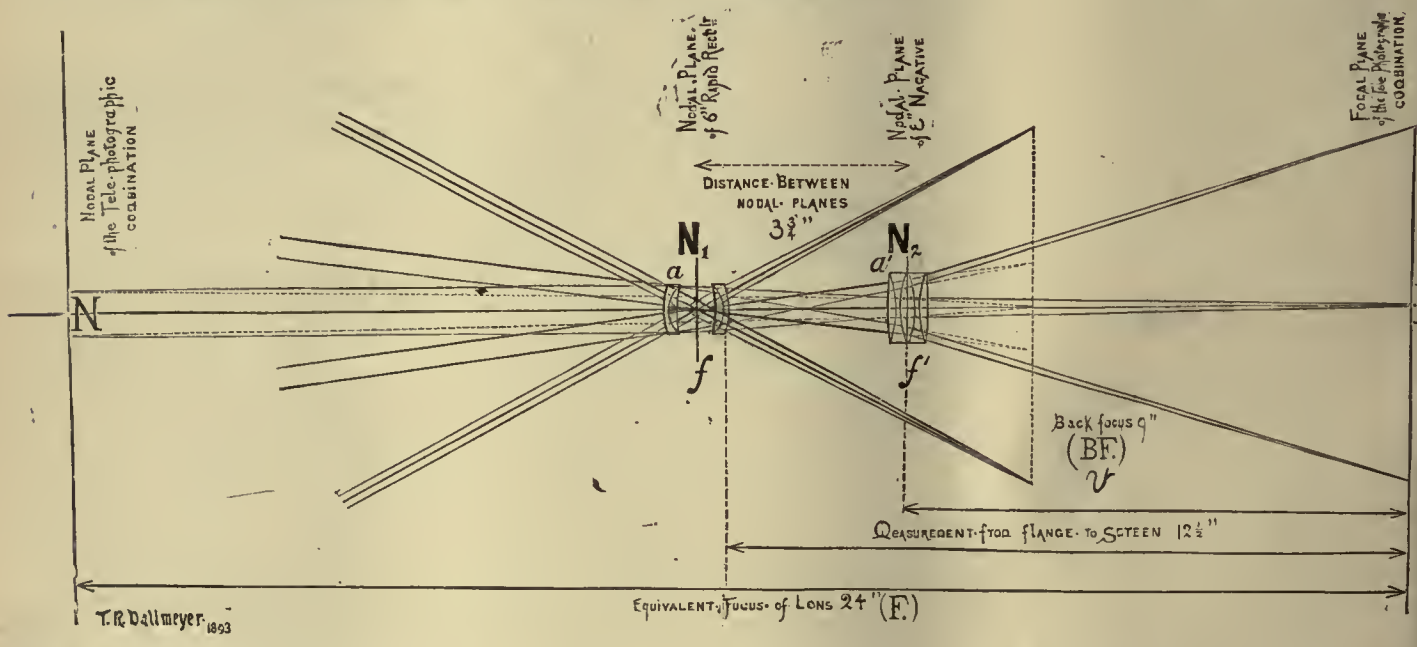
in the particular type of case illustrated;

$$\text{Intensity} = \frac{\frac{1}{8}}{4} = \frac{1}{32}$$

In the actual example illustrated, the intensity of the rapid rectilinear is *f*-7, and the intensity of the tele-photographic system *f*-28, for the particular extension.

[Note.—With less magnification and less camera extension, the intensity increases.]

Rule V.—To FIND THE INTENSITY for a given extension of camera when magnification is known: *Divide the intensity of positive lens by the magnification.*



Simple rules cannot, unfortunately, be given for the remaining two data that should be known to fully determine the capacity of the lens system—viz., the plate that can be covered and the extreme angle included—but the formulæ to obtain them are readily used.

I give them applied to the case illustrated.

(1) To DETERMINE THE DIAMETER OF THE PLATE COVERED:—

Calling D the diameter of the plate,
a the full aperture of positive lens $\frac{1}{8}$",
a^1 " " negative lens $\frac{5}{4}$",
and v, as before, the back focus, 9",

$$D = (v + f^1)\frac{avf^1 \times a^1 f\,(v \times f^1)}{f^1[v(f - f^1) \times ff^1]}$$
$$= (6 \times 3)\frac{\frac{1}{8} \times 9 \times 3 \times \frac{5}{4} \times 6 \times 12}{3[9 \times 3 \times 6 \times 3]}$$
$$= 12 \times \frac{113\frac{5}{8}}{3 \times 45} = \frac{909}{90} = 10{\cdot}1''$$

Thus it appears that with an extension of 9" from negative lens to screen, a circle of 10" is covered at full aperture—nearly sufficient to cover a "whole plate." In the diagram I have indicated the lens as covering only the diagonal of a 5×4 plate, but it will be seen that half of the whole pencil incident upon the front of the positive lens is received by the extreme margin of this plate. To find the covering power for any smaller stop inserted in the positive lens, it is only necessary to measure its diameter and substitute its value in place of a in the formula given.

(2) The extreme angle included by the combination is given by the following formula:—

Calling a the angle, and F the equivalent focus, as before,

$$a = 2\tan^{-1}\frac{D}{2F}$$

$$= 2\tan^{-1}\frac{10{\cdot}1}{48} = 2\tan^{-1}{\cdot}210416$$

From the table of natural tangents we find tan 11° 53″ = ·21043, and hence the extreme angle that can be included is 24° nearly.

When the lens is used to its utmost limits, it will be found that the angle included is approximately a constant for any extension of camera, *i.e.*, with a fixed aperture of the positive element.

It may be well to point out, in reference to the diagram, that a back focus (measured from the negative lens to screen) of only 5½″ is really necessary to cover the plate indicated (viz., 5×4) if full aperture be used.

To work the matter out practically, we have for this a back focus of 5½″. The magnification $M=1+\frac{5\frac{1}{2}}{3}=2{\cdot}8$, and the equivalent focus $F=M\times f=2{\cdot}8\times 6=17''$.

$$D=(v+f^1)\frac{avf^1+a^1f(v+f^1)}{f^1[v(f-f^1)+ff^1]}$$

$$=(\tfrac{1}{2}^1+3)\frac{\frac{7}{8}\times\frac{1}{2}^1\times 3+\frac{5}{4}\times 6\times(\frac{1}{2}^1+3)}{3[\frac{1}{2}^1\times 3+18]}$$

$$=\tfrac{1}{2}^7\times\frac{1251}{24\times 69}=\tfrac{1}{2}^7\times\frac{139}{8\times 23}$$

$$=\frac{2363}{368}=6{\cdot}4,\text{ the diagonal of a } 5\times 4 \text{ plate.}$$

Further the angle taken in is—

$$2\tan^{-1}\frac{D}{2\times F}\,2\tan^{-1}\frac{6{\cdot}4}{34}=2\tan^{-1}{\cdot}1882.$$

And, from table of natural tangents, tan 10° 40′ = ·1883, and thus the angle included is 21° nearly.

I have given a formula for the distance from the *flange to focussing screen* in my paper before the Society of Arts (published March 3rd of this year), but have not given it here, as the "back focus" is most readily measured, and this measurement, as already pointed out, is the simplest cue to all further information that is desired or necessary.

I hope that the very unpopular "formulæ" contained in this paper may not detract from its interest to the ordinary reader, for the formulæ are *readily interpreted* by any one with a knowledge of arithmetic.

In conclusion, I may add that the effect of the form of negative lens adopted is one that tends, by its moderate power, to flatten the field of ordinary aplanatic lenses without introducing "reverse" curvature; it minimises the tendency, in tele-photographic systems generally, to introduce pincushion distortion, it eliminates the violent chromatic fringes brought about by negative lenses of the double concave type, and diminishes the astigmatic aberration in the eccentrical pencils.

T. R. Dallmeyer, F.R.A.S.

CONTINENTAL NOTES AND NEWS.

Clearing Negatives Developed in Impure Water.—M. E. Forestier, in *L'Amateur Photographe*, says that the quality of the water used in making up developing solutions is not always irreproachable, which causes the lights and half-tones of a negative to have their transparency degraded. In order to remove this veil, he recommends that the plate, after fixing and washing, should be immersed in a solution of—

Water	1000 c.c.
Oxalate of iron	20 grammes.
Alum	80 „

This clears the negative, which should then be well washed.

The Fluorides of Sodium and Potassium for Stripping Purposes.—These two salts, which are prepared by saturating commercial hydrofluoric acid with sodium or potassium carbonate, take the form of white crystals, easily soluble in water, and present no danger in handling them, while they form excellent substitutes for hydrofluoric acid, which requires to be used with considerable precaution. The alkaline fluorides in the presence of an energetic acid, such as sulphuric acid, set free hydrofluoric acid, the alkaline sulphate being formed at the same time. Taking advantage of this reaction to produce a trace of hydrofluoric in a film of gelatine attached to a glass plate, the gelatine will be found to leave its support with as great facility as if hydrofluoric acid were employed. To produce the minute quantity of hydrofluoric acid necessary for the operation, M. L. Mathet says he first places the plate in a solution of alkaline fluoride, leaving it therein for three or four minutes, then, without washing, immerses it in a ten per cent. sulphuric acid solution, when the film will soon commence to regularly detach. He suggests that the plan would be available for cleaning off old negatives. In order to prevent the film, when detached, from expanding, the negative, before being stripped, should be soaked for about an hour in a five or six per cent. solution of chrome alum, being afterwards washed in several changes of water before the application of the fluoride and sulphuric acid.

The Boiling Water Reducer.—A writer in a contemporary advises the immersion of over-toned prints [presumably albumen, although it is not stated] in boiling water until they have toned back sufficiently. The prints are then placed in cold water.

Toluol Matt Varnish.—Toluol is a product of the distillation of coal, from which it is obtained at a temperature of between 100° and 130° C. It is analogous to benzine. According to Lainer the following formula with toluol gives a good matt varnish:—

Ether	100 c.c.
Sandarac	100 gr.
Toluol	350 to 400 c.

The powdered sandarac is dissolved by agitation in the ether, and, after filtration, the toluol is added. The varnish is employed in the usual manner.

Photography without Light.—Captain Colson states that in a picture on albumen paper of a bronze object, such as a coin, can be obtained by moistening the paper and placing the coin in contact with the surface, a reduction of silver takes place, and in a few minutes an impression similar to that producible by light is obtained, which may be toned and fixed.

Flexible Glass.—The following is the formula given by *Science Illustrée* for a flexible substance as transparent as glass. Dissolve four to eight parts of pyroxyline in alcohol and ether in the proportion of a one per cent. solution. Then add two to four per cent. of oil of rice or any other non-siccative oil, and four to ten per cent. of resin or Canada balsam. Coat a plate of glass, and dry in a warm current of air at 50° C. This will give a sheet of a durable, unbreakable, transparent substance, impervious to acids and alkalies, and less inflammable than ordinary collodion, and of any desired thickness or colour. With zinc oxide it has the appearance of artificial ivory.

A Very Rapid Collodion Process.—Having experimented with Dr. Hill Norris's process, which was patented some four years ago, without obtaining satisfactory results, M. P. David, of the Service d'Identification de la Préfecture de Police, Paris, has introduced some modifications of his own, and gives the following method of preparing a dry-collodion plate of a sensitiveness about 22° or 23° Warnerke. He coats a plate, 180×240 cm., with 25 c.c. of collodion, containing eighteen grammes of silver nitrate and seven to eight grains of pyroxyline per litre. The film being set, the nitrate is bromised in a bath of

Potassium bromide	80 to 120 grammes.
„ iodide	0 01 „
Gelatine	2 „
Distilled water	1000 c.c.

Sensitiveness is obtained by immersing the plate for a greater or less time in a solution of

Potassium bromide.....	18 to 25 grammes.
Gelatine	1 "
Distilled water	1000 c.c.

The sensitiveness increases with the temperature of the bath. At 70-75° the plate is left in for about two hours, at 90-95° for one hour. The figures are, however, approximate. The plate is then washed and dried. Contrary to what might have been supposed, says M. David, the collodion film does not show any tendency to leave the support even at a temperature of 100° C., provided that the surface of the glass has been carefully prepared.

No more Double Exposures.—For the modest sum of three francs a Bavarian gentleman undertakes to impart particulars of a method whereby the amateur may discover whether a plate has been exposed or not, and this without impairing the original quality of the plate. They should render impossible the oft-accomplished feat of "securing thirteen pictures on a dozen plates." The catchpenny trade is always with us, it seems, even in photography.

Black tones in Ferro-prussiate prints.—A contemporary says that ferro-prussiate prints acquire black tones by treatment with a solution of silver nitrate followed by development with iron oxalate. The print fixed and washed as usual is placed in a solution of silver nitrate, in which it is left until it has bleached, when it is placed in the developing solution. If, after development, it is placed in a solution of hypo, the black tone will tend to disappear, passing back to the blue stage. Thus, with a little care, a print may be obtained, in which the deep shadows are black, while the half-tones are blue.

PHOTOGRAPHIC INDUSTRIES.

The Lantern-slide Factory of F. York & Son.

It was our privilege, on returning home from the Photographic Convention at Plymouth, to be permitted to break the journey to visit a very important photographic industry, of which a brief account will interest our readers.

Very few there are who are not more or less intimately acquainted with the lantern slides, either individually or in series, so well and so long associated with the name of F. York & Son, of Notting Hill, London; but it is not equally well known that these slides are produced in the town of Bridgwater, Somersetshire, for here is situated that factory from which emanate in hundreds of thousands those little gems of art whose function it is to delight, instruct, and amuse.

It is no figure of speech to say that more slides are issued from the offices and distributing centre of this firm at 67, Lancaster-road, London, than from any other centre of operations in the world; and even several years ago, when writing some notes of a visit to this distributing centre of the firm, we spoke of their negatives and output as being measurable by the ton weight; but since that time these have been very greatly increased. Some years have now elapsed since, with a sentimental regard for his native town, Mr. F. York decided upon selecting it as his place of manufacture.

Under the guidance of the veteran chief, whose wonted energy does not seem in the slightest degree to be impaired, and his resident local manager, we have been privileged to inspect the whole of the Bridgwater factory and witness the various operations there carried on. Mr. York himself was, nay, still is, a great traveller, and, when he visits scenes or towns either at home or abroad, he rarely terminates his visit without carrying away with him negatives representing every salient feature of the locality thus visited, whether such be in the West India Islands, Monte Carlo, and other Italian towns, or even places of equal or greater merit, although of less distinction at home, such as those selected for Convention meetings. His camera and his aim are true; he selects his subjects by instinct, and, while having a pardonable love for the civic palaces now to be found in every town of any pretensions, still he is not averse to

> "Loiter by the peasant's cot,
> And pot it with unerring shot."

The Bridgwater factory occupies two houses in a quiet street, with out-houses erected in their gardens behind.

We first visited the negative room. This is a fireproof structure, strongly built and slightly isolated from the other buildings. Humanly speaking, there seems no chance of the valuable contents sustaining damage from fire. These are arranged in boxes on shelves around the walls, the numbers on each corresponding with those in the catalogue of negatives in the possession of Mr. King, the manager; so that, when an order from any subject is received by letter or telegram from headquarters, he can, by referring to his negative catalogue, lay his hand at once upon the package in which the required negative is contained, and to which it is immediately returned when done with.

The only kind of glass used is Chance's Crown, which York & Son find to possess certain advantages over others in respect of brilliance of surface, flatness and freedom from certain defects, which, although small to the eye, are visible in a marked manner when the picture is shown on a scale of great magnification on a fifteen or twenty foot screen.

The negatives in most cases are taken on 5 × 4 plates and, as we have said, there are many thousands of these in stock, for during the twenty-five years that this business has been carried on the number has been ever constantly increasing. The process of reproduction is wet collodion, which is supplied mainly by two makers if we judge of this by the enormous number of large labelled bottles we saw in a repository of "dead men." The transparencies are all taken on plates seven and a half inches square, this being of the best quality supplied by Chance Brothers, of Soho, Birmingham, and already alluded to. Of this glass thirty gross per month are regularly supplied. There are four transparencies printed on each plate.

There are three dark rooms in which the plates are coated and developed. These, when coated, are sent by a lift into the room above, where they are exposed in cameras which point upwards to the sky. But, as even Somerset skies often vary in their brightness, the exposers above are in verbal communication with the developers below, who occasionally call out to give so many seconds less or more exposure to the next lot according as the light gets brighter or grows more dull. In the exposing room are four cameras with repeating backs, which slide both vertically and horizontally, and they are adjusted so as not to necessitate focussing. After exposure the plates are sent down for development and subsequent treatment.

When the rush of work or the darkness of the weather necessitates it recourse is had to artificial light. This consists of a kerosene lamp as a source of illumination, the light from which is concentrated upon the negative by a five-inch compound condenser, and is then transmitted through an objective to the sensitive plate, an average exposure of twenty seconds being given. As there are quite a number of these copying lanterns, the firm is rendered independent of the weather, seeing that work may be carried on by night as well as by day.

The developer employed is a ferrous-sulphate one, so prepared as to give the utmost clearness and gradation with purity of the whites. After being fixed in hyposulphite of soda, the transparencies—of which, as stated, there are four on the plate—are toned. It is no secret that a solution of a salt of platinum is the toning agent employed by York & Son. Seeing that platinum behaves in a whimsical and unreliable manner in the hands of many, bleaching in some cases and giving an exceedingly heavy and black image in others, investigations were long ago gone into by the firm, the result of which is that the platinum toning bath now and for some years employed is stable and reliable, its erratic tendencies being eliminated. In this lies the chief secret of the uniform tone, which is such a characteristic of York's slides that they can be distinguished from most others at a glance. The platinum toning also confers such stability, that we are not aware of any case of fading of the image ever having been known to occur with these slides. Varnishing follows toning, the varnish being a colourless spirit one.

The system adopted in severing the plate, which is seven and a half inches square, ensures identity in the four transparencies impressed thereon. After a considerable pile has been prepared, the examiner then takes them in hand, and unceremoniously rejects every transparency on which there is the slightest blemish, or which in any respect falls short of what in his estimation a transparency ought to be. Owing to the experience of the workpeople and the care taken throughout, the number rejected is but few, and these, after having had the films stripped off and being cleaned, are employed as cover glasses.

Concerning the mounting, it is not necessary we should describe it further than to say that starch paste is invariably used as the mountant. When gum is employed, it is found that, sooner or later, it ceases to adhere to the glass and leaves it. Each picture has its title printed in small type on a slip of paper, which is pasted on the edge of the finished slide. This is convenient for reference when a quantity are packed in

grooved boxes, as the subjects are thus known without the necessity of withdrawing them for inspection being experienced. It is also useful in selecting and arranging subjects for lectures or miscellaneous entertainments.

Some of the rooms are devoted to silver printing, and there is also a large carpenter's shop on the premises, for, as may be readily supposed, the packing and sending away of goods forms no inconsiderable item in the day's work of a busy establishment like this.

We have said that the factory is in Bridgwater, and may incidentally observe that the river on which this town is situated is the only one which supplies the material out of which "Bath" bricks (so called from the name of the originator of the industry of that well-known domestic article) are formed. Each tide deposits a large quantity of the sand suitable for the purpose for a mile above and a mile below the town. Beyond these extremes the deposit is either too fine or two granular for this industry. The finer deposits are, however, utilised in America and elsewhere in the manufacture of sapolio and kindred soaps.

Returning for a moment to York's lantern-slide factory, there were twenty-six hands employed at the time of our visit.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.*

The following paper was taken as read:—

ANASTIGMATIC APLANATISM AND THE ZEISS ANASTIGMATIC LENSES.

By Dr. Paul Rudolph (Jena).

[Translated from the German MS.]

The anastigmatic lenses of Zeiss made their first appearance scarcely two years ago; nevertheless, they have attracted the general attention of the photographic world, and, despite considerable adverse criticism, proved a great success. It would, therefore, be interesting to examine the special features to which these new objectives owe their popularity.

Over 7000 lenses have now been sold, and though there are still many professional photographers and amateurs who have not had an opportunity of testing the powers of the anastigmatic lenses from personal experience, it may be assumed that nearly every one has heard of them or has seen photographs produced by them. The Zeiss anastigmatic lenses are well adapted for portraits and groups, for copying and enlarging, for interiors and flashlight exposures, and for outdoor instantaneous photography, for architecture, landscape, and photogrammetric work.

Experts unanimously pronounce the Zeiss anastigmatic lenses to be superior to the older objectives, and praise their extensive range of applicability. We may refer to the respective writings of Koster, Faber, Wallon, Eder, Vogel, and others.

The following remarks are based upon the criticism of these experts, and, in particular, upon a paper read by me in March, 1892, in the Free Photographic Association of Berlin.*

The Zeiss anastigmatic lenses are dissymetrical doublets, consisting of an achromatic anterior part whose *flint* has the higher refractive index, and an achromatic posterior part in which the *crown* has the higher refractive index. These two cemented parts of the doublet possess, therefore, opposite differences of refractiveness in the crown and flint glasses employed for achromatisation.† This embodies the important principle by which it became possible to effect anastigmatic aplanatism of a system of lenses corrected spherically and chromatically for large apertures.

The series of new glasses produced about six years ago by the glass works of Messrs. Schott & Co., of Jena, rendered it possible to practically realise this principle in the construction of the Zeiss anastigmatic lenses.

Let n_f, n_c, n_d be the refractive indices of a certain glass corresponding to Fraunhofer's lines, F, C, and D, then the ratio $\frac{n_f - n_c}{n_d - 1}$ represents the relative dispersion for the interval C-F. With the older series of glasses this value increased in a measure as the refractive index increased, *e.g.*,

Crown of $n_d = 1{\cdot}5166$ had $\frac{n_f - n_c}{n_d - 1} = 0{\cdot}01643$.

Flint of $n_d = 1{\cdot}6129$ had $\frac{n_f - n_c}{n_d - 1} = 0{\cdot}02708$.

In order that the anastigmats may be constructed, it is, however necessary a range of glasses in which any given refractive index may be coupled with any desired dispersion. This postulate is realised, *e.g.*, by the following glasses made by Messrs. Schott & Co.

The sodium lead glass, flint $n_d = 1{\cdot}5205$ of relative dispersion, 0·01956.

The barium-silicate glass, crown $n_d = 1{\cdot}6112$ of relative dispersion 0·01747.

The refractive index of the former, viz., 1·5205, would, in the older series of glasses, necessarily imply a relative dispersion of 0·01700, while to obtain a refractive index of 1·6112 with the other glasses the relative dispersion would have to be about 0·02700, *i.e.*, sixty per cent. higher.*

All photographic lenses preceding the anastigmats had either a very much curved field, or, if flat, an astigmatic field. In the latter case the image was perfect in the centre, but the quality of the image declined towards the edge.

It may be useful here to define what is meant by a curved, flat, and astigmatic image.

Let the object be placed in a plane which is accurately vertical to the axis of the objective, or let all the object be at so great a distance from the objective as compared with the focal length of the objective, that the difference of the distances of the different objects may be neglected. Then *the field of an objective is* considered to be *curved* if different positions of the focussing screen are required for *sharply* focussing an object point in the axis (centre of the image), and an object point lying outside the centre of the image.

The whole of the older photographic lens types exhibit curvatures of the image, such as to necessitate the distance of the focussing screen being shorter for marginal points of the image than for axial points. The points of distinct delineation are, therefore, situated upon a curved surface, whose concave side is presented to the objective. Fig. 1 represents a section of the image surface, and a plane passing the axis of the objective. The dotted line *a* represents the ideal image plane, which intersects the axis in the axial image point, and is at right angles to the axis of the objective, while curve *b* represents the actual surface of the image.

Fig. 1.

The *field* is *flat* if the position of the *focussing screen* is *the same* for central and extra-axial points, *i.e.*, if the sharply focussed points are all contained in a plane which is at right angles to the axis of the objective, or if these points lie in the ideal plane of the image.

The image is *astigmatic* if sharp images of *lateral*, *i.e.*, extra-axial, *points* may be obtained by *two different* positions of the focussing screen. The two images are not exactly similar to the object; one of them shows distortions in the direction radiating from the axis (radial distortion), while the other exhibits distortions in the directions at right angles to the radii (tangential distortion). This fact may easily be demonstrated by means of an "aplanatic" lens, say, by using a small circular disc having a diameter of only a few millimetres situated *outside* the axis and attempting to sharply focus it. With the nearer position of the focussing screen, the image of the disc appears as a radial line of a breadth proportional to the diameter of the disc. With the longer distance of the screen, the image is an arc of a circle concentric to the axis of the objective (tangential distortion). The lengths of the radial and tangential portions of a line are essentially dependent upon the difference of the two positions of the screen, and increase continuously from centre to margin in the case of the "aplanatic" lens. With objectives yielding astigmatic images, there are thus two image surfaces conjugate to one and the same object plane. These two image surfaces touch each other in the axial image point, and the distance between them increases continuously from centre to margin. "Mean curvature" may be defined as that surface which represents the arithmetical mean of the deviations of the two image surfaces from the ideal surface. The dissimilarity between the details in the two image surfaces *inter se*, and the original increases from the centre to the margin. The following is an interesting experiment:—

* *Photogr. Wochenblatt*, Berlin, 1892, Nos. 18 to 21.

† "Crown" and "Flint" are here placed in opposition, not with respect to their chemical composition, but are considered with respect to their *optical properties*. The same glass may, therefore, appear in two different achromatic combinations as lenses, either as "Crown" or "Flint" (*vide* Eder's *Jahrb.*, 1891, p. 221., Rem.). In the following remarks "Crown glass" is always understood to refer to that glass of a binary lens, which is less in *relative* dispersion, while the term "Flint glass" refers to that glass which has the greater *relative* dispersive power. Relative dispersion is the value represented by the expression $\frac{\Delta n}{n-1}$, Δn being the difference of the refractive indices for two lines of the spectrum, as a refractive index within these limits.

* Refractive and dispersive power was, with the older glasses, dependent upon each other in a certain manner. If n_d and $\Delta n = n_f + n_c$ were respectively made to represent abscissæ and ordinates, the points so represented formed a fairly straight line inclined to the axis (*vide* Dr. J. Czapski, "Optical Lenses," *Zeitschrift fuer Instrumentenkunde*. Berlin, 1886, pp. 344 and 345); n_d was, therefore, a linear function of Δ_n or—

$$n_d = a + C\,\Delta n$$

Arrange in one plane (fig. 2), along the radii of concentric circles, bright discs. The angles between the radii should be chosen according to the astigmatic aberrations and the focus of the objective. Direct the axis of the objective at right anglea towards the centre of the system of radially grouped discs, and focus one of extra-axial discs. The image obtained at the shorter diatance of the focussing screen from the objective is, as fig. 3 shows, a portion of a radial line which, in proportion to the curvature of the image plane, becomes more and more indistinct towards either side, and is more or less interrupted radially in proportion to the degree of astigmatic deviation. Fig. 4 is an image obtained by focussing a disc on a circle, situated midway between the axis and the outside circle. It will be seen that images of all the discs grouped along the same circle are of the same degree of distinctness or indistinctness, and also exhibit the same amount of distortion.

Focussing at the greater distance of the screen shows the object (fig. 2) tangentially distorted. The image becomes thus composed of a series of circles concentric to the centre of the image, which are more or less

Fig. 2. Fig. 3. Fig. 4.

interrupted, or perfectly uninterrupted. The discs grouped along another circle, which had not been sharply focussed, are similarly distorted, though in a less marked degree.

If, now, a screen having drawn upon it concentric to the axis of the objective circles and radii be substituted for the system of discs, the astigmatic objective would reproduce the original with partial similarity, but both systems of lines could *not simultaneously* be delineated with the same position of the screen. The shorter distance would yield sharpness of the radial elements, the circles at the same time being badly defined; the longer distance would show the circles sharply, and at the same time the radial elements badly defined.

A sufficiently large screen bearing the two systems of lines, radial and concentric circular lines, appears thus to form the most natural test for astigmatism. Such a screen would, however, be too uniform and too little adapted for exhaustive tests.

The screen of 2×2 metre area, as it is used in the photographic laboratory of Carl Zeiss of Jena, is for this reason arranged somewhat differently, and it may not be uninteresting to here give a short description of it. Upon strips of paper of 18×21 in area two systems crossing each other at right angles of parallel lines of varying thickness, and placed at varying distances from each other, and the strips themselves are fixed to the screen with one of their ends at the centre of the screen, and their sides parallel to the sides of the screen in such a manner that in each strip the radial and tangential lines alternate. The middle of the screen contains a field consisting of rectangular cross lines, which is intended for testing sharpness of definition. The tangential parallels form substitutes for the system of concentric circles, while the radial parallel lines take the place of the radii proceeding from the centre. The difference between the two positions of the focussing screen for sharp delineation of the marginal portions of the systems of straight lines represents the astigmatic difference. For the purpose of demonstrating the incorrectness of the image caused by astigmatism, the screen has square fields of more or less fine rectangular cross lines diagonally attached to it in such a manner that in one case the system of lines is parallel and at right angles respectively to the diagonal, while in the other case they are inclined at 45° to the diagonal. The screen has also samples of writing and printing attached to it.

When focussing square cross lines at the edge of the image, the astigmatic objective produced in the two characteristic cases furnished by the test screen the following deformations:—

1. The straight lines composing the net at the edge of the image are parallel and at right angles respectively to the direction of the radial lines.

In this case—represented by fig. 5, in which A is the point of intersection of the axis of the objective and the plane of the object, A′ that of the axis and the plane of the image—sharp focussing of the tangential lines causes the lines which are at right angles to the radius to appear nearly sharp, while the lines which are parallel to the radius are almost entirely invisible (image *a*). Focussing of the radial lines produces the converse of the last test. The lines parallel to the radius appear sharp, the lines at right angles to it disappear (image *b*). Mean focussing results in a totally ill-defined image, and eventually in more or less marked reversion of the cross lines, such as a black net in a white field.

2. The straight lines of the net are inclined at 45° to the radial direction. In fig. 6 let A and A′ again be the point of intersection of the objective axis with the plane of the object and image respectively. Tangential focussing causes the rectangular cross lines to be distorted so as to present the appearance of tangentially elongated hexagons, and, in the

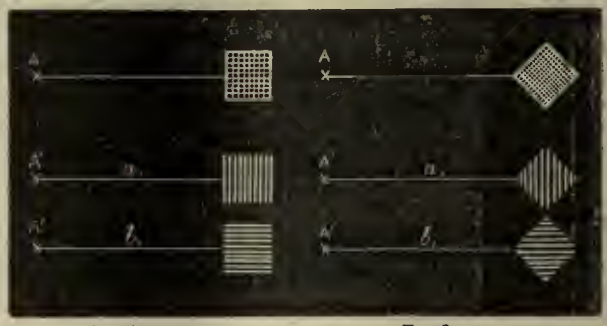


Fig. 5. Fig. 6.

case of great astigmatic difference, it may result in almost precise commutation of the cross lines into a *single* system of tangential lines (image *a*, fig. 6).

If we focus between these two limits, the net may, similarly as above, eventually be reversed so as to appear as black points in a white field; the same effect may also be produced in anastigmatic images by unsharp focussing. Similar results of a more or less marked character may be obtained by replacing the quadratic net by one formed of oblongs, rhombi, circles, &c.

In order that these relations might be objectively fixed, photographs were taken in the photographic laboratory of the optical works of Carl Zeiss of the test screen, and the photographs so obtained were reproduced by photo-lithography. There are four plates, of which we show the two most characteristic ones, Nos. I. and IV. (shown). Here an "aplanat" and "anastigmat" are subjected to direct comparison Plate I. has been taken with an "aplanat," made by a renowned firm. The objective had a focal distance of 14 cm. and a relative aperture of 1·6, and was stopped down to *f*·12·5. Image and object are in the ratio of 75 to 1000, and the angle subtended by the object is about 67°.

The centre of the screen is sharply focussed. In this part the delineation is extremely good, a sufficient proof that the objective, *per se*, was a good specimen of its kind. As the margin is approached, the definition, however, loses more and more in distinctness, and astigmatic distortion increases more and more. While the tangential lines are fairly sharp up to the edge, the radial lines rapidly decrease in definition past the third field. In the diagonal squares, the bounding lines of which are at right angles and parallel respectively to the radius, it will

Fig. 7.

be noticed that the tangential lines are markedly sharper than the radial lines, the latter being almost invisible, and in the squares, whose sides are inclined at 45° to the radial direction, the distortion at the margin of the tangential lines may readily be observed. The squares appear, in fact, as hexagons.

Plate IV. has been taken with a Zeiss anastigmat, viz, anastigmat 1·6·3, 14 cm. focus, all other conditions being the same as those existing in the former case. There, too, the centre was accurately focussed; but barely any traces of those details which point to astigmatic imperfections of the margin of the image will be noticed.

Plates II. and III., which are not shown here, were taken with the

same "aplanat" as that used for Plate I. In the first case the tangential marginal lines were focussed, in the second case the marginal radial lines formed the critical part of the object. While in the former case the centre appeared to be fairly sharp, in the latter case it was totally worthless. The characteristics of astigmatism, as above explained, become apparent in both plates.

The older types of lenses (aplanatic, antiplanats, portrait lenses, single lenses, &c.), admitted of astigmatic correction, but they could not at the same time be corrected for flatness of field. The Zeiss "anastigmat" was the first lens in which, as we pointed out, anastigmatic aplanatism was combined with the realisation of other requisites of a good photographic lens.

A lens having *anastigmatic curvature* yields sharply defined points from centre to margin. These cannot, however, simultaneously be fixed upon the *plane* negative plate of the photographic apparatus whenever the points constituting the object are nearly in one plane at right angles to the axis, or when they are at a relatively great distance from the objective. If it be desired to simultaneously fix these sharp points upon the plate, it would be necessary to use a *curved sensitive surface* corresponding to the curvature of the image. Clearly the use of such curved sensitive strata is impossible, for it must not be forgotten that for each lens type, each focal length, and even each degree of magnification or reduction, there is a distinct corresponding curvature, to say nothing of the practical inconvenience attaching to curved photographic plates. At present we are, at any rate, limited to flat negative plates. From an optical point of view, this is an undesirable limitation, which seriously affects definition and depth of the curved image.

The flat plate must be covered nearly uniformly sharply from centre to edge, unless the objects are grouped on a curved surface corresponding to the curvature of the image. With portrait groups photographers had a means of compensating the anomaly by arranging the persons in a semi-circle, in the centre of which the objective is placed. With landscape and instantaneous photographs, however, such an expedient is only rarely, if at all, applicable. In order to obtain tolerable distinctness in the image from centre to edge, it would be necessary to work with narrow angles or to stop the lenses down considerably.

In working in this manner, it must be borne in mind that both in the centre and at the edge near and far objects are to be depicted simultaneously; the objective yielding a curved image causes, however, on the photographic plate distinct objects to appear indistinct, and sufficiently near objects sharp at the edge when the focussing is sharp for the centre. On the *oblong* flat negative plate, A B C D (fig. 7), let near objects be depicted at AB, distant objects at CD; then, if the *centre*, M, be accurately focussed, the points of sharp delineation are situated upon a curve, and are represented by E, which intersects A B in two points, and is symmetrical with respect to A B. By stopping the lens down we obtain, as is well known, greater depth for distant objects than when focussing for near objects. In the present case the depth necessarily diminishes, therefore, from the centre to the margin. The limits may be graphically represented by curves, T_1 and T_2, which, being symmetrical with respect to E, have their greatest distance apart at M. The depth of focus is represented by the area contained between T_1 and T_2. By this area the imperfections of the marginal image may readily be ascertained. When it is important to improve the distinctness at the edge, it would be necessary to sharply focus a point situated at a distance from the centre, and to sacrifice the distinctness at the centre.

The deficient depth of focus of lens yielding a curved image does, under certain conditions, not become apparent in street scenes. In such cases it may happen that the position of the camera is such that the rows of houses are delineated simultaneously on both sides of the street, the distant houses being thus shown in the centre, the near ones at the edges of the plate. In such a case the curvature of the image may even become the very cause of greater marginal distinctness than is obtainable with the flat field. With all other, and nearly always existing, cases distant objects have to be shown simultaneously at centre and edge, and in such cases it is absolutely necessary to have a flat field.

It is possible to partly flatten the field of the aplanat. This is most conveniently done with those points of the image which are due to the meridional rays, *i.e.*, for the tangential directions in the image. Under these circumstances, one would, however, have to abandon the anastigmatic correction of the image, and to rest content with partial distinctness. These points of the image which are due to rays contained in a sagittal section yield another image surface (image points of radial directions), which touches the former surface in the axis of the objective, and deviates from it with continuous curvature towards the edge, as already explained.

With angles of 50° this deviation amounts to one-fifteenth; with 70°, to one-sixth; and to 90°, even nearly one-third of the focal length of the lens. The section of these image surfaces by a plane passing through the axis of the lens would present the appearance shown in fig. 8. Curve *a* appertains to the image points in the meridional section (tangential distortion), *b* to those of the sagittal section (radial distortion). H_o represents the axis of the lens H_n a principal ray.

This result may be obtained with aplanatic lenses if their halves be sufficiently widely separated. The marginal distinctness is then very

FIG. 8.

FIG. 9.

defective, and the stopping down has to be carried very far if it is at all desired to obtain sharp definition at the edge or fair definition extending over a considerable field.

An objective having an anastigmatically flat field, such as the "anastigmat" produces, however, a sharp image upon the flat plate, which, as fig. 9 shows, is bounded by lines T_1, T_2, the latter being parallel to the focussing line E. This objective delineates near and distant objects with the desired uniform sharpness and centre at edge.

The Zeiss anastigmats yield, therefore, a uniform depth of focus from centre to margin without necessitating the same amount of stopping down that is imperative with the "aplanats." *The anastigmats have in proportion to their covering power a considerably relative rapidity.*

A paper read by the author in the Free Photographic Association at Berlin was accompanied by two instantaneous photographs reproduced by the lithographic process, which served for comparing the "anastigmat" with a normally corrected "aplanat." The two lenses used in the tests had the same maximum aperture, and were stopped down to 1-9. The anastigmat 1-6·3, $f=21$ cm., gave a circle of 25½ cm. diameter of fair definition (62½°), while with the aplanat 1-6 of 20 c.m. focus stopped down to 4-9 the same circle of 11 c.m. at most (31°). The aplanat,* which was the make of a renowned firm, was in itself a good specimen, the definition being excellent in the centre.

In order to obtain with the aplanat a sharp image of the same extension it would have been necessary to stop the lens down to about *f*-36, and thus to seriously diminish its rapidity.

Professor Roster, of Florence, who, in his own interest, subjected the anastigmats to exhaustive practical tests, found that the anastigmats, with a given angle, admit of five to eight times more rapid exposures than aplanats and antiplanats of best make.

Dr. Chinaoli, of Ravenna, speaks equally favourably of the anastigmats, and Professor Fabre, of Toulouse, writes, in his *Aide-mémoire* of 1891, "The anastigmat is eleven times more rapid than the comparable objectives of older types."

The author himself compared an anastigmat 1-6·3 $f=170$ mm., with an excellent specimen of the *aplanat* 1-9, $f=145$ mm., and found that the *anastigmat* covered the test screen of Zeiss with almost the same degree of definition that could be obtained with the *aplanat* working at *f*-32, *i.e.*, the anastigmat working at 1-6·3 with a *twelve times greater rapidity* than the aplanat 1-9 was found to do the same as the latter. Owing to the better concentration of light in the anastigmatic flat image, as compared with the anastigmatic curved or astigmatic flat image, with an objective of the former type, the intensity necessarily diminishes less from centre to edge than a lens belonging to either of the last-named types. This advantage of the Zeiss anastigmats cannot be overrated, as the oblique incidence of rays at the edge of the image is, in itself, productive of a continuous diminution of intensity towards the edge. The anastigmats yield a negative which is *uniformly exposed* from centre to margin. The advantages resulting from the anastigmatic flatness of field greatly extend the range of applicability of these lenses.

The advantage of being permitted to use a large stop when a certain size of plate is prescribed, and the advantage of the uniformly bright

* By "aplanat" we understand the well-known type of symmetrical doublets of four lenses introduced by Steinheil. Previous to the invention of the anastigmats, it was the best type, and appeared in the market under many names, such as aplanat, eurycope, rectilinear, symmetrical, lyncéinoscope, paraplanat, &c.

field, assists in the solution of the problem of using short focus lenses for relatively large plates; *i.e.*, with a given rapidity of the objective, essentially shorter foci may be used in the case of anastigmatic lenses than is admissible with other types, *e.g.*, anastigmat 1-6·3 (Series II.), of a focus of 105 to 120 mm. is *quite* sufficient for sharply covering a plate 9 × 12 c.m. (3½ × 5 inches) at *f*-9; with the older types, the focus would have to be 120 mm. (7½ inches) at least. In order to cover 13 × 18 cm. (5 × 7 inches) at *f*-9, it was necessary to employ a lens of, say, 350 mm. (14 inches) focus, whereas, with the anastigmats, this result may be obtained with a focus of 210 mm. (8¼ inches), and even with 170 mm. (7 inches). Short foci give, however, at equal distances of the object, a better depth than long foci; they yield a sharper image of objects situated at *different* distances from the position of the apparatus. The anastigmatic lenses have, therefore, in another sense, greater depth of focus than the older lenses.

These advantages become particularly apparent in instantaneous and wide-angle lenses, and in the photography of architecture and interiors, and in copying. Detective cameras may be made of smaller dimensions, as they may be fitted with short-focus lenses. Photographs of architecture and interiors, and reproductions of maps and paintings, may be taken by means of rapid lenses, *i.e.*, at short exposures.

The tables published by the author in *Eder's Jahrbuch*, of 1893, in his paper on "The Astigmatism of Photographic Lenses," which are based upon calculation, show the extent to which anastigmatic flatness has been obtained with the *various* series of the anastigmats.

TABLE I.

Mean Deviations of Image Curvature for Objectives at 100 mm. Focus.

Objectives.	Deviations for Inclinations of a Principal Ray of—						
	10°.	15°.	20°.	25°.	30°.	35°.	40°.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Anastigm 1-18 (Long foci) ...	−0·2	−0·4	−0·5	−0·2	+0·3	—	—
Anastigm 1-9 ...	−0·5	−0·9	−1·2	−1·0	−0·6	+0·4	+2·4
Anastigm 1-6·3 ...	−0·3	−0·5	−0·6	−0·3	+0·8	+2·4	—
Anastigm 1-12·5 ...	−0·6	−1·1	−1·4	−1·4	−1·0	+0·2	—
Anastigm 1-4·5 ...	−0·5	−1·0	−1·1	−1·5	−0·6	+1·3	—
Anastigm 1-7·2 ...	−0·7	−1·2	−1·3	−1·2	−0·2	+3·0	—
Anastigm 1-18 (Short foci) ...	−0·9	−1·4	−1·9	−2·2	−2·2	−1·4	+0·4
Aplanat 1-7	−0·2	−0·6	−0·9	−0·8	+0.2	+3·0	—

TABLE II.

Astigmatic Differences for Objectives at 100 mm. Focus.

Objectives.	Deviations for Inclinations of a Principal Ray of—						
	10°.	15°.	20°.	25°.	30°.	35°.	40°.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Anastigm 1-18 ...	−0·1	−0·1	−0·2	+0·1	+ 0·6	+ 1·0	+8·0
Anastigm 1-9 ...	0·	+0·05	+0·5	+0·3	+ 0·6	− 0·5	−4·0
Anastigm 1-12·5 ...	+0·1	+0·2	+0·4	+1·3	+ 2·2	+ 3·0	—
Anastigm 1-6·3 ...	+0·1	+0·4	+1·2	+2·2	+ 3·6	+ 4·2	—
Anastigm 1-4·5 ...	+0·2	+0·6	+1·5	+3·0	+ 5·3	+ 9·0	—
Anastigm 1-7·2 ...	+0·2	+0·5	+1·4	+2·8	+ 5·5	+11·0	—
Aplanat 1-7	+0·8	+2·0	+4·0	+7·0	+12·2	+19·4	—

Table I. shows the deviations of the mean curvature of the various anastigmats for every interval of 5°. The table gives also the corresponding value for an aplanat of relative aperture 1-7, as it may be interesting to directly compare the correction of this hitherto best type of lenses with the Zeiss anastigmats.

Table II. gives the astigmatic deviations. The figures are reduced to a focus of 100 mm.

These two tables suffice to give an adequate idea of the correction of the anastigmats. Studying them more closely, we find that the long-focus lenses at the series 1-18, the typical copying lenses, are at the head of the table. In computing these lenses, the greatest possible pains were taken to render anastigmatic flatness as perfectly as possible without in the least neglecting accurate spherical correction.

The greatest deviation of the mere curvature in an objective of 100 mm. focus of this type, with an inclination of a principal ray of 30°, *i.e.*, with a field of 60° is 0·5 mm., and the astigmatism 0·6 mm., amounts which may be practically neglected.

Next to this type comes the anastigmat 1-9, which, up to 70° of field (35° inclination of a a principal ray), has a maximum deviation of curvature of 1·2 mm. and a maximum astigmatic differerence of 0·5 mm.

After these come the shorter focus lenses of anastigmat 1-18, anastigmats 1-6·3, 1-12·5, 1-4·5, and 1-72.

The aplanat 1-7 has up to 30° a deviation of curvature of about 1 mm., while with the more rapid anastigmat, 1-6·3, it is only 0·6 mm. The former has 12·2 mm. astigmatic difference, the latter only 3·6 mm., *i.e.*, less than one-third of that amount. The difference is still greater with wider angles.

In conclusion, the other advantages which the Zeiss anastigmats combine with anastigmatic flatness may be shortly enumerated. They are the following:—

1. The reflection images have a most favourable position.
2. They admit of the most colourless glasses being used, and
3. The two parts of the doublet are in close proximity.

The images formed by reflection at the boundary surfaces between glass and air are all at a considerable distance from the plane of the image. By this means the appearance of fogged images, which generally increases with the number of isolated lenses, is reduced to a minimum, and thereby the image rendered exceedingly brilliant.

The existence of this property is amply proved by photographs taken with the anastigmatic lenses.

None of the anastigmatic lenses can be shown to have a *flare-spot*, even when dazzling light enters the objective.

The use of colourless glasses is an advantage which cannot be overrated. Apart from sensitive plates, this is the only means of satisfying the universal postulate, *depth of definition with short exposures.*

With objectives of the same type, a certain desired amount of depth can, with a given focal length, only be obtained by corresponding stopping down of the lens. The further, however, this stopping down is carried, the less becomes the light which can pass through the lens. If, in addition to this, the scanty light thus admitted is further impaired by detrimental colouring in the glasses, as was the case with the glasses formerly used in the construction of aplanats, it becomes naturally impossible to work at short exposures.

The anastigmats, when applied to outdoor photography at *f*-18 give fully exposed negatives, the usual commercial instantaneous dry plates being used. Before the application of the Schott baryta glasses to the construction of photographic lenses, this belonged to the province of impossibilities. Even with stops *f*-25 and *f*-36 instantaneous photographs are still obtainable.

The *short structure* of the anastigmats favours the *diminution of the rapidity with which the intensity decreases from centre to edge.* It diminishes that part of the decrease of the intensity which is caused by partial stopping of these oblique pencils by the edges of the lenses.

Let L_7 and L_2 (fig. 10) be the lenses forming a doublet of a diameter 2·D, let B be the plane of the diaphragm, and let the diaphragm be

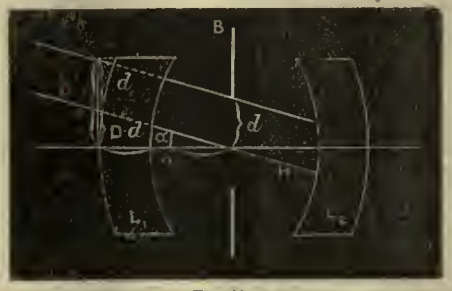


FIG. 10.

situated midway between L_1 and L_2. Let a be the distance of the diaphragm from the apex of the anterior surface, and let $2d$ be the diameter of the aperture of the diaphragm.

If for the sake of simplification the collective effect of the parts of the doublet be neglected, *i.e.*, if it be assumed that the diameter of the pencil passing through the diaphragm $2d$ is also $2d$ previous to the passage through the lens, and also if we disregard the curvature of the external surfaces and the thicknesses of the lenses, then the oblique pencil passing through $2d$ is stopped in that particular moment when the principal ray, H, is of that degree of obliquity which is represented by a straight line contained in a plane passing through the axis of the objective, and connecting the edge of the lens with the diaphragm edge on the same

side of the axis. Let the angle between this principal ray, H, and the axis be a, then it will easily be seen that $tg\,a = \frac{D-d}{a}$. This limit is increased in a measure as the difference $D-d$ increases, *i.e.*, In a measure as the aperture of the diaphragm d becomes less.

When $D-d$ is constant, then a increases in a measure as a decreases.

From this we infer: *The shorter the distance of the diaphragm from the extreme apices of the lenses, the later is the moment of the stoppage of oblique pencils by the edge of the lenses.*

The following table contains a few results derived by actual measurement of some of the best known lenses:—

When $D - d = \frac{1}{2} D$.
Or $d = \frac{1}{2} D$.

the double limiting scale, *i.e.* the field illuminated without stop, has the following values in the cases of the lenses so measured:—

Let $d = \frac{1}{2} D$.

Objective.	Greatest relative aperture of the objective.	Field without stoppage of pencils by edge of lens.
Busch Aplanat (No. 4)	1-8·5	31° 2′
Goerz Rectiplanat (Rap. Lync.)	1-6·5	33° 22′
Zeiss Anastigmat 1-4·5 ...	1-4·5	36° 40′
Euryscope IV. von Voightlander	1-6	38° 18′
Group Antiplanat von Steinheil	1-7 bis 1-6·5	40° 6′
Zeiss Anastigmat 1-6·3 ...	1-6·3	41° —
Goerz Landschafts Aplanat ...	1-8·5 bis 1-9	44° 14′
Zeiss Anastigmat 1-7·2 ...	1-7·2	45° 15′
Zeiss Anastigmat 1-9	1-9	50° 6′
Zeiss Anastigmat 1-12·5 ...	1-12·5	58° —
Zeiss Anastigmat 1-18 ...	1-18	58° —

According to this table, Busch's aplanat is last in the order of excellence. It has, with relative aperture of 1-8·5, an unstopped field of 31° 2′ only, the anastigmat 1-4·5, which is four times as rapid, having an angle of 36° 40′, or 5° 38′ more, while anastigmat 1-9, which is about equally rapid, has 50° 6′, *i.e.* 19° 4′ more. Better results are obtainable with the rectiplanat of 1-6·5 aperture; still it falls short of the doubly rapid anastigmat 1-4·5. None of the above-named aplanats, and even the group antiplanat, which is noted for its shortness, possess the same angles as anastigmats of corresponding apertures.

It must again be stated that the figures here shown are not quite correct, inasmuch as the refractive power and the thickness of the combined lens, and the curvature of the external surfaces of the lenses, have not been considered. This does, however, not materially affect the *relative* position of the lenses as compared with each other.

The short structure of lenses has also the advantage of permitting of instantaneous shutters being adopted before or behind the objective, without the risk of thereby causing detrimental stopping of the incident rays when no shutter is being used. The localisation of the shutter between the lenses of the anastigmat is not, therefore, of the same importance as with long-bodied aplanats.

News and Notes.

Manchester Photographic Society.—July 29, Southport (Hand Camera).

Gosport Photographic Society.—July 29, Shanklin, Ventnor. Leaves Portsmouth Harbour twenty minutes past one p.m.

Hackney Photographic Society.—July 29, Excursion, Belvedere Park August 1, Open Night. Members are requested to bring up questions, &c.

We have received the trade price list of Mr. J. Furnell, New Malden, S.W., who undertakes silver, carbon, platinotype, and bromide printing, enlarging, copying, and lantern-slide making.

Mr. C. J. Whittaker, of Station-road, Penrith, informs us that he will be happy to grant the use of his dark room for purposes of changing and developing to amateurs (tourists, &c.). The studio is next the station entrance.

Birmingham Photographic Society.—July 29, Half-day Excursion to Salford Priors and Cleeve Priors. Leader, Mr. William Rooke. Train leaves New-street at fifteen minutes past two. Returning from Salford Priors at five minutes past nine.

Will Louis William Green, Photographer, formerly of 18 or 22, Dennetsroad, S.E., and also a member of the 3rd Middlesex Artillery (2nd Division), please send his present address to Mr. H. M. C. Sprunt, 192, New Cross-road, S.E., as his father is anxious to hear from him?

On Thursday, August 3, before the London and Provincial Photographic Association, Messrs. F. B. Grundy and A. Haddon will read a paper *On the Amounts of Silver and Hypo left in Albumenised Paper at Different Stages of Washing*. We understand that the paper is the outcome of much experimental work.

The International Union of Photography.—The second session of the International Union of Photography will be held from August 21 to 26 next, in the Electoral Palace, Geneva, the session being opened at ten o'clock on the morning of the 21st. Several important communications are expected. The address of the Secretary is 33 Rue Rembrandt, Antwerp.

A catalogue of the library and museum of the Photographic Society of Great Britain has just been issued. It extends to thirty-two pages, and is well arranged. The library of the Society, considering the short time that has elapsed since its formation, appears to be in a creditably forward state of completion, and, as it includes most of the standard text books and sets of periodicals, should be of great interest to members of the Society.

On Saturday evening last, and on the occasion of a garden party given by the Canonbury Constitutional Club, the novel experiment was tried of having a lantern entertainment out of doors. This was under the auspices of the North London Photographic Society, which meets in the premises of the Constitutional Club (Canonbury Tower). The exhibition was highly successful, the lantern being worked by Mr. B. J. Grover. Although the "Constitutional" is a political Club, the North London has nothing to do with party politics.

The results of Messrs. Wormald's third "Photomnibus" Prize Competition are as follows:—First prize (two guineas and bronze medal), awarded to Mr. Frank W. Robinson (age fourteen), 140, High-street, Lewes, Sussex, for his photograph of *A Sussex Farmhouse*, 1570. Second prize (one guinea) awarded to Miss A. L. Walker, 38, South-parade, Southsea, for her photograph of *Corner of a Drawing-room*. Third prize (half-a-guinea) awarded to Mr. Charles Hunter, 30, Clifton-street, Margate, for his photograph of *John Sanger's Tomb*, Margate Cemetery. Three extra awards were made. A fourth competition is announced.

Assistants and their Specimens.—A correspondent writes: "Lately you have written about the annoyances that assistants are put to by the detention of their specimens and references, &c. Through your columns, lately, I have engaged, first, a retoucher, and, secondly, a printer; but, on or about the day they should have commenced work, I have received a letter, coolly saying they had made other arrangements. On both occasions I had written to the unsuccessful applicants saying that I had engaged one, and that their services were not required. Among these rejected ones several would have suited my requirements; but, having destroyed their letters, I was unable to write to them. The last one I engaged sent me the enclosed letter, saying that the writer had made fresh arrangements with his employer and would stay on. I had paid 1*s.* 6*d.* for advertisement, about 2*s.* 6*d.* in telegrams and postage, and he has the impudence to send 2*d.* for his specimens to be returned. I have written, asking him who is to recoup me the expense I have been put to."

What the Photographers are Doing in New Zealand *re* Free Portrait System.—The following draft petition, which is being circulated amongst the photographers in New Zealand, should be of peculiar interest in connexion with the correspondence on "Depression in Photography" now appearing in our pages:—"To the Honourable the Members of the House of Representatives of New Zealand in Parliament assembled. The humble petition of the undersigned photographers, resident and practising in New Zealand, sheweth:—1. That your petitioners approach your Honourable House with a sincere desire to maintain and advance the character and excellence of photographic art in New Zealand. 2. That your petitioners are discouraged, and in many instances ruinously affected, by the competition of travelling pretenders to the art, and by the unrestricted sale of foreign photographs by the agents of foreign companies, whose pictures and enlargements are introduced and sold in the colony at prices or remuneration ruinously competitive with the work of your petitioners. 3. That your petitioners would respectively submit to your Honourable House that the existing New Zealand Customs Tariff is not calculated to foster colonial excellence in photography, or to prevent the introduction and sale by itinerants of cheaply produced articles, to the discouragement of the investment of capital in improved photographic apparatus and materials by qualified members of the profession permanently resident in the colony. 4. Your petitioners would therefore pray your Honourable House to abolish the *ad valorem* duty on imported photographic materials; to permit bromide, chloride, and platinum papers the same privilege of free entry granted to albumen papers; to enact that persons practising photography in New Zealand as a profession, and particularly all itinerants engaged in the art or in the sale of photographic pictures, should be subject to registration and a licence fee, and all imported photographic pictures of New Zealand scenery and photographic enlargements be subject to a protective duty of not less than twenty-five per cent. And your petitioners will ever pray," &c.

RECENT PATENTS.

PATENTS COMPLETED.

Improvements in or connected with Doublet Lenses for Photographic Purposes.

No. 23,378. Carl Paul Goerz, 7A, Hauptstrasse, Schöneberg, and Emil Von Hoegh, 60, Prinzregentenstrasse, Wilmersdorf, Berlin, Germany.—*June* 13, 1893.

Our invention relates to doublet lenses for photographic purposes, and is illustrated in the sectional views (figs. 1, 2, and 3 of the accompanying drawing).

Within the last few years, as the result of the labours of the scientific glass-

laboratory in Jena, there have been made available for optical industries new kinds of glass, which by reason of their optical properties, differing from those of the kinds of glass which alone were previously to be obtained, have given rise to improvements in optical instruments, and especially in photographic objectives. The conditions of the elimination of the astigmatic errors of pencils of rays entering obliquely require that the crown glass should be of a refractive power higher than that of the flint glass combined with it. Varieties of glass which render combinations of this kind possible have been regularly manufactured since 1886, and since that time attempts have been made in various quarters to utilise the new kinds of glass for the elimination of the astigmatic error in photographic objectives. Thus, for instance, amongst others, the "anastigmat" of Hartnack, calculated by Dr. Miethe, was introduced in the year 1887. This objective is free from astigmatism when the image is approximately plane; but, like all other objectives manufactured by various opticians upon the same principle, it has the disadvantage that the spherical error cannot be eliminated, and hence the system has an illuminating power too feeble for most of the needs of practical photography, and is especially ill adapted for instantaneous exposures.

The reason for this fact is that in order that, the spherical error may be compensated for, the refractive power of the crown glass must of necessity be lower than that of the flint glass which is combined with it. The construction of an "anastigmat" of good illuminating power, with the spherical error corrected, that is to say, without injury to the sharpness of the image, thus appears to be prevented by the interposition of two incompatible conditions, standing in opposition to each other, and, as a matter of fact, it has been customary in the best-informed scientific circles for a long time to consider it impracticable to devise a method of construction which should combine the two properties above referred to.

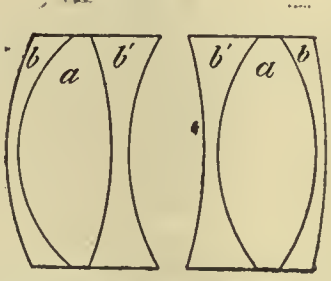
Dr. P. Rudolph, of Jena, the inventor of the recently introduced "anastigmat" of Zeiss, forming the subject of a German patent, No. 56,109, was the first who succeeded in bringing forward proof of the possibility of constructing "anastigmats" of good illuminating power.

We have endeavoured to gain greater approximation to the ideal form by a method differing essentially from that adopted by Dr. Rudolph.

For this purpose we have made extensive calculations, directed at first to the single object of determining whether, as a fundamental principle of a new objective, the astigmatic error could be reduced as far as possible, in the expectation, which appeared, humanly considered, to be justifiable, that, even if it should prove to be impossible to eliminate the astigmatic error absolutely, it might yet be hoped to effect important improvements in the direction indicated.

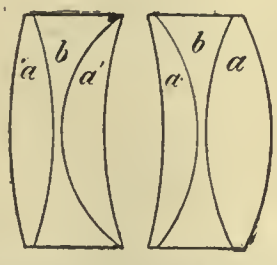
Starting from the above-mentioned facts, well established theoretically, in accordance with which a crown glass of lower refractive power than that of the flint glass combined with it must be used to eliminate the spherical error, and a crown glass of higher refractive power than the flint glass component for the elimination of the astigmatic error, it was sought to determine, by strict calculation, how far a doublet, each half of which was built up of three lenses, would be able to fulfil the conditions required for the elimination of the two aberrations, the spherical and the astigmatic. The separate components of such a system might, with reference to the result, be conceived to be so made up that they should consist either of a negative flint glass (*b*, fig. 1), enclosed

Fig. 1.



between two positive crown glasses, *a* and a^1, in such a way that one of the two latter, say *a*, should have a higher refractive index, and the other, say a^1, a lower refractive index, than that of the enclosed flint glass, *b*, or be made up of two negative flint glasses, *b*, b^1 (fig. 2), enclosing a crown glass, *a*,

Fig. 2.



in which case one of the two flint glasses, say *b*, should have a refractive index higher, and the other, say b^1, lower than that of the enclosed positive crown glass, *a*.

It was found to be possible in both methods of construction, whilst compensating for the spherical and chromatic aberrations, not only to reduce the astigmatism, but to eliminate this last in a manner theoretically perfect. Of the two methods of construction under consideration, the latter (crown glass between two flint glasses) is found to involve unfavourable forms for the separate components, and the employment of such kinds of glass as have their practical applicability limited by disadvantageous peculiarities, so that the former combination (flint glass between two crown glasses) was exclusively adopted in the further working out of the problem, and the determination of the constants of an objective capable of being carried out in practice. As an example, there is depicted in fig. 3 of the appended drawing an objective of

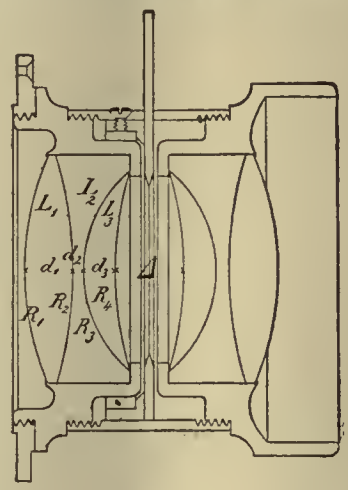


Fig. 3.

the kind described, of an equivaleut focal length of 240 mm., and a free aperture of 36 mm., of the natural size, and in axial section.

The maximum effective aperture is 30 mm., corresponding to one-eighth of the focal length.

The constants required for the construction of the objective are as follows:—

Radii of Curvature.	Thickness of Lenses.	nD Kind of Glass.	nG Kind of Glass.
R1 = − R8 = 45·835	d1 = d6 = 7·334	$L^1 = L^6$ 1·61310	1·62883
R2 = − R7 = 54·324	d2 = d5 = 1·833	$L^2 = L^5$ 1·56804	1·58182
R3 = − R6 = 19·853	d3 = d4 = 4·584	$L^3 = L^4$ 1·51497	1·52663
R4 = − R5 = 49·088	Δ (distance apart) = 11·00.		

All measurements, radii, thickness, distauce, &c., are expressed in millimetres; the kinds of glass are designated by their exponents of refraction for the line D (nD) of the solar spectrum, and for the line H_8 (NG^1) of the spectrum of hydrogen.

If a principal ray, inclined at an angle of 30° to the axis, be calculated through the system, and the position upon it of the image point of the sagittal rays, and those of the meridional rays, be determined, a measure of the residual astigmatism is found in the distance of the two points. This distance amounts, in the case of the objective chosen as a specimen, to 1·2 mm. when the image formed by the meridional rays is flat, and this residual amount of astigmatism has no greater unfavourable effect upon the sharpness of the image formed by the marginal rays than that caused by the secondary spherical aberration in the axis.

The lens just referred to as an example, based upon strict calculation, is symmetrically constructed, but the combination of two absolutely identical halves is not to be regarded as a special characteristic of the objective system under consideration. The only characteristic mark of objectives of the new kind is rather the combination of separate systems independently corrected for spherical, chromatic, and astigmatic error, each made up of three lenses, the glass of these last having refractive indices properly graduated in the manner described; indeed, one system of the objective might have an external form differing from that of the other, or in the same objective one system might be built up as in fig. 1 and the other as in fig. 2. Any such modifications may be undertaken by a calculating optician without difficulty; but, from a practical standpoint, they are to be regarded as purposeless, since the more simple symmetrical form satisfies all the conditions herein taken into account to a sufficient extent. Furthermore, since each of the two separate systems constitutes in itself an objective corrected for spherical, chromatic, and astigmatic errors, each may be employed alone as a simple photographic objective.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A photographic doublet, the two component systems of which are each corrected for spherical, chromatic, and astigmatic errors, being to this end made up of three lenses, as follows:—either

(*a*) of a negative lens enclosed between two positive lenses, one of which has a higher, and the other a lower, refractive index than the enclosed negative lens, or

(*b*) of a positive lens, enclosed between two negative lenses, of which one has a higher, and the other a lower, refractive index than that of the enclosed positive lens.

2. The employment of a single system of the kind described in claim 1 as an independent photographic objective, substantially as hereinbefore described.

APPLICATIONS FOR PATENTS.

No. 13,354.—"An Improved Frame or Holder for Photographic Films and plates." S. D. Williams.—*Dated July* 10, 1893.

No. 13,373.—"Improved Means for regulating the Rays of Light passing through Photographic Lenses." Complete specification. J. W. Fawcett.—*Dated July* 10, 1893.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 31	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 31	Richmond	Greyhound Hotel.
August 1	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 1	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 1	Exeter	City Chambers, Gandy-st., Exeter.
,, 1	Hackney	206, Mare-street, Hackney.
,, 1	Herefordshire	Mansion House, Hereford.
,, 1	Lewes	Fitzroy Library, High-st., Lewes.
,, 1	North London	Canonbury Tower, Islington, N.
,, 1	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 1	Paisley	9, Gauze-street, Paisley.
,, 1	Rochester	Mathematical School, Rochester.
,, 1	Rotherham	5, Frederick-street, Rotherham.
,, 1	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 1	York	Victoria Hall, Goodramgate, York.
,, 2	Leytonstone	The Assembly Rooms, High-road.
,, 2	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 2	Southport	The Studio, 15, Cambridge-arcade.
,, 2	Southsea	3, King's-road, Southsea.
,, 2	Wallasey	Egremont Institute, Egremont.
,, 3	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 3	Glossop Dale	
,, 3	Hull	71, Prospect-street, Hull.
,, 3	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 3	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 3	Oldham	The Lyceum, Union-st., Oldham.
,, 3	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
,, 4	Cardiff	
,, 4	Croydon Microscopical	Public Hall, George-street, Croydon
,, 4	Holborn	
,, 4	Leamington	Trinity Church Room, Morten-st.
,, 4	Maidstone	"The Palace," Maidstone.
,, 5	Hull	71 Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

July 25, Technical Meeting, Mr. W. E. Debenham in the chair.

Mr. A. S. C. Forbes, of the Blair Camera Company, exhibited the "Bull's-eye" hand camera, which takes films. It can be loaded in daylight with a cartridge of film for twelve exposures. Mr. Forbes also showed the "Hawk-eye" No. 3 Columbus camera, for taking a 5×4 roll-holder.

A New Photometer.

Mr. A. Cowan exhibited the photometer of Messrs. Franz Schmidt & Haensch, the principle of which is based upon reflection from an opaque surface of plaster of Paris. In his experience it was a great deal better than the grease-spot photometer. It was specially good for weak lights.

Mr. T. Bolas said Mr. A. P. Trotter, who first introduced a photometer of that form, claimed that its great advantage was in being used with a weak light.

Tele-photography.

Mr. T. R. Dallmeyer exhibited a rapid rectilinear lens, with negative attachment, and said that, by remembering the following formula, all tele-photo calculations would become easy:—

$$M = 1 + \frac{v}{f1}$$

m = magnification.
v = distance of negative lens from screen.
f = focus of negative.

Knowing the intensity of the positive lens, and the magnification being determined by the formula, the intensity of the tele-photo lens under the given circumstances $= \frac{I}{M^2} = \frac{\text{Intensity.}}{\text{Magnification.}}$

He said that, when a negative was used with the rapid rectilinear, the ratio could exceed two to one without introducing spherical aberration. In such a construction the diameter of the circle of illumination was always as large as the back focus of the tele-photo combination.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

July 20,—Mr. W. E. Debenham in the chair.

The Adams' New Hand Camera.

Mr. J. A. Sinclair exhibited the new Adams' hand camera of Messrs. Adams & Co., Charing Cross-road, W.C. It has a swing back and rising front, and rack-and-pinion focussing movement, the shutter having a range of speed of from one-hundredth of a second to one second. There was an arrangement for enabling the finders to be cleaned, they being hinged and lifting out of the front. The rising front moved both vertically and horizontally, and the swing back was brought into use by loosening clamping screws at the top and bottom of the camera. The changing back differed from all others in that it would take twelve plates or twenty-four films, or some of both. An indicator stop prevented more than the proper number of exposures being made, so that an exposed plate could not be exposed a second time. The lifting was done by pulling up the lifter at the back, the plate coming up at the front, and being then carried to the back instead of a plate being lifted from the back to the front, as in some changing backs.

The Chairman remarked that he thought a swing back objectionable, and preferred a high rising front.

Miscellanea.

Mr. T. E. Freshwater (Hon. Secretary) showed photographs of Fleet-street and Temple Bar on the day of the Royal Wedding.

Apropos tele-photo lenses, Mr. R. P. Drage said that a few days previous he was out photographing with a friend who had a Dallmeyer tele-photo lens with him, and, after waiting an hour and a half, found that the state of the atmosphere prevented him from using it.

Mr. Freshwater asked if there was any advantage in using pink or mauve albumenised sensitised paper over white? He also inquired how it was that the pink colour washed out more in some instances than others in prints taken from the same sheet of paper?

The Chairman thought the latter might be due to the thickness of the coating of albumen, the thick coating retaining more colour.

Mr. Freshwater had seen it stated that pink and mauve papers retained their colours better than white paper.

Several members thought the contrary was the case.

Uranium Toning of Platinum Prints.

Mr. J. S. Teape said that Mr. Haddon had, at a previous meeting, stated he was unable to tone platinum prints with uranium on paper made by himself, and suggested that, as he (Mr. Teape) had toned some of the Platinotype Company's cold-bath paper in this manner, there might be some silver in the paper which accounted for the toning action. To test the point, he had placed platinum prints in a saturated solution of bichloride of mercury, acidified with hydrochloric acid, for eighty minutes, washed them for two hours, and then put them in a hypo bath (four ounces to the pint) for twenty-five minutes. They were again washed for two hours, and then toned for thirty-five minutes in a uranium bath. He showed the prints, some of which were of a full sepia colour. It had been said that uranium-toned prints faded; he showed prints toned eighteen months ago to show that they had not undergone any alteration. Toned prints which had the uranium removed by washing took a much longer time to tone a second time.

Mr. A. Mackie inquired if Farmer's reducer would reduce platinum prints?

Mr. Drage said that he had tried it, and found that it did not reduce the prints, which, however, turned mealy.

After other discussion the meeting closed.

FORTHCOMING EXHIBITIONS.

1893.	
August	*Welsh National Eisteddfod. The General Secretary, Pontypridd.
September 5	*Royal Cornwall Polytechnic Society, Falmouth. W. Brooks, Laurel Villa, Wray-park, Reigate.
,, 20–21	*Hove Camera Club. Hon. Secretary, H. Emery, 142, Church-road, Hove, Brighton.
,, 25–Nov. 15	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1–31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 9–Nov.	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
November 7–11	*South London Photographic Society. Hon. Secretary C. H. Oakden, 53, Melbourne-grove, Dulwich, S.E.
,, 10–12	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.

* Signifies that there are open classes.

Correspondence.

THE CONVENTION GROUP.

To the Editor.

Sir,—In your issue of July 21 you refer to the collotype copy of the Convention group "from a negative taken by Mr. R. L. Kidd." Permit us to state the following facts:—

1. The group was entirely arranged by our operator, and is a *facsimile* of our official 18×15 group taken at the request of the Committee.

2. It was exposed by the writer, Mr. Kidd being in the group.

3. It was developed in our dark room by our operator, Mr. Kidd being present.

4. It was dried, packed, and sent off by us.

We presume that Mr. Kidd was unaware that he would be honoured with your commendations of "his" negative, or he would doubtless have suitably acknowledged our connexion with the picture. We heartily agree with you in commending the promptitude of Mr. Kidd's firm in producing the bromide prints, and in admiring the excellence of the collotype prints.—We are, yours, &c.,

W. Heath & Co.

24, *George-street, Plymouth, July* 24, 1893.

THE QUEEN AND "PROFESSIONAL" PHOTOGRAPHY.

To the EDITOR.

SIR,—For the information of other professionals, I think it only right to draw attention to the following: An operator and retoucher who has recently left my employment, having possessed himself of a copy of my photograph of their Royal Highnesses Prince and Princess Henry of Battenburg, taken at Windsor Castle for Her Majesty the Queen, writes, apparently in their behalf, to a lady holding a responsible position in Her Majesty's household, forwarding a coloured copy of the photograph, asking that it may please Her Majesty graciously to accept the same, and, should Her Majesty desire to have it enlarged or obtain additional copies, he would deem it an honour to execute Her Majesty's commands in this respect, or as regards any similar work.

I need hardly say that Her Majesty the Queen refused to accept it, and ordered that the photograph and the letter should be handed to me, to take any action that I thought proper in the matter.

I feel sure that the profession will be glad to know of, and will appreciate, the action taken in the matter by Her Majesty the Queen.—I am, yours, &c.,

G. P. CARTLAND.

Windsor, July 19, 1893.

Answers to Correspondents.

PHOTOGRAPHS REGISTERED :—

Frederick Argall, Truro.—*Six photographs of J. Passmore Edwards.*

Richard Keene, Burton-on-Trent.—*Six photographs of Charles Frederick Claverhouse Graham.*

Thomas Maitland Laws, Darlington.—*Three photographs of the Wolverhampton Wanderers Football Team, with English and Birmingham Cups.*

H. J. CHANNON.—Received.

CHARLES JOHNSON.—We are inquiring into the matter.

YACHTSMAN.—The picture bears the appearance of a snap-shot.

SHAPOOR N. BHEDWAR.—The negatives were dispatched about a month ago.

W. AND F. VERNON.—We cannot well publish your complaint; it borders on libel.

M. F. B.—The address is Mr. H. N. King, 4, Avenue-road-villas, Goldhawk-road, W.

G. TUMLY (Battersea).—Unless putty or white lead, or a mixture of the two, will answer, we do not know what will.

W. M'DOUGALL.—Although of local interest, it possesses none for photographers in general. Thanks, notwithstanding.

G. BEAUCHAMP.—Ordinary lithographic ink answers every purpose. In some cases it will be desirable to thin it with litho-varnish.

J. YATES.—Communicate with Mr. Fallowfield, Charing Cross-road, who may be able to supply you with one of the automatic machines.

J. LEACH and F. ARNEY.—Our publishers will register the photograph for you if you will send them three copies of it and *1s. 7d.*

PHANTOM asks: "Is there a book published on Accessory Making? If so, where obtainable? Answer in this week's, if possible."—We know of no such work.

LIGHT.—We are unable to add any explanation to that given you by the Company, unless it be that possibly the water is contaminated with iron or some other deleterious substance.

NICHOLSON.—If another really holds a copyright in the picture, it will be illegal for you to copy it. As to whether the copyright is valid or not, depends upon circumstances. On this point, better consult a solicitor who makes a speciality of copyright law.

COUNTRYMAN.—Powdering the face of sitters to obliterate freckles is not much, if at all, practised by London photographers at the present time; they mostly rely upon retouching to effect the object. Of course, as you say, this takes up a lot of time in the case of some sitters.

T. COLMANE.—The lens in question is not very well known in this country. It is well adapted for the purpose for which it is designed, and gives excellent results with a large aperture; but it is very bulky and heavy, and, for this reason, for landscape work, it is not often employed.

M. HOUNSLOW.—Burton's *Printing Processes*, or Wilkinson's book, will give you a good idea of the process. Of course, that, like any other process, is not to be learnt by merely reading a description of it. If you really desire to learn to work it commercially, the best way is to apprentice yourself to a good house.

THOMAS GATES asks: "Could you state what power of electric light is required to take sitters?"—It all depends upon the exposures required to be given. You may calculate the power of the light from the fact that 1000 candle power necessitates an exposure of about ten seconds. Possibly a power of 5000 to 6000 candle power would be the most convenient to employ.

J. PAGE.—Enamelled iron dishes may be used with safety for washing prints on P.O.P. paper. Common brown-ware baking dishes can be also used, but the former are preferable as they are not liable to breakage.

G. FORBES.—Possibly a solution made up in the following strength per drachm would suit:—Hydroquinone, one part; sodium sulphite, two parts; sodium carbonate, ten parts; water, sixty-seven parts. Dilute each drachm of concentrated solution with four times its volume of water. Many other hydroquinone formulæ are given in the current ALMANAC, to which we refer you.

S. T. S.—Although the picture has been largely used as a "poster" for advertising purposes, it would be illegal to copy it, whether leaving out the advertisement portion or not. The advertisers paid a very high price for the painting, to use it in the way they do, and it is not at all probable that they would permit any one to copy the picture itself to be sold without the advertisement.

G. NEGRIO.—The negative was delivered to us in about a score of fragments and innumerable particles. So far as one is able to judge under such circumstances, the spots are due to air bubbles adhering to the film while in the developer. The plate was certainly old, as proved by the appearance round the edge. Evidently there was no fault with the plate when issued by the maker.

J. HETHRINGTON.—The article from which you quote is the one that contains the fullest description of that method of photo-engraving. You are not the only one that has failed to work it successfully, but that may be due to inexperience. However, as the inventor works the process commercially, it is scarcely likely that he has published the details of it with the greatest minuteness.

R. BLANE.—Bichromate of soda can be obtained from any operative chemist or dealer in electrical appliances. But it is not so good as the bichromate of potash as a sensitiser in carbon printing, neither is the bichromate of ammonia for general purposes. The tissue should be dried within eight to twelve hours, according to the temperature. The cooler it is, the longer the time it may take to dry without injury.

R T. says: "I have an old oil painting to copy, and I am told that to get the best effects I should rub the picture over with glycerine and water to improve it for copying. Is this so?"—Glycerine is employed by some, at times, as it shows up detail in old paintings nearly as well as a fresh coat of varnish; but it is what the owner of a valuable painting would not allow to be applied if he knew it. However, if the varnish is not cracked, we doubt if much harm will accrue to the picture if the glycerine is completely removed directly the copy is obtained.

R. SMART.—The work is only published in German. Its price is, we fancy, about three marks—equal to three shillings. If it is only the formulæ that are really required, we should advise you to obtain the work; for, although you are unable to read German, you will doubtless be able to understand them, as the names of the majority of the things mentioned are the same, or nearly so, in German as they are in English, and the proportions are quoted in grammes and cubic centimetres. Liesegang, Düsseldorf, Germany, will supply the book, if it is not published by him; or it may be obtained through any of the foreign booksellers in London.

A. R. (Berks) says: "I have, during the two years I have practised photography, taken some dozens of very pretty views of country scenery, which I should like to turn into money. I am an amateur, but do not care if I sacrifice my title to be considered as such if I can sell my negatives, as I find photography, though agreeable, an expensive hobby. Can you suggest a market, as the photographs are really good?"—The only thing we can suggest is to advertise the negatives, with a description of their character, for sale, or to communicate with one or other of the large publishing houses. Unless the views possess some interest beyond "country scenery," we fear they will not find a ready sale.

W. T. puts the following queries: "1. In using ferrotype plates to enamel P.O.P. paper, I find that the paper sticks occasionally in spots, and will not leave the plate without spoiling the print. How is this to be remedied? 2. How can I bring my silver bath to its senses? It has got dirty, and leaves dirty water marks on the albumen paper. I have used kaolin, too. 3. I am stationed on the high roadside in the country for the purpose of taking groups of pleasure parties. Can any one interfere with me if I don't obstruct? I have not been interfered with, but should like to know if they can."—1. If the plate be clean and is treated with French chalk, the prints will not stick. 2. Kaolin will decolourise the bath. Probably the "water marks" are due to scum on the surface of the solution at the time of floating: skim it with a strip of blotting-paper. 3. If the thoroughfare is not obstructed, we imagine no one will interfere. Better obtain the bye-laws of the highways authorities of the district.

*** EDITORIAL TABLE, many letters, and other communications, unavoidably crowded out this week.

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THE BRITISH
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THE FUNCTION OF SULPHITE OF SODA IN DEVELOPMENT.

From the time that sulphite of soda was introduced into the alkaline developer some twelve years ago by the late Mr. Herbert B. Berkeley, it has been the custom to regard it mainly, if not entirely, as a preservative of the pyro and preventive of staining; but since the advent of numerous new developing agents which exhibit no tendency to stain the negative, and which may be, if desired, used as pyro formerly was, without any preservative, the retention of sulphite of soda in the developing formulæ seems to argue that it possesses other functions besides those mentioned.

By very many of those who have used it in conjunction with pyro, sodium sulphite has been regarded as a restrainer or retarder of developing action, though it has over and over again been pretty conclusively shown that any such action is really due to the presence of sulphate, produced by the oxidation of the sulphite, which, in its pure state, has not been proved to possess any slowing action. On the other hand, from the value of the sulphites as reducing agents, quite the opposite tendency might be anticipated, and indeed, so far back as 1872, and later again by Mr. Sammann in 1877, a modification of the pyro developer was proposed, in which, by the action of zinc upon the acid sulphite, a new substance was formed which, in combination with pyro, possessed powerful developing action.

It was noticed at that period that both the so-called "neutral" sulphite of sodium as well as the acid salt frequently exhibited developing powers when mixed with pyro, without the action of zinc, though in the former case the effect was most probably due rather to the presence of free alkali in the sulphite. With the bisulphite, however, this was out of the question, and it became evident that chemical development in the acid condition was a possibility, as, indeed, was foreshadowed by Mr. M. Carey Lea about the same time.

All this, however, was in connexion with collodion films, which, as is well known, behave somewhat differently from gelatine. For instance, old dry-collodion plate workers were wont to commence development with plain pyro solution, and, when detail had been thus obtained, to proceed to obtain density by the addition of acid silver. Frequently, in cases of over-exposure, an image would be produced with acid pyro alone, without the addition of any soluble silver salt, but this might probably be set down to the presence of minute traces of nitrate of silver remaining on the film after sensitising. Similar results were also obtained with collodion emulsions prepared with excess of silver. With gelatine films, however, no such development had been known to occur until Captain Abney, Mr. G. W. Webster, and others, showed that pyro and sulphite in the neutral, or even the acid, condition were capable of developing an image, and, quite recently, the researches of MM. Lumière prove that acid development is possible, and even practical.

Up to the present, however, the matter can scarcely be said to have got beyond the experimental stage, so far at least as acid development is concerned, though in one case, that of amidol, we have a developing agent which acts in conjunction with sulphite in the neutral, or even, it is said, in the acid condition. But in this instance the necessity for the addition of sulphite to the amidol is recognised, which is not so with others of the newer developers, and in conjunction with which it is usual to employ alkali in much the same proportions as with pyro.

Seeing that the addition of sulphite is not rendered necessary for the prevention of stains, and that some of the newer agents are sufficiently soluble in water to be dissolved at the time of use, the question arises, of what utility is the sulphite? It undoubtedly adds very materially to the cost of development, besides increasing the trouble of preparation, and if merely an ornamental addition, serving no really useful purpose, it seems to us desirable to dispense with it if possible.

To put the matter to a practical test, a plain three-grain solution of metol was made, this being the developer that came first to hand, and this was applied to a plate that had received a rapid exposure in the camera—that is to say, a fraction of a second—an exposure that under the circumstances would have required the full strength of a pyro developer though without any forcing. The metol solution, without either sulphite or alkali, was applied to the plate for ten minutes without the least trace of an image appearing, when an addition of ammonia and bromide was made equal to three minims of the former and one-third of a grain of the latter to the ounce of developer. In about three minutes the image began to appear, but proceeded so slowly, that at the end of twenty minutes—half an hour altogether from the commencement—it was still not half out, and very thin. It was then placed in a dish of water and covered, to protect it from light.

Another plate was similarly exposed and treated with a solution containing three grains of metol and thirty grains of

sulphite of soda to each ounce of water. In a trifle over two minutes the image began to appear, and at six minutes it appeared to be fairly dense, though too clear in the shadows to be fully developed. At ten minutes it had apparently progressed no further, and was evidently finished, so it was washed and transferred to the fixing bath. The previously developed plate was then treated with the same solution, containing metol and sulphite, when in about three minutes the detail and density that had been wanting were obtained, and, on fixing and comparing with the second plate, there was no difference to be detected except in the colour of the image and a greater clearness in the one developed without alkali.

This experiment quite upsets the theory that sulphite of soda is a useless addition to metol, at any rate; on the contrary, it proves it to be a far more important adjunct of the developer than the alkali, for, while the latter in half an hour failed to more than half perform the duty required of it, the sulphite in one-third of that time, or probably less, had completed its work. Compared with the time occupied in developing with the usual metol formula, the action of the neutral solution is decidedly slow; but, judging it alongside an ordinary pyro development, we question whether there would be found any great difference.

The quality of the image, too, was very satisfactory; for, although before fixing it conveyed the idea of being either under-exposed or under-developed, that proved to be the result of the unusual clearness of the shadows even for metol. The colour was less black than that produced with the aid of alkali, and the gradations, especially in the higher lights, decidedly softer; on the whole, indeed, a better negative. Development without alkali where time is not an object, and especially in case of over-exposure or with subjects presenting strong contrasts, would seem to be worth trying.

The first experiment was made as much to test whether metol without sulphite showed any tendency to stain the film as to try the developing power of the former alone. In this respect the film proved as free from stain as if sulphite had been used, but the solution after use had become nearly as dark as pyro would have been under the circumstances, although clear and free from sediment. Where the developer is to be used repeatedly, then the necessity for sulphite is indicated.

Turning now to amidol, a plain five-grain solution was made and applied to a plate exposed similarly to the others for ten minutes, without the symptoms of development. A similar quantity of ammonia and bromide solution to that previously employed was then added, and development then proceeded very slowly, and after another quarter of an hour appeared complete. A second plate was treated for ten minutes with a fresh plain solution with no result. A crystal of sulphite of soda—perhaps five or six grains—was then thrown into the developing cup, and the solution poured backwards and forwards from the dish to the cup. In just two minutes the image began to appear, and in five minutes was strong, and vigorous, and full of detail, presenting an appearance of greater "pluck" than we are accustomed to with amidol. Here, again, the absolute necessity for sulphite seems evident, and the conclusion is forced upon us that it exercises an important and specific function in development altogether independent of any free alkali it may contain.

Whether the proportions of sulphite recommended in the different formulæ are the best or not remains yet to be seen; but, judging from the last experiment, and especially the character of the image produced, we are inclined to think that the proportions of 10 : 1 are far too high. Used in those proportions, we find amidol absolutely requires restraining bromide; whereas, if the proportion of sulphite were reduced, it seems likely that, in addition to the saving thus effected, the bromide might be altogether dispensed with.

DEPRESSION IN PHOTOGRAPHY.

THE article relating to photography as a business that appeared a few weeks ago has given rise to a large amount of correspondence, and, as all sides have now been fully heard, it is necessary to bring it to a close. During the discussion professionals have soundly rated amateurs for being the principal cause of the present unfortunate depression. This position certainly cannot be maintained, though, there is no gainsaying it, they have directly and indirectly conduced to bring some not inconsiderable proportion of it about.

From the correspondence it must be admitted that photographers themselves have greatly injured portraiture as a business by their own actions. They have, it is proved, been for years past competing with each other, not in the healthy direction, with quality of work, but in the suicidal policy of reduced prices, free sittings, speculative enlargements, and the like. To such an extent is the free-sitting phase now carried that many popular men, such as clergymen, doctors, and others, who used to be good customers to photographers, get what portraits they require by obliging different photographers with sittings from time to time, and accepting a few copies in way of compliment.

It has been pointed out that the introduction of gelatine plates has not been an unmixed blessing to the profession. Before their advent a certain amount of skill, only to be acquired by long practice, was undoubtedly necessary to work the collodion process under the ever-varying condition of the chemicals. Therefore the number of really good workers had always been limited. The difference between the productions of the skilful worker with collodion and the unskilful one was wide indeed, and, so long as this continued, ability counted for much. But with plates purchased ready for putting into the camera, and, as now, of uniform quality, the conditions are altered. A degree of proficiency that would be utterly inadequate to produce even a passable negative with collodion will now suffice to secure a really good one with a commercial plate. It was remarked to us during this controversy that greater ability is required in the "beach operator," who still has to prepare his own plates, than the present-day studio operator. Under these circumstances it is not surprising that there has been a great influx into the ranks of the profession, so that for some years past the supply has much exceeded the demand, and, as a result, competition has increased in all directions. It may be taken as a rule that any craft that is quickly and easily learnt does not, permanently, continue a very profitable one.

In the controversy amateurs have not been backward in retaliating on professionals. They say that the profession have done little or nothing for the advancement of the art, and that all the great improvements have been made by amateurs, and they have always freely given their discoveries to the world. There is undoubtedly a great deal of truth in this; but the reply is, that there is a wide difference between the amateur of the past, who was generally a good friend to the professional even as a customer, and the amateur of the present of whom he so loudly complains. The former took up photography as

a scientific pursuit, and was prepared to spend time and money in acquiring the necessary knowledge, and their number was limited. The latter, in the majority of instances, takes up the art as a fashionable pastime, and his name is legion. Some correspondents have said, in some instances, he is proud to give his work away; in others, to charge the cost of material, and often to make a profit for himself. In any case, the professional must suffer to some extent.

We can quite imagine that, in many cases, amateurs of the present day, unlike those of old, have an idea of the £ *s. d.* element, and do not give any improvements they may make so freely to the world as did their elder brethren. We find, on going through the specifications of patents in connexion with photography for the last few years, that by far the larger proportion of them are taken out, presumably, by amateurs, for it is rarely that the trade or profession of the applicant is described as "photographer." The patentees are of all manner of callings, most of them totally unconnected with photography, and not a few are entered as "gentlemen." Therefore the complaint that the modern amateur is of a different type from him of the past seems to be not altogether ill-founded, and therefore he is not entitled to trade on his predecessors' reputation.

Nothing is to be gained by professionals and amateurs decrying each other. That great depression does exist in the portrait business is undeniable, be the cause what it may, and the immediate question is how is it to be remedied. During the discussion various ways have been suggested, but whether any of them would be successful, or whether some of them are practicable, is very problematical. The idea of legislation on the subject, such as granting of licences to professionals or heavily taxing amateurs, as some have proposed, is of course out of the question; with this most business men will agree. It has been suggested that, if diplomas were conferred, it would raise the status of photographers, but that would not prevent the general public from going where they could get the work done cheaper if it were equally as satisfactory to their ideas, for it must be confessed that a portrait is by many better appreciated as a likeness than it is as a work of art or excellent example of photography.

Among the suggestions made, is that a union should be formed to regulate prices and other matters, including employing only certificated assistants and the like. But have we not the National Association of Professional Photographers, that was formed to carry out practically these objects? Of course any rules such a union might frame would not lie on those who are not members of it. Unfortunately many only consider themselves. If they want an *employé* the first consideration with them is, 'Can he do the work required and at the wages?' further accomplishments are too often reckoned as nothing. One of the suggestions made was at least worthy of attention, but the opportunity of putting it into practice has passed for a time. It was that the whole subject should be taken into consideration at the meeting of the Convention at Plymouth. At the Convention meetings, which are held but annually, are gathered together representative professional photographers, amateurs, manufacturers, and dealers from all parts of the kingdom; and one might have surmised that a subject of such vital importance to all concerned might have received some attention.

A New Light-sensitive Salt.—A considerable number of salts of sulpho-phosphoric acid, obtained in a pure state by Dr. Glatzel, of Breslau, are recently described by him in a foreign chemical journal, and among them is a new compound shown to be sensitive to light. This is the mercury sulpho-phosphate, which is acid, and very sensitive to light.

Detection of Halogens.—Still another method—this time a comparatively simple one—is described by Herr L. F. Kebler. A few drops of nitric acid, sg. 1·42, are added to the solution to be tested, and a few drops of bisulphide of carbon added. If iodine be present, the bisulphide will be coloured purple. A brownish yellow tint indicates bromine and no iodine. If iodine be found, more acid is added, the liquid heated for a few moments, and again tested with bisulphide. If the iodine has been all removed, the bromine colour, if any, will alone be seen. If bromine be present more acid is added, and the solution boiled till all the bromine is volatilised. Nitrate of silver solution is next added, and the presence of chlorine shown by the usual precipitate so well known to photographers.

The Manufacture of Oxygen on a Commercial Scale.—At a recent sitting of the Paris Academy of Sciences, the dissociation of calcic plumbate was discussed by M. H. Le Chatellier. This operation, it may be remembered, is the foundation of Kassner's process for procuring oxygen, described on a previous occasion in these columns, the reaction as follows: $PbO_2 2CaO = PbO + 2CaO + O$. Comparative experiments were made with this and the peroxide of barium method. It was found that with the new method there was the drawback that a temperature of 900° had to be reached as against 700° for the older method, for the dissociation of the oxygen at 0·1 atmosphere. On the other hand, the plumbate had an advantage in that, being fusible, it absorbed the oxygen more rapidly and completely, and, further, the air needed no special desiccation and decarbonation.

The Preservation of Pictures.—One of the conclusions of the Commission appointed to examine and report on the effect of light on water-colour paintings, was that every pigment is permanent when exposed to light *in vacuo*, and this indicates the direction in which experiments should be made for the preservation of water-colour drawings. Mr. W. S. Simpson has devised an apparatus for making use of this suggestion. He places the picture face down on a sort of glass trough, and then covers it at the back; all, of course, we presume, being hermetically tight. He then extracts the air by a Spreagel mercury pump, and completely seals the whole against air. The expectation is that, apart from accidents, the picture would then last for ever. The apparatus has connected with it a small manometer, somewhat like an aneroid, which, if there is any leakage, will exhibit the fact in a moment.

Uranium Toning of Platinum Prints.—An interesting discussion on this subject has recently taken place at the London and Provincial Photographic Association. Mr. J. S. Teape succeeded in toning some platinum prints with the ordinary ferridcyanide of potassium and nitrate of uranium intensifier, from which Mr. A. Haddon inferred that, as platinum has no reducing action on the ferrideyanide, silver must be present in the platinum paper, the more especially as he had failed to tone platinum paper of his own preparation. Upon treating the paper for the presence of silver with mercuric chloride and hypo, as well as with bichromate of potash and hydrochloric acid, Mr. Teape still succeeded in toning the pure platinum image; so that the silver theory falls to the ground, and we are led to believe that, after all, platinum does reduce potassium ferridcyanide to the state of ferrocyanide. The mysterious part of the matter is Mr. Haddon's failure to tone platinum paper of his own preparation.

Photography of the Shortest Ultra-violet Rays of the Spectrum.—Professor Schumann, in one of the reports of the Session of the Imperial Academy of Sciences in Vienna, discusses this subject at length, describes the present position of our knowledge on the subject, and while detailing the results of a portion of his inves

tigations, states that years may probably elapse before he completes his investigations. He describes how the earliest important results were dependent upon an examination of fluorescent effects, a method which has lost ground as sensitive plates have increased in efficacy. Becquerel's were the first investigations, but, being made on a basis of a spectrum-formed glass, they did not extend very far. Stokes, by using quartz, obtained a spectrum which, measured from Frauenhofer's H., was, in the ultra-violet, twice as long as the total visible spectrum. With the electric light it was from six to eight times as long. His results were given to the Royal Society on June 19, 1862, and on the same day was read a paper from Miller on "The Photographic Transparency of Various Bodies," both papers treating of the same subject in substance. Stokes, however, used the fluorescence, and Miller the photo-chemical power of the rays, the former being able to examine much shorter rays than the latter. Other physicists used fluorescence, and it would seem as though photography was insufficient to do the work. This, however, was shown not to be so, as Carnn, in 1879, published an account of what he could do with photographic aid. He used wet plates, but dipped them in distilled water to avoid stains through the long exposure, and so obtained at once photographic results superior to any. Schumaun, aware of all these difficulties, and cognisant of the advance in dry plates, determined to investigate, or "open up to photographic study," the remaining ultra-violet as far as 185·2 mm. (that is as far as Stokes had gone with fluorescent methods) by means of a more suitable process than those hitherto applied, and at the same time to consider the extension of this region of observation as the direction of greater deviation. The report we are giving in brief discusses the former portion of the plan, and also the preliminaries of the second.

THE INFLUENCE OF DEVELOPMENT ON GRADATION.

The papers read at the recent meeting of the Photographic Convention should be carefully studied by all who are interested in the matter of the influence of development on gradation. The questions at issue appear to be becoming clearer, and light is gradually being shed on some doubtful points. Mr. Bothamley, indeed, suggested that it might possibly prove that there was, after all, no real difference of opinion on the question among photographers, and that, when we came to properly understand each other, it might turn out that all thought alike; but I think that view of the matter will hardly bear examination. Between the opinions maintained by Messrs. Hurter & Driffield and those held by the majority of photographers a wide gulf seems still to exist. It is true that all agree that the ratios of the *opacities* of a negative *may* be modified in development, and Mr. Bothamley's diagrams showed how that follows from Messrs. Hurter & Driffield's principles. His explanation, put simply, merely means that a negative will print differently accordingly as greater or less density is given to it, by carrying on the development for a longer or shorter time. That the photographer has such control as results from that is a matter of course, but Messrs. Hurter & Driffield will admit the existence of no other. They deny that any practical alteration or improvement in gradation can ever be made by altering the *composition* of the developer, while nearly all photographers believe, on the contrary, that great and often valuable variations in results are to be obtained by that means. Mr. Bothamley touched on that point, and thought the different opinions might, perhaps, be reconciled by taking into consideration the greater or less amount of fog produced by the various developers; but here he appears to have fallen into a pitfall against which he has warned others, viz., that of confounding density with opacity (using both terms in Messrs. Hurter & Driffield's sense). The effect of general fog is to spread a certain proportion of reduced silver evenly over the film, and it therefore adds equal amounts to the *densities* at all parts, and so alters their ratios; but these densities are the *logarithms* of the opacities, and it is, of course, unnecessary to point out to Mr. Bothamley that equal additions to a series of logarithms make no difference in the ratios to each other of the numbers which they represent. The effect of the fog is, in fact, as Mr. Cowan suggested, just equal to placing a piece of thin paper over the negative. I see Mr. J. Sterry has already drawn attention to the matter.

Messrs. Hurter & Driffield's present position is becoming more clearly understood; they certainly do not now maintain all that a reader of their original paper would be likely to gather from it. Taken literally, it appeared to be there asserted, in several places, that the ratios between the densities were *altogether* unalterable in development, and that the only sort of control left to the photographer was to give a greater or less value to the development factor γ, according to the length of time employed in the process. This view has now quite broken down, and every one of the many sensitometer experiments of Professor Burton (as described in the valuable paper read at the Convention), in which the opacity curves (and therefore the density curves also) *crossed*, has given sufficient proof of its unsoundness. Messrs. Hurter & Driffield, however, are now themselves convinced that extreme alterations in the composition of the developer may bring about somewhat greater alterations in the density ratios than they at first thought was the case. This they candidly admit in their preface to the reprint in *Dry Plates* of their original article. The opinion they now hold appears to be that, in *picture-making*, no advantage can, in any case, be gained by varying the method of development, *because*, the difference in gradation to be so obtained, will be too small to be appreciable in the small range of intensities of light which they believe to exist in ordinary photographic subjects. Now, supposing this to be so, it is still important to know that the simple principles laid down in the original paper are not accurates and especially that there is so serious a weakness in the formulæ, a' other uses, besides mere picture-making, are every day being found for photography, and there are probably many cases in which a knowledge of such principles, if true, might have been most valuable. But even in ordinary photographic work I do not think Messrs. Hurter & Driffield's opinions regarding development are likely to be yet accepted. Mr. E. J. Wall's Convention paper and the discussion on it show how little impression has yet been made on the majority of photographers, not one of the members present having expressed any doubt as to the great influence which the choice and composition of the developer may have on the resulting negative. And even their most enthusiastic supporters are unable to fully agree with them on that point. I have previously referred to an advertisement of Messrs. Marion & Co. as evidence of that, and Mr. Ashley Cowan, who represents that firm, and has made a very large number of photometrical experiments, has since shown, in a discussion at the London and Provincial Photographic Society (April 20), that he considers that variation in the composition or temperature of the developer will seriously affect results. But the experience of Messrs. Cadett & Neall is a still more striking fact (see *Dry Plates*, No. 9, page 52); having now adopted the Hurter & Driffield system, they mix the developer used in testing their plates according to the standard formula agreed upon by those platemakers who use the actinograph speed numbers, while, in their instructions to the users of the plates, another formula is recommended. "The result (they write) is a general complaint of over-exposure" (of course, from users of the actinograph), and, since their attention has been called to the matter, Messrs. Cadett & Neall have undertaken a series of experiments, and now find that these two species of developers, neither probably differing extremely in constitution from normal proportions, yet differ so greatly in their action that the correct exposure is found to be twice as long when one mixture is used as it would be if the other were employed. These experiments, it should be remembered, were made strictly on Messrs. Hurter & Driffield's principles.

The every-day experiences of working photographers, including users of the actinograph, are apparently confirmed by the evidence of systematic experiments, such as those described by Professor Burton; but Messrs. Hurter & Driffield oppose the latter by the argument that, in ordinary photography, the range of intensities of light to be dealt with is far less extensive than is usually supposed, and that erroneous conclusions have been formed in consequence of a want of knowledge of that fact. That the range is confined to such narrow limits as they described will, they suspect, be news to Professor Burton. No doubt it will, and to others also; but the matter, I think, requires clearer proof than we yet have before these views can be generally accepted. The experiment described (in the paper which they sent to the Convention) by Messrs. Hurter & Driffield, in order to show the correctness of their opinion, seems scarcely satisfactory. To represent the range of illumination likely to be found in a landscape, they attached sheets of white card and black paper to each side of a folding screen, and, having placed it so that one side was in full sunlight and the other in shade, a negative was taken of the screen and the densities measured. By this means they arrived at the, no doubt, correct conclusion that the intensities of light reflected from the various parts only varied as much as 1 : 30. The questionable matter is whether that screen could fairly be considered to represent the differences of illumination existing in even an average landscape, for the shaded side was fully exposed to all the light coming from one half of the sky—equal in intensity, as the experiment showed, to direct sunlight itself—while in every

landscape there are places which receive light from only a small fraction of the sky, or often from no part directly. This is a matter likely to enormously extend the scale.

Messrs. Hurter & Driffield have previously expressed this opinion as to the shortness of the range in their article in THE BRITISH JOURNAL OF PHOTOGRAPHY of April 21 last, and I was much surprised on reading it. Since then, I have tried a few experiments to test the matter, but my results, being only negative, have been rather unsatisfactory; still, they appear to be very inconsistent with Messrs. Hurter & Driffield's conclusions. Opposite my dark-room window is a house, which I frequently use as a test subject for trying plates, &c. A nursery business is carried on there, and there are several outhouse and stable doors which are frequently open, showing spaces which furnish the darkest parts of the view, and in the foreground is a summer-house, the interior of which is nearly as dark. By taking negatives, and comparing on them the images of these dark spots with those of the sky, I found reason to suppose that there had been far greater differences in the intensities of the light during exposure than 1 : 8, which Messrs. Hurter & Driffield had given as the average, or 1 : 30, which they considered an extreme case; but, as the darkest parts covered too small a part of the negative to be measurable in the photometer, I afterwards took a negative of the summer-house from a few yards' distance, so that the interior covered a considerable space. That, however, was not quite the darkest part of the view, an open doorway in the opposite house being still darker. The experiment for which this negative was taken was my last and most satisfactory one, and I will therefore give fuller details of it. A backed "Ilford ordinary" half-plate was cut in two, and one half exposed, as mentioned, on the summer-house (eight seconds with *f*-45). To the other piece, cut into strips, a series of carefully timed exposures, to a standard candle, was given, varying from 1 to 64 C.M.S., and another series of from one to five minutes at a metre's distance, and all were developed together in a well-restrained solution. On examining the results in the photometer, I found that the sky part of the negative was slightly denser than the patch representing the five minutes' candle exposure. The means of several readings were :—

Exposure	180 C.M.S.	240 C.M.S.	300 C.M.S.	Sky in Negative.
Density	2·67	2·71	2·72	2·81

As these densities were all in the "period of over-exposure," the difference shown of ·09 may represent a large excess of exposure over 300 C.M.S. The densities shown by the summer-house interior, with those nearest to it, are given below :—

Exposure	1 C.M.S.	2 C.M.S.	4 C.M.S.	Summer-house in Negative.
Density	·14	·35	·68	·51

These densities, except as regards the 1 C.M.S. patch, were found to be included in the "period of correct exposure," and the value of the exposure of the summer-house interior could therefore be easily calculated, and was found to be equal to 2·8 C.M.S. That exposure, however, was the result of the action of all the light which fell on that part of the plate, but a considerable proportion of the deposit in the shadows of a negative (especially when, as in this case, bright sky covers a large part of the view) is generally produced by light scattered by the lens or reflected in the camera, which must be allowed for when judging in this way of the actual brightness of a dark part of the subject. I endeavoured to estimate the amount of the scattered light by comparing two negatives, which I exposed immediately after that of the summer-house, and developed with it. The parts compared represented the interior of a black box, which appeared in the foreground of each of them, a bright sky being included in one negative, but entirely cut off in the other, by hanging a black card in front of the lens.

It is, perhaps, unnecessary to give fuller details, so I will merely state that I concluded that the action of the scattered light, during eight seconds of exposure, might be taken as equal to ·6 C.M.S.; but, unfortunately, I found that I had included a much smaller amount of sky in the view in this experiment than appeared in the negative of the summer-house. Taking, then, 2·8 less ·6 as the proportion of light reflected from the deepest shadows when that of the sky was equal to 300, the intensities in the subject appeared to have varied from 2·2 to 300, or in the ratio of 1 : 136, and the only conclusion I could arrive at was that the difference was certainly no less than that; but, considering that the light of the sky and the scattered light had both been under-estimated, it was probably considerably greater, and the subject is by no means an exceptionally strongly contrasted one. I intended to have made another experiment, in which I should have given different exposures to sky and foreground, so as to bring both within the "period of correct exposure," but have not been able to find an opportunity when the light could be depended on to remain sufficiently constant.

H. J. CHANNON.

AMERICAN NOTES AND NEWS.

Dr. Goddard's Portrait.—Photographers are indebted to Mr. Julius F. Sachse for providing them with a portrait of Dr. Paul Beck Goddard in the *American Journal of Photography*. It is an enlargement from one of the first Daguerreotypes made with the use of bromine in December, 1839. We have already spoken of Dr. Goddard's researches in these notes, and have now merely to add, on the authority of Mr. Sachse, that the proofs for the assertions formerly made relative to Dr. Goddard's discovery are to be found in the minutes of the American Philosophical Society of the period.

A Palatial Business Establishment.—In its business relations photography appears to be looking up in New York. Mr. G. Genert has just completed a new business structure in the up-town part of the city which has a frontage of fifty feet, a depth of ninety feet, and contains six stories and a basement. It is of handsome and artistic exterior, formed of light buff brick and terra-cotta trimmings, with polished granite pillars up to the first floor. It is said that in solidity of construction and perfection of lighting it surpasses all buildings of its class in New York.

Sympathy with Dr. Ehrmann.—The American papers record the death of the wife of Dr. Charles Ehrmann, teacher of photography at Chatauqua, and one of the editorial staff of the *Photographic Times*. We tender sincere sympathy to our talented *confrère*.

Bogardus on Photographic Possibilities.—There is always to be found a rare mixture of genuine fun and philosophy in the ever-welcome contributions of Abraham Bogardus to the *St. Louis and Canadian Photographer*. He hits foibles and fads with amazing hardness, and yet so manages it as to avoid giving pain to any single individual. Before he retired from the profession, he was probably one of the ablest and best known of professional photographers in the United States, from the Daguerreotype onwards. The amount of money he made in the palmiest days of photography was prodigious. Speaking of the photographs at the World's Exposition being sprinkled all round, Mr. Bogardus is of opinion that, if photography continues to grow as it has done, it will, in a hundred years, be able to hold a World's Exposition for itself, and rule the art matters of the world. In the advance of photography it is wise to receive assistance from all directions. Too much self-reliance has ruined many a man and many an enterprise. Never refuse assistance because the party offering it may look insignificant; he may develop unexpected qualities. You cannot tell how far a toad may jump by looking at his tail. A good hornet, if he feels well, can break up a whole camp meeting. Who is so rash as to limit photography's future?

Still Another Tele-photo Lens.—"All tele-photographic objectives which are brought to America are copies or infringements of Krogman's Patent Lens System, which reference to part fifteen of specifications forming part of Letters Patent No. 409,981, dated August 27, 1889, will prove." This is an extract from a letter in the *St. Louis Photographer*, signed The Cincinnati Photo-optical Company. Having access to Mr. Krogman's patent of the date above given, we have carefully examined it, and find that he has not the right to make any such claim as he does. His invention consists of an

almost plano-convex achromatic lens, the flattest side of which is placed at the back or inner end of the mount; a concavo-convex, or negative meniscus, formed of crown glass alone being placed at the other, or outer end of the tube, the concave surface being to the outside. This is of the same diameter as the achromatised back lens. A second figure in the drawing shows an alternative form. In this, a plano-concave lens of crown glass, and of smaller diameter than the achromatic, forms the front lens, the flat side being to the outside. If any one will be at the trouble to draw on paper the lenses from this description, or examine the patentee's own drawings, he will see that such a combination cannot, in the nature of things, form a tele-photo lens at all. The special claim in Mr. Krogman's patent is summed up in two unequal lenses, the front being a single concave with negative focus, and the back an achromatic, with positive focus. Had he first reversed the position of the achromatic lens, and then reversed the relative positions of the two lenses, so as to have the positive to the outer end of the tube, he might have had an approximation to a tele-photo lens, although one can only guess at this, for the specification, which is very brief, contains no other information than we have here given.

American Estimate of the London Camera Club.—Referring to the falling away of interest in the Camera Club, and to members declining to contribute papers which are withheld from the public, the *Beacon* says: "It should never be forgotten that no photographic society can be healthy, or remain long so, that seeks to confine its benefits to its own members, and it may be taken as a rule that the prosperity of a society will always be in proportion to the publicity given to its proceedings."

Blackening Brass.—Here are some details of the blackening of metal diaphragms, given by H. H. Buckwalter, in the *Pacific Coast Photographer*. He dissolves an ounce of copper nitrate in three or four ounces of water. The diaphragms are then heated in the flame of a spirit lamp, and dipped in the copper solution. Without drying, they are again heated in the alcoholic flame until the metal ets a red colour, which instantly changes to black on withdrawal from the flame. It is sometimes necessary to repeat he dipping. When cool, clean the metal with a damp cloth.

The Ethoxycon.—Mr. T. H. M'Allister, of New York, who occupies a foremost place in the New World in respect of optical lanterns, has, in the World's Fair, a specially fine exhibit of these, many being new in design. Especially interesting and convenient is said to be the ethoxycon, a compact piece of apparatus, which makes the gases necessary for combustion during the working of the lantern. This, we know, has been done some years ago in this country, by Birrell and others. Meantime, no publication has yet been made of the American device.

Restrictions at Chicago.—Loud outcries are being raised against Mr. Arnold, who holds the rights for photographing at the World's Fair, and who seems to be interposing what is alleged to be difficulties in the way of others. Dr. Nicol says (in his *Beacon*) there is now an impression that he is a concessionaire, and one who, in partnership with a son of one of the Executive, got the concession without competition, and with no thought of fitness. "Is it too late to make an Augean clean out of the whole business and start on a new and different footing? The Stereoscopic Concession may be allowed to stand, it is in good hands; but, surely, the most wonderful photographic possibilities that the world has ever seen should not be continued to be sacrificed through the incompetence of an *employé* or concessionaire, even if he has as a partner a son of one of those in power." It is suggested that a staff of competent artistic photographers should be employed so as to make negatives of exteriors and interiors, and supply first-class prints at reasonable prices, which we infer has not hitherto been done.

PHOTOGRAPHIC METASTASIS.

Those of us who are in the habit of taking crepuscular effects, whether at dawn or sunset, have doubtless, at one time or another, encountered on some developed film a black circular dot situated in the midst of a series of concentric halos, alternately light and dark.

When this grotesque pictorial sun presents itself to our notice, we know that the cloud veil was too diaphanous to conceal the shape of his face, and that, though we did not, perhaps, observe it, the disc must have been visible.

Fictitious "suns" behaving in much the same way may be produced by interposing a large sheet of brown paper or cardboard, having a circular hole cut in the centre, between the camera and a pane of ground glass illuminated by daylight, gaslight, lamplight, candlelight, &c.

Again, if a cylindrical aperture over a centimetre in diameter be cut in a body of such opacity that we consider that though light may penetrate it superficially it cannot pass through, and a dry-plate film be exposed directly behind this orifice, and be protected everywhere else, we can readily develop the well-known dark fuzz or halation around the edge of the circle.

If polygonal, bluntly elliptical, or square apertures be substituted for the circular one, but little difference is noticeable in the shape assumed by the halation, and this is also the case where the hole is an equilateral triangle, or, in short, of any form whatsoever provided it be approximately as broad as it is long. Under these last-named conditions there is no series of light and dark halos, but only the dark prototype.

But, if we replace orifices of these forms by those which have some such shape as a very obtuse-angled triangle, a right-angled triangle having one side much shorter than the others, an isosceles triangle, in which the two equal sides, or a scalene triangle, in which the two sides are very much longer than the third, we observe at once that the halation falls away or disappears at the more acute angles, although present everywhere else.

This modification of our former experiments furnishes the clue, hitherto wanting, to the possible reconciliation of our camera and printing-frame experiences, and instantly suggests the means to be adopted in testing the validity of our explanation as to why, in the first instance, a series of concentric rings were produced, which, in the second case, were absent.

If, therefore, we once again revert to our printing-frame circles, ellipses, polygons, squares, or equilateral triangles, but diminish their size till they are only one or millimetres in diameter, we see that exposures which would have produced halation as usually observed, had the apertures been larger, have now no longer this effect, for instead of a dark circle, &c., with a dark halo, whose deepest edge is in complete contact, at least, with the periphery, we have a dark circle with a clear halo immediately beyond the limiting circumference.

Let us, for simplicity's sake, confine our attention to the distribution of the developed deposit in or near a circular area of the film which has been exposed to the action of light through a cylindrical aperture of about a millimetre and a half in diameter, drilled in a screen of ebony. One shade of "half-tone," but one alone, is secured by causing the beam of light to impinge obliquely upon the plate in such a manner as to cast a narrow crescent-shaped shadow on the otherwise unprotected portion of the film. The depth of tint of the shadow as it appears to the eye is not, strictly speaking, an absolute mean between the brightest and darkest parts of the film. Consequently, the number expressing the exposure, which allows the part of the film on which this shadow falls to develop into the densest bit of the film, is not a geometric mean between the numbers expressing respectively the exposures that cause the brightest and darkest parts to develop to the same maximum of density when all three are simultaneously immersed and remain equally long in the same liquid multiplier. It therefore follows that waxing and waning half densities will not be reached at the same moment, and hence, as a matter of course, that, when the two densities are equal, it will be at a period earlier or later than the geometric mean of the exposures which produce the extremes according to the amount by which the brightness of the real shadow is greater or less than half-tone. The actual brightness of the shadow will naturally depend upon the quantity of reflected light which reaches it either from the illuminated side of the cylinder or from some other effectively lustrous body. I mention this in order to show the futility of expecting that such phases or sub-phases should correspond to, or present themselves contemporaneously with, the production of the neutral phase proper (see diagram on page 185 of The British Journal of Photography for March 24, 1893). At another time I will prove, prove beyond all question, that, contrary to Messrs. Hurter & Driffield's

assertion, there are no "periods" of "under-exposure" and "correct representation" obeying separate laws. The law that *the densities are proportional to the logarithms of the exposures* is the natural corollary, the primary inference, to be deduced from, and implied by, my law as given in these pages in 1888; and, generally speaking, this is the closest approximation to the absolute truth which we have as yet been able to formulate. But, as I shall shortly show, the statement which I have put in italics is not quite sufficient, even in its arbitrarily restricted application to a supposed 'period of correct representation,' and to be precisely accurate must be somewhat modified. The amount of silver reduced by the conjoint action of light and a developer is never directly proportional to the exposure. The "inertia," or, as I prefer to term it, the resistance, is an ever-present, constantly shifting influence, essentially diabatic, and to study its transference from point to point in the film is in the highest degree instructive.

But, to realise the facts upon which these affirmations are based, it will be necessary to describe the more striking or salient forms which the image of a small circular aperture can assume, the word "image" being extended so as to embrace the various excrescential halos which under certain circumstances invariably accompany and react upon the more definitely limited disc-image. It will also be advisable, I think, to regard this latter area as a tube—a short tube of force—so as to be able to get an idea of the state in which the film may be supposed to be in *before* the developer is applied. Rightly or wrongly, I insist upon regarding the phenomena which characterise the small image as typical of the manner in which its constituent ultimate particles or molecules are affected.

The following extracts, taken as they stand from one of a host of note-books on the one subject, may now be seen to have some bearing on the question at issue. The exposure values are omitted as tending to distract the attention, and it is to be understood that several of the consecutively described peculiarities may be simultaneously displayed, *e.g.*, the aperture-image reaches greatest density, and the aperture-image begins to reverse.

(*a*) The aperture-image acquires density at first slowly, then with an accelerated rapidity, next with a retarded acceleration, and, finally, with a retardation corresponding to the initial acceleration.

(*b*) The shadow-image only becomes visible under development after the aperture-image has made its appearance and has acquired a density proportionate to the difference in the intensity of the light at the two places. When the exposures have been very short, and the developer is of normal strength, or weaker, prolonged immersion does not appreciably alter the difference between the two densities.

(*c*) When the shadow density is as far beyond the clear film, when fixed, as the shadow itself was brighter than "absolute darkness," the exposure is correct as referred to the developer employed and the duration of the immersion. These factors remaining constants, this is the only instant which produces a true representation of the subject as far as the *relative* proportion of the greatest, intermediate, and least densities may be looked upon as the (inverted) equivalents of most light, less light, and no light in the subject portrayed. Let this be reasoned out. Take, for instance, the case of a star of the first magnitude in the midst of a nebulous unresolved cluster set in a sky "as black as Erebus."

(*d*) A *clear halo* now seems to surround the dark aperture-image, and yet neither the naked eye, nor the eye when furnished with a microscope, can detect the faintest sign of the dark annulus or ring which, in some shape or form, is present at all subsequent stages. The film beyond the clear halo is, or seems to be, uniformly degraded, possibly fogged by the light employed during development.

(*e*) A faint ring, soft although narrow, darker than the marginal portion of the film, now surrounds and emphasises the clear halo, which, probably by an optical illusion, appears still clearer. For some time to come this dark ring will grow more and more opaque, and will widen, fading very gradually externally, somewhat more abruptly internally, encroaching upon, and diminishing the territory occupied by the clear halo.

(*f*) The aperture-image has now reached its greatest density. The shadow image, although very dense also, maintains nearly the same intensity compared to the strength of the aperture-image, but is much too dense *for a shadow* (*vide c*).

(*g*) The aperture-image now begins to clear. This, however, cannot be noticed by the naked eye, and requires for its detection nice photometric testing.

(*h*) The shadow-image vanishes. This is due to the fact that it, ascending, has reached the same density as the aperture-image descending. As this effect, among others, can be materially hastened by the substitution of a developer strong in alkali, or accelerator, for that which we have been employing hitherto, it seems idle, from one point of view, to deny that the ratios are not altered by the developer employed.

(*i*) Halation, as generally understood—that is, a fading fuzz, with its darkest edge in contact with the periphery of the aperture-image—now shows itself. If the screen, ebony or otherwise, is not perfectly flat and smooth, the halation will take the form of dark irregularly radiating brushes.

(*k*) The contrast between the clear halo and dark ring is great. The clear halo now presents the aspect of a vortex motion or smoke ring, owing to the double invasion.

(*l*) The clearing aperture-image is now of the same density as the darkening "clear" halo.

(*m*) The clearing shadow-image is now of the same density as the darkening clear halo.

(*n*) The clearing centre of the aperture-image is contrasted by the darkening "clear" halo. The general aspect of the entire image is that of a weak reversal.

(*o*) A dark line is now observed just within the periphery of the aperture-image. The cause is found in a fact to which I formerly drew attention, namely, that it is the central part of the aperture image which first begins to clear. As this centrifugal action goes on, the inner edge of the circle seems gradually to accumulate all the density at one time spread over the entire disc, and as the centre clears the dark margin becomes narrowed down till it is little more than an outline.

(*p*) Reversal is complete.

HUGH BREBNER.

ON THINGS IN GENERAL.

WANTED, a word! If it were not that our Editor was too great a man, and our JOURNAL too great a journal, what a boom they could create by a new word competition, or tournament it might be called! Wanted, a WORD to describe the particular sort of person who takes a photograph without the slightest intention of bettering any one else with little or no knowledge of art or science—amiably, indifferently or malignantly careless of the labours of past workers who have made latter-day photography possible! A big prize might be offered, as I am afraid the language is not expressive enough, for we see even the painter-artists are not in possession of a word stronger than "sign-painter" when they wish to refer to one not possessed of the divine afflatus spread over the gods of Burlington House. "Amateur" will not suffice. It is the lack of a suitable term that has caused the amateur and professional controversy to be as wanting in conciseness as it is fertile in expletive and declamation. Is there is a single professional of ability who does not honour the memory or the work of those on the long roll of fame who have advanced photography to its present high pitch of technical excellence? Almost every one is, or was, what is ordinarily understood as an amateur, and the present professional owes his means of livelihood to their labours. It is as dishonourable as dishonouring to hold up to photographic scorn these pioneers and apostles of progress in our science. We must look things fairly in the face. The professional photographer is earning a living by doing work which, in a way, can be done by any one who chooses to invest a five-pound note in buying the necessary materials. What is the logical result? He must attain to the utmost skilfulness possible to him, and must then hope to attract clients by the character of his work. I assert that, if he only produces work of a character that a tyro can soon equal, he stands on an inferior level to a so-called working man, *i.e.*, a handicraftsman, and cannot logically expect more pay or as much, unless he can become a master handicraftsman, and make money by employing others and reaping the profit of subdivision of labour. A really good photographer is less readily found than a really clever doctor; the others will, I am afraid, go to the wall. Some of the former also are unfortunately doing so; but, unfortunately also, photography is not alone in that respect. However, it is idle repining to talk of amateurs and the harm they are doing—this is a free-trade country. I should like to contribute my quota to the discussion of the cause of bad trade. From inquiries I have made, there seems scarcely an exception to the cry that enlarged work is falling off everywhere. It has been pointed out to me that a possible explanation may be found in the firms of enlargers supplying the public as well as professions

photographers. Here, again, free trade comes in. They have a perfect right to do so; but also photographers have an equal right to decline to deal with any firm that supplies the public. It would be the height of folly to buy from a man who offers his wares to the next-door neighbour.

The present has been decidedly an optical season; the air is big with lenses, new and old, and discussions on their merits. The tillman-Burton controversy is very amusing, but it is apt to lead to a neglect of the value of the lens in question, which possesses incontestably high merits. I wonder how many photographers there are at this minute who possess a lens that defines with such a stop as is of common use, say *f*-32., equally well in middle and margin of a plate about the same size as (or even larger than) the focus of the lens, as the concentric fairly does. Then we have the double anastigmat controversy, where a lens, evidently of great value, is concerned, as the published diagrammatic photographs prove. Unfortunately for the manufacturer, the sheet of photographs showing the performances of the various lenses loses almost all its scientific value from the fact that the lenses employed were either eccentrically placed as regards the diagrams, or the latter were not properly "squared up," a condition of affairs fatal to the value of the reproductions as scientific evidence. This condition, which instantly struck me when I saw the diagram, is explained by saying that the rails upon which the diagram-holder was placed, "though accurately directed upon the centre of the trial plates, were placed ..... not completely vertical to the plates." This explanation is meaningless as it stands, for the words are self-contradictory.

The editor is again to the fore with some valuable remarks upon the equivalent focus of lenses, and explains in the simplest of manners how, and how easy it is, to find this focus of any lens. But my experience is that few will go to the trouble of doing even such an elementary piece of work as this; they will prefer to guess at it. Now, I am about to propose a still simpler method, which will give the focus quite near enough for practical purposes. Fix the camera at one end of the room, and at the other, and right opposite the lens, place a penny or other tape measure. Focus this measure on the ground glass, and cut a strip of paper, just the same length as the tape appears to be. As it will be small, we will take it in sixteenths of an inch. Then, as the yard tape will contain 576 sixteenths, that number must be divided by the size of the image (expressed in sixteenths of an inch). All that is then needed is to measure the distance that separates yard tape from ground glass, and divide it by the number we shall obtain when we add 2 to the figures resulting from the yard tape as above. The result will be the focus, not mathematically exact, but quite near enough; and any one can perform the operation in a minute. FREE LANCE.

DODGES.*

DISTORTION.

IT may sometimes happen that, notwithstanding the use of a swing back, distortion occurs, through the camera being pointed too much towards the sky. This can be cured as follows:—First make a transparency in the enlarging camera, tilting the negative and plate for transparency until the picture appears as it should do. Develop the transparency, then make a negative from the corrected transparency; or, if the transparency is not quite right, the negative can be further corrected in the same manner, and with care the result should be satisfactory.

A SHIFTING-BACK PRINTING FRAME.

This frame I bring under your notice was some time ago broken and repaired in such a manner as to be useless, owing to the back so easily shifting. For a time it was discarded, but, since, it has been found useful in placing prints on the negatives again in cases of under-printing. Place the negative in the frame and secure it, to prevent it shifting; then place the print to be corrected as nearly as possible in its proper position, fasten up as usual, and it will be found that the back and print will shift about together, so that, by looking at, the front can be accurately adjusted to the negative with very little trouble. I find it useful when letting inexperienced persons do printing, as I can quickly correct a dozen prints, and find it a useful contrivance.

EXPOSURE.

There is often a great discrepancy in the calculation of exposure by different persons, in my experience as much as six to eleven. The pulse-beat in middle-aged persons is nearly correct for seconds. A dodge is also recommended of repeating as rapidly as possible 1, 2, 3, 4; 2, 2, 3, 4; 3, 2, 3, 4; 4, 2, 3, 4, and so on; each four figures will so nearly represent seconds that the difference may be disregarded. It is also recommended to hang from under the tripod-head a small weight on a cord forty inches long—thirty-nine inches I believe to be correct. This will give seconds each sway of the weight. A much shorter cord is undoubtedly more convenient, such as is used on an exposure meter in the market. This, to give half-seconds, should be nine and three-quarters of an inch long. The swing and return will be one second. Considering the inventive genius shown in photographic matters, I am surprised that no one has yet placed in the market a small simple, seconds-ticking instrument, so that by giving a few turns the instrument would tick seconds when required. It seems to me to be a want in the dark room when enlarging.

* Concluded from page 425.

TONING.

When I first tried gelatino-chloride printing-out paper I found great irregularity in toning; the first prints toned all right, but the last of the batch hardly got any gold, owing to the greediness of those first deals with. This difficulty can be overcome in the following manner: Suppose there are eighteen prints to tone; make up the toning bath, pour half of it into the toning dish and place six prints in it, when they are toned take them out and add half of the remaining bath to that already in the dish, and tone six more, take them out and add the remainder of the bath, and tone the remainder; all the prints will by this arrangement be toned in a regular manner. I mention this, as I have heard of this difficulty twice within the last few days.

REGISTERING CLOUDS.

This is a subject which I think deserves some consideration. Clouds too often look very funny in our landscapes, printed without much regard to lighting, and my object in mentioning this matter is to suggest a method of knowing what clouds will fit a landscape. In one of the journals some time ago there was a paper on the subject, and it was recommended to take various particulars—time of day, point of compass, &c., and a diagram—rather a complicated proceeding, and I confess I did not get quite to the bottom of it. My plan is a simpler one, and is this: Paste on the top of camera a small piece of cardboard or paper marked like the face of a watch, with the XII. pointing the same direction as the lens. When a plate is exposed, draw an imaginary line from centre of cardboard to the sun, and mark the plate in your exposure plate the number the line intersects—say it is 8, No. 8 cloud and No. 8 landscape will always fit; No. 8 cloud reversed will fit a No. 2 landscape, and so on. The number need not be very exact—a No. 5 or No. 7 cloud may do for No. 6 landscape. I don't say the cloud will suit, I only say the lighting will be the same. The altitude of the sun should perhaps be taken into consideration, but this can be readily discovered by referring to your note-book for the time of day the negative was taken. This system is easy of adoption; it is not necessary even to have a diagram on your camera, for your watch on the top after each exposure, a note of the number can be obtained.

PRINTING CLOUDS.

I have very little time for cloud-printing, and am obliged to adopt the following rough-and-ready dodge to print clouds quickly. For this method you must have a thin negative. I do not use a frame but paste brown paper to the bottom and top, place the print on the negative, and turn the brown paper at the top and bottom over the print. I then place the back of a printing frame in the usual way, and clamp one side to the negative, holding the other between finger and thumb of left hand. I shade the front portion with brown paper or anything that comes handy, roughly follow the outline with wool, and print in direct sunlight. Should there be a tower or high building with sharp outline print it on a separate piece of sensitised paper, cut it out correctly, and stick it on the print, and proceed to print from the cloud negative. Nearly all my clouds are done in this manner, and only take a very short time each.

One other contrivance I will mention, and that is, a convenient way of drying sensitised plates. You may attempt to develop a plate not exposed, don't throw it away, well wash and dry. There may be other occasions when you may be puzzled for the want of a drying cupboard. For a few plates it is not necessary to have a cupboard, use your old plate boxes. The shape I show you is excellent (a sliding box) when you have a plate to dry. Let it drain, wipe the back, place in the empty box film side up, and close. You will find it quite dry in the morning, presuming the box had previously been kept in a dry place.

C. O. GREGORY.

SEASONABLE NOVELTIES.

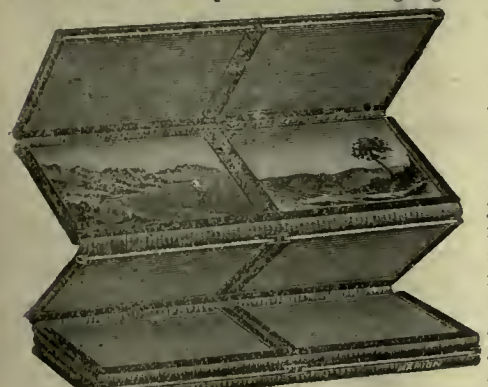
Fallowfield's New Hand Cameras.

Premier Hand Camera.—This neat hand camera is so designed that all the adjustments can be made from the top of the apparatus, all the scales being in full view when in use. While compact, it is light, and strongly made. The drawing conveys an idea of its appearance. It is equally suitable for hand or stand. The one we examined carries twelve plates, or twenty-four films. The lens is Wray's well-known rapid rectilinear hand-camera lens of 5¼ in. focus, fitted with four stops which are changed from outside by the milled head and indicator, and the lens can be instantly taken out for cleaning purposes. The self cap works automatically, so that the lens is always covered except at the actual moment of exposure, and for time exposures can be held open by a turn of the small knob in front. Two finders with metal hoods are provided, giving the identical view on plate, for either landscape or upright picture. The shutter works between the lenses, and being provided with Newman's pneumatic regulation, can be set for exposures of any duration from $\frac{1}{10}$ to one second by the milled head on top of camera. It is set by pulling up the small ebonite knob, and released by pressing the small button below. It is absolutely accurate in working. Focussing is done instantly by central rack and pinion sunk flush below. A scale of accurate distances, 6, 9, 12, 18, 25, 35 feet and infinity, is fitted on top. For use on tripod a light celluloid screen (carried behind changing box) is provided.

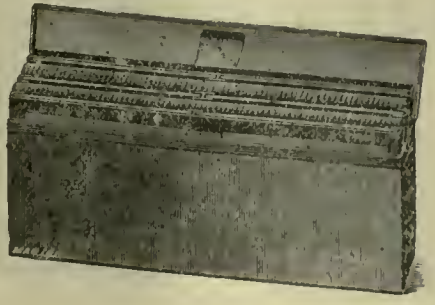
The Focussing Facile.—With the assistance of the cut and the following description, a good idea of this, the latest "Facile," will be had. Focussing is done by adjusting the indicator from six feet to infinity, or at any fixed focus desired. The shutter is fitted with a spring release, giving exposures of any duration, and it is always set. The finders are deeply sunk and thus shielded from the light, and give the identical views as the lens. The plate changing is effected by simply pointing the arm of the indicator to any number of plate on the scale. The finder, focussing scale, and shutter are on the top just under the eye, so that each can be rapidly manipulated. It is finished in dull grain black and has a good although non-pretentious appearance.

Marion's Negative Holders.

This is a safe and simple means of storing negatives for easy inspection and exhibition. Any negative may be inspected and removed without disturbing the others. The negatives are held in independent grooves, and they cannot injure each other. The negative holders, as shown in the cut, are neat metal grooved frames, hinged together with flexible joints, and so arranged that any negative contained therein may be easily inspected and withdrawn. They are folded and enclosed in a japanned metal case, with hinged lid. (See cut.)



They are much more portable and compact than ordinary grooved boxes, and their use obviates the necessity of lifting out of their grooves a number of negatives in looking for those desired. They are destined to become popular, especially as they sell at a very low price.



Our Editorial Table.

The Eastman Company's Publications.

115, Oxford Street, London.

These include pamphlets relating to the Kodak, Solio printing-out paper, the new Nikko paper, with a comprehensive list of the manufactures of goods sold by the Company. From a note we have received concerning the Kodak, we learn that Kodaks and films are very much to the fore in all scientific expeditions and especially in the recent expeditions fitted out to "catch" the North Pole. "Lieut. Peary has taken with him to Greenland, on this last trip of his, no less than five Kodaks and 2500 extra film exposures. You are no doubt aware that he brought back with him about 2000 good negatives, taken on his last trip. Mr. Johnson, another explorer, has also taken to Labrador a No. 2 Kodak and 500 extra exposures. Also Dr. Nansen has taken with him on the *Fram* to the Pole (but whether he will bring them back or not is very doubtful in the opinion of experienced scientific men in this country) a No. 4 Junior Kodak, and a half-plate roll holder, and over 1500 extra exposures." The tractates received include *How to Make Glossy Prints without a Burnisher*, the directions applying both to Solio and Nikko paper; also *The Hypo Toning Bath for Nikko and Bromide Papers.* It is enough to say here that we have followed the directions with great success. Meantime, as we are preparing an article on the hypo-toning bath as applied to these papers, we shall defer special notice of it till then.

Enlarged Convention Group.

This enlargement, by Morgan & Kidd, Richmond, is one of the sharpest and finest of which the art seems capable. The degree of magnification will be ascertained when we say that the Convention group which so recently appeared in these pages has been enlarged to 22 × 16 inches without the slightest blemish or blur.

Fallowfield's P. O. P. Mountant.

Among the various mountants now in the field, this of Fallowfield's will hold a good place. It is white, very adhesive, and contains some antiseptic by which it is prevented from ever going bad. We have proved its good properties.

Mr. C. C. Vevers, Leeds, has issued a price-list of second-hand photographic and lantern apparatus, shop-soiled stock and job lots, from which selections may be advantageously made.

News and Notes.

Messrs. R. W. Thomas & Co. will shortly place the "Sandell" multiple-coated film on the market.

Northern Photographic and Scientific Association.—August 7, Burnham Beeches and Stoke Poges.

Gosport Photographic Society.—August 7, Arundel. Leaves Portsmouth Harbour at fifty minutes past nine.

We are informed that Messrs. Brown, Barnes, & Bell, of Manchester and Liverpool, have reopened their studio at 12, Baker-street, London, W.

Photographic Club.—July 9, Members' Open Night. Bank Holiday Outing to High Wycombe. Leader, Mr. A. Broad. Train from Paddington at eleven o'clock.

Hackney Photographic Society.—August 5, Excursion to Radlet. Leaves Moorgate-street, Midland Railway, by the nineteen minutes past two train for Radlett. 8, *Composition.*

In the Liverpool District Registry of the Chancery Division, High Court of Justice, on the 8th ult., Messrs. Brown, Barnes, & Bell, photographers, of Liverpool, obtained a perpetual injunction restraining Mr. John Ashley, of 87, Bold-street, Liverpool, and Ormskirk, from carrying on the business of a photographer under the style of Brown, Barnes, & Bell, and from representing that the business he is now carrying on at Liverpool and Ormskirk is the business of the plaintiff, or in any other way a part or connected with it.

Bristol International Photographic Exhibition.—The Council of the Bristol and West of England Amateur Photographic Association announces the Triennial International Exhibition of photographs, apparatus, appliances, and processes, to be held in the galleries of the Academy of Arts, Queen's-road, Clifton, Bristol, will be opened on Monday, December 18, 1893, continuing open till Monday, January 22, 1894. Apart from photographs for competition, the Council will esteem it a favour if those who have any interesting examples of the history and progress of photography will kindly lend them for exhibition. All pictures, apparatus, and contributions of any kind will be insured at the expense of the Association. Especial care will be bestowed on the hanging, so that all pictures shall, as far as possible, be done justice to, to facilitate which the whole of the extensive galleries above referred to have been retained. Thirty-six medals, including one gold and twenty-one silver, are to be given. A fee of five and ten shillings, according to space, will be charged each exhibitor.

Photographic Survey of Warwickshire.—On Monday there was opened to the public at the Birmingham Museum and Art Gallery an exceedingly valuable and interesting collection of photographs of Warwickshire landmarks and scenery. The exhibition is the result of the second year's work of the members undertaking the photographic survey now being systematically carried on under the auspices of the Birmingham Photographic Society. Last year, it may be remembered, something like 700 pictures of old and famous buildings —some of them since swept away by the ruthless hand of the present-day "restorer" and speculative builder—were hung in the Art Gallery; and at the close of the exhibition, by a happy idea, they were presented to the Corporation for preservation on behalf of the public. The present exhibition consists of nearly 500 photographs, and, at its close, these also will be presented to the Corporation. The survey, it may be explained, is being carried on voluntarily by the members of the Birmingham Photographic Society, who at their own expense defray all the costs involved in the taking and preparation of the views. The cost of mounting, preparation of catalogue, &c., which is very considerable, is defrayed by the Warwickshire Survey Council (who also provide the oak frames in which the photographs are publicly exhibited) by the help of subscriptions and donations.

Leytonstone Camera Club.—August 5, Open Social Evening at Headquarters, eight o'clock. 7 (Bank Holiday). Burnham-on-the-Crouch. Leader, Mr. A. E. Bailey. The Club will proceed by the train leaving Liverpool-street, G.E.R., twelve minutes past eight, calling at Stratford twenty-eight minutes past eight, arriving at Burnham fifty-six minutes past nine The Club will also attend the Firemen's Fête and Competition on the Essex County Ground, Leyton (open all day).

Ashton-under-Lyne Photographic Society.—Excursion to Liverpool, 29th July, 1893.—Considering a dark and drizzly morning, a goodly number attended, led by Mr. Chas. Lord, who had secured a permit to photograph on the docks, also a permit from the White Star Line to view and photograph the R.M.S. *Majestic* The ship had just been beautified, and those who had cameras soon had them in position, and secured rare and good pictures. After this a number of plates were exposed on ships, &c., amongst them being a good picture of one of H.M. Troopships. Over sixty plates were exposed.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 13,808.—"An Improvement in Camera Cases." F. E. Bussell.—*Dated July* 17, 1893.

No. 13,820.—"A New Apparatus for the Connexion of the Fronts and Backs of Cameras, Stereoscopes, Graphoscopes, and the like." J. Day.—*Dated July* 17, 1893.

No. 13,940.—"An Improved Gauge for Centering and Mounting Photographic Prints and the like." C. F. Gooch.—*Dated July* 18, 1893.

No. 14,024.—"Improvements in or Relating to Colours for and Colouring Photographs and other articles." F. C. D. Beacham.—*Dated July* 20, 1893.

No. 14,036.—"Improvements in Magazine or Detective Hand Cameras." A. J. Buncher.—*Dated July* 20, 1893.

No. 14,045.—"Improvements in Hand Cameras for Photographic Purposes." Communicated by A. Delug. W. P. Thompson.—*Dated July* 20, 1893.

No. 14,074.—"Improvements in Apparatus for Taking Photographs on Sensitive Films or Plates." B. J. Edwards.—*Dated July* 20, 1893.

No. 14,112.—"Improvements in Optical Lanterns." S. J. Levi and A. J. Jones.—*Dated July* 21, 1393.

No. 14,163.—"An Automatic Changing Box for Photographic Films." W. R. Baker.—*Dated July* 22, 1893.

No. 14,364.—"Improvements in Instruments for calculating Photographic Exposures." Complete specification. A. Watkins.—*Dated July* 25, 1893.

No. 14,432.—"An Improved Focussing Appliance for Photographic Cameras." F. T. Y. Niblett.—*Dated July* 26, 1893.

No. 14,604.—"Improvements in Frames for Photographs, Opalines, and other Pictures." P. Campbell.—*Dated July* 29, 1893.

PATENTS COMPLETED.

A New or Improved Process and Combination of Materials for the Treatment of Photographs previous to Colouring.

No. 6906. L. M. Williams, 1, Camden-place, Bath, Somersetshire. *July* 1, 1893.

My invention relates to a new or improved process in the treatment of photographic prints, for imparting thereto a perfectly translucent enamelled or ivory surface, sufficiently brilliant to constitute a finished picture, and which may, if desired, be tinted or coloured in an elaborate and most artistic manner by the application of suitable oil colours upon the back surface thereof, whereby the lighter or more delicate tints, as well as the heavier or more pronounced colours, appear with added brilliancy upon the face of the picture, and I intend that my said process shall be commercially known as "Mrs. L. M. Williams's Enamel Process."

In carrying my invention into effect, I procure a sheet of perfectly clear glass, which I clean with white wax, and edge the same with mucilage, gum, or other, preferably, transparent adhesive substance, the waxed portion of which may then be coated with collodion, and permitted to stand aside until perfectly dry, which, under ordinary conditions of temperature, will generally occupy about six hours, when a well-mixed solution of gelatine and glycerine, in equal parts or thereabouts, may be poured over the plate, and again placed aside until quite dry and hard.

The surface of the glass thus prepared is then well wetted, and upon this is carefully placed (also wetted) the photographic print, with the albumenised side downwards, which, after being treated with the squeegee, is put aside and allowed to stand for about twelve hours, more or less, according to atmospheric conditions, at the expiration of which time, or any reasonable subseqnent period, the whole is then immersed in a bath of hot molten wax, with a photographic print uttermost, and allowed to there remain until the print becomes perfectly transparent, when it may be removed from the bath and placed aside until quite cold. I then remove the picture from the glass by carefully cutting around the gummed edges thereof with a sharp knife, and by the means of the same instrument I remove the glaze from the print, thereby leaving upon the picture a clean, bright ivory surface, of sufficient brilliancy to constitute a finished picture, which may then, if desired, be mounted and framed in the usual way.

If the picture is to be tinted or coloured, I place this face downwards upon a sheet of perfectly clean glass, and retain it smoothly thereon by the application of mucilage, or its equivalent, at each corner, when, by reason of the perfect transparency of the picture (rendered so by the process through which it has passed) every detail of the print will be clearly read upon the back surface, and may then be painted in oil colours to any degree of artistic finish desired, and when quite dry the picture may be removed from the glass, when it will be found that the front of the print has a most beautifully enamelled ivory surface, and showing every detail of colour and tint that has been given upon the back surface, and with a brilliancy not attained by any system hitherto employed. The picture may then be mounted and framed in any manner desired.

The claim is:—The herein-described process, and combination of materials, in the treatment of photographic prints, for imparting thereto a perfectly transparent enamelled ivory surface, which may or may not be afterwards coloured or tinted by the application of suitable oil colours to the back surface of same, substantially as herein described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 8	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 8	Derby	Smith's Restaurant, Victoria-st.
,, 8	Great Britain	50, Great Russell-st. Bloomsbury.
,, 8	Hackney	206, Mare-street, Hackney.
,, 8	Manchester Amateur	Lecture Hall, Athenæum.
,, 8	Paisley	9, Gauze-street, Paisley.
,, 8	Stockton	Mason's Court, High-street.
,, 9	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
,, 9	Leytonstone	The Assembly Rooms, High-road.
,, 9	Munster	School of Art, Nelson-place, Cork.
,, 9	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 9	Southport	The Studio, 15, Cambridge-arcade.
,, 9	Stockport	Mechanics' Institute, Stockport.
,, 10	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
,, 10	Glossop Dale	
,, 10	Hull	71, Prospect-street, Hull.
,, 10	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 10	Manchester Photo. Society	36, George-street, Manchester.
,, 10	North Kent	Gravesend.
,, 10	Oldham	The Lyceum, Union-street, Oldham.
,, 11	Cardiff	
,, 11	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 11	Halifax Camera Club	
,, 11	Holborn	
,, 11	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 11	Maidstone	"The Palace," Maidstone.
,, 11	West London	Chiswick School of Art, Chiswick.
,, 12	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 27,—Mr. A. Cowan in the chair.

Mr. J. COLE said he was making a hand camera with a front which would allow the lens to be used at the extreme edge of the plate. He promised to show the camera at a future meeting.

URANIUM TONING OF PLATINUM PRINTS.

Mr. J. S. TEAPE, in reference to his experiments in the uranium toning of platinum prints, referred to those in which silver, if any present, had been removed, and said it had been suggested that mercury might have remained, which would have accounted for the toning action. In a more recent experiment he had used bichromate of potassium and hydrochloric acid as a means of reducing the silver, if there were any in the paper, to a state of chloride. The print was then washed and put in hypo, as before, for twenty-five minutes. The print was cut in halves, and one half treated in the manner described; then both halves were placed in the uranium toning solution for half an hour, and the two halves toned to precisely the same colour.

Mr. H. HADDON, on chemical grounds, could not understand the reducing action of platinum on potassium ferridcyanide.

LESS CUSTOMARY USES OF ORTHOCHROMATISM.

Mr. W. E. DEBENHAM showed two photographs of a violin. In one the inlaid brown wood was not visible, and neither he nor the possessor of the violin was satisfied with the result. He then prepared a dipped plate, which he used with a deep yellow glass, with the result that a much better result was obtained, the detail being clearly visible. He used an ordinary Britannia plate, dipped in a bath of erythrosine, 1 :10,000, for two minutes, and not washed before being allowed to dry. Ammonia was not necessary. He found that with purchased orthochromatic plates he could not get clearness.

Mr. C. H. COOKE agreed with Mr. Debenham that dipped plates gave superior results. He always used a dipped plate when copying old silver prints.

In reply to a question,

Mr. DEBENHAM said that with the dipped plate the exposure was very much prolonged, though he had forgotten to what extent. He used the coloured glass placed in an extemporised stop in front of the lens. He always used the stop in front of his portrait lenses.

Mr. J. S. TEAPE said he could not get clear results on commercial orthochromatic plates. When using them he found a material sold by Christy & Co. far superior to cherry or golden fabric, to answer well for dark-room illumination. He asked how long dipped plates would keep.

Several members thought they would keep for at least a fortnight. After further discussion on orthochromatic plates, the meeting terminated.

Amateur Photographic Association.—A Council Meeting, to award the prizes, was held July 11, at 58, Pall Mall, the Right Hon. the Lord de Ros in the chair.—The minutes of the last meeting having been read and confirmed, the following members were elected:—R. Darlington, Esq., F.R.G.S., Lady Agnes Dalton Fitzgerald, Newton W. Emmens, Esq., and James Gale, Esq., LL.D. The following resolution was proposed by Mr. Milne, seconded by Mr. Howard, and passed by the Council:—"That, in the event of exhibitors sending in their own prints for competition, members be allowed in future to print clouds into their pictures, it being understood that the clouds added are from negatives taken by themselves, and that a notification to this effect be stated on the exhibit." The SECRETARY (Mr. A. J. Melhuish) stated, in reference to the "British Museum of Portraits," that, in accordance with the wish of the authorities at South Kensington Museum, he proposed in future to send, affixed at the back of each portrait, the place and date of birth, and such other particulars as each person chooses to send, with their autograph at the foot. This was approved by the meeting, and it was considered that it would greatly enhance the value of the collection. The Secretary then laid before the Council the pictures for the current year, which had been arranged and classified by Mr. Glaisher. Class I. consisted of 160 pictures (the largest number of first-class pictures yet contributed). Class II. comprised 130 pictures, and the remainder were contained in Classes III., IV., and V. The pictures in Class I. were contributed as follows:—C. Stephens, 4; Lord de Ros, 1; R. Murray, 6; F. E. Currey, 1; W. S. Hobson, 4; F. S. Schwabe, 4; Major Board, 4; General Sladen, 2; R. O. Milne, 17; R. Leventhorpe, 11; the Earl of Rosse, 2; J. T. Black, 3; M. de Dèchy, 8; Colonel Foster, 3; F. G. Smart, 8; Arthur Dresser, 12; H. Emmons, 6; Mrs. Wrigley, 12; E. F. Scongal, 1; E. Kennard, 5; Viscount Maitland, 6; Jerome Harrison, 31; and Lady Agnes Fitzgerald, 1. Besides these, some very fine bromide enlargements were exhibited by Mr. Milne, which were greatly admired. The following prizes were awarded:—First prize to R. O. Milne, a large silver goblet, for Nos. 49, 51, and 52; second prize, a silver goblet, to R. Leventhorpe, for Nos. 235, 237, and 238; third prize, to Jerome Harrison, a silver goblet, for Nos. 5, 8, 117, and 123; to Arthur Dresser, a silver medal, for Nos. 29 and 89; to H. Emmons, a silver medal, for Nos. 1, 2, and 3; to F. G. Smart, a large landscape album, for Nos. 54, 53, and 57; to M. de Dèchy, a portrait album, for Nos. 1 and 77; to R. Murray, a portrait album, for Nos. 292, 298, and 299; to Mrs. Wrigley, a silver medal, for Nos. 20, 21, and 23; to Major Board, a medal, for Nos. 13 and 14; to Lady Agnes Fitzgerald, a medal, for No. 5; to E. Kennard, a medal, for No. 6; and to Colonel Foster, a medal, for No. 13. It was proposed by Mr. Glaisher that a special medal be given to Mr. Milne for his magnificent enlargements. This was seconded by Mr. Howard and passed. Mr. Dresser's pictures of the *Wild West* were specially noticed as being of exceptional interest. A vote of thanks was proposed by Mr. Milne to Mr. Glaisher for the time and care spent by him in arranging and classifying the pictures. This was seconded by the Earl of Rosse and passed.

North Middlesex Photographic Society.—The first of the new series of Instruction Evenings was successfully brought off on July 19. The subject was *Development Modified to Soften Harsh Contrasts or Under-exposure.* As the lecture and demonstration were for the benefit of tyros, an elementary statement of the generally accepted views as to the action of light upon the sensitive plate was given, and the properties of the reducing agent, the restrainer, and the accelerator explained. The reasons for and against the use of sulphite of soda as a preservative were stated, and beginners were advised either not to use it at all, or in smaller quantities than generally given. Messrs. Hurter & Driffield's views of the impossibility of altering density ratios by development were briefly stated, and Mr. C. H. Bothamley was quoted as showing that, while the density ratios might be unalterable, the printing qualities of the negative and their modification were well within the hands of the worker. For the purposes in view, the developer recommended was:—Pyro, ¼ grain; bromide of potassium, ½ grain; carbonate of soda, up to 12 grains; water, 1 ounce. When the shadow detail was out, this developer must be thrown off and a fresh one substituted, containing pyro, 2 grains; water, 1 ounce; no bromide or soda. Plates exposed at the special outing to Kingsbury, on July 15, were then developed, and appeared to be satisfactory. Prints from them were to be shown at the meeting on July 21. The next Instruction Evening will be on August 23, the subject being *Development Modified to Improve Flat Subjects or Over-exposure.* Visitors are welcome.

JULY 24, Mr. C. C. Gill read a paper, entitled *Notes on Printing.*—He confined himself solely to the practical side, ignoring the historical and theoretical. He dealt with the ordinary silver albumenised print, which, he said, was being ousted by the gelatino-chloride, which gave finer and more permanent results and was equally economical. He advised that Solio paper, notwithstanding the directions of the Company, should not be printed in direct sun; he found the sun shining on to a blind was a capital light to print by, and, where printing was done in the open, to be done in the shade in a north light. He showed a great number of specimens, principally of portraiture, on this paper, which gave splendid results. For portraits he recommended the mauve shade. Dealing with platinum, he demonstrated the development of the cold-bath process, the ease of working which was generally acknowledged. He gave hints as to vignetting, showing masks made of zinc with serrated openings, which, he said, were more useful than those made from any other material, it being very pliable, and thus allowed the opening to be enlarged or otherwise with the greatest facility. An interesting discussion followed. Mr. H. Smith took first place for pictures at the London Colney outing.

Northern Photographic and Scientific Association.—July 20, Mr. Robins (President) in the chair.—Mr. COULTER delivered a lecture on *The Chemistry of the Dry Plate.* A considerable amount of discussion took place after the lecture was over, and eventually a hearty vote of thanks was accorded to Mr. Coulter, to which the latter gentleman made a suitable reply. Mr. COGHILL reported the result of the excursion to South Kensington Museum, and spoke in high terms of the kindness and courtesy extended to the members of the party by Mr. George Murray, one of the Curators of the Botanical Section of the Museum. Mr. GOODHEW reported the result of the excursion to Battersea Park, and handed round some photographs he had taken in the sub-tropical gardens, which were very beautiful. He referred to the courtesy of those in charge of the park, who assisted the party in every possible way. At the excursion to White Webbs Park and Enfield no photographs were taken, as the weather was unpropitious. Dr. Atkinson and Mr. W. V. Haylett were elected auditors for the ensuing year. Five new members were enrolled. A class for beginners is in course of preparation, and those wishing to join are requested to send in their names at once to the Secretary, 32, Park-avenue, Woodgreen, N.

Hackney Photographic Society.—July 18, the President (Mr. Houghton) in the chair.—Various books were added to the library. Mr. POLLARD showed and explained his reduction camera. Mr. HENSLER asked how to intensify a film which had had retouching medium on? Mr. R. BECKETT advised use of turps first to remove retouching medium, and proceeding in the adopted manner. Mr. BARNES asked the best way to develop an old plate? The HON. SECRETARY said, "Use less alkali." Mr. T. H. SMITH asked what proportions of amidol should be used to develop a much over-exposed Cadett plate? Mr. BECKETT said, "Reduce the quantity of sulphite solution to quarter the quantity, four grains bromide, and double the amidol." The HON. SECRETARY (Mr. W. Fenton Jones) then read a paper on *Exposure Tables and Meters.* He advised, before actual practice, overhauling camera, backs, dark room, to see if white light was perfectly excluded, and, when using lens, to cover up diaphragm slot. The sun's position had a great deal to do with time of exposure. Use as large a stop as possible consistent with good defining powers. Rain cleared the air, and many a good picture could be taken when raining. Would not advise judging by amount of light through diaphragm stops. Experience and judgment are best, but a table or meter to start with is advisable. Exposure of bromide plates and papers are best tested by giving varying test exposures, and then according for future use. Plates were not always the speed they purported to be. Mr. PENNY asked, "Was it best to use one table and plate?" Mr. HENSLER had used Watkin's, but not successfully. Mr. MUNN had used Hurter & Driffield's, saving himself a lot of plates. Mr. HAWKINS asked about Cadett's developer being a quickener up of plates. Mr. W. FENTON JONES said he did not study the developer when exposing, and thought it erroneous. Would advise one plate and one table, and that of a simple kind. Mr. AVENT had used nearly every table in the market, and said that, whilst he had found them right around London, in the country they had given him wrong exposures. He was of the opinion, too, that a table should be as much simplified as possible.

JULY 25, Mr. W. Houghton presiding.—Members' work was shown from Messrs. Beckett, Guest, Munn, and Roofe—Question by Mr. Fort: "What is the best varnish for films?" Reply: "Messrs. B. J. Edwards & Co. supply a good one, use cold." Mr. Hensler asked, "Should one aim at softness or contrast in statuary?" Reply: "Softness. Study the lighting. A dark background is generally used because it will permit of more contrast. The range of tone should show relief." Mr. Selfe showed a print in which the sun was solarised, and a second reflection, due to one of the

surfaces of the lens, appeared over the foreground of the print which was weak enough to escape reversal. Mr. Morgan then read a paper on Messrs. Hauff's metol and glycin. He said the class of work which suits amidol will also suit metol. The chief difference is that amidol requires no alkali, metol will tolerate almost any amount—preferably potash carbonate. For bromide papers metol with three parts of their "A" developer to one of "B" will gives as good results as the best ferrous-oxalate ones in half the time and with half the exposure. Experiments were made under same circumstances. Thirty seconds proved correct for ferrous oxalate whilst only fifteen seconds for metol. Afterwards seven half-plate negatives were developed in the same two ounces of metol developer and no difference in density could be detected amongst them. Metol will keep indefinitely. But only half the exposure necessary for pyro is sufficient for metol; this is essential. A plate was developed with metol, in eight seconds the image flashed up strongly at once, but development was continued till dense enough without fear of fog. Over-exposure gives flatness. Negatives and prints were shown, one three seconds with pyro, against one and a half seconds with metol; the pyro one was hard and the metol one soft. The peculiar speciality for glycin is for black and white line subjects, it *must* be used on very dilute form, and its action is nearly automatic, as time will bring varied exposures to full density without its going beyond. For hand-camera work either time or stop can be reduced to half. Generally develop a little deeper than that for pyro, as it prints quicker, because there is no stain and it loses little in fixing. Warm tones can be obtained by development, but it takes too long. Either amidol, metol, or glycin, developed plates can be toned, intensified, or reduced as others. Amidol will stand forcing better than metol.

Brixton and Clapham Camera Club.—July 18, the President (Dr. J. Reynolds, F.R.G.S.) in the chair.—A member of the newly formed Committee of Instruction was present for the purpose of assisting less-experienced members in the more elementary principles of photography and answering questions relating thereto. The attendance of members showed the necessity for forming such a committee, and it is believed that the result of such a step will be to strengthen the number of members of the Club to a considerable extent. This was the first attempt in the history of the Club to form such a committee, and at the meeting two nominations for membership and promises of others were given in. Mr. BALDWIN, of the Eastman Company, gave a very interesting demonstration on *Solio Paper*, and toned several prints by the separate and combined baths with great success. Members were invited to comply with the request of the Photographic Society of Great Britain for a representative set of lantern slides and results of modifications of the several printing processes, and the meeting was then closed. The next meeting will be held on August 1, when Messrs. Fuerst Brothers will demonstrate the working of *Amidol*.

South London Photographic Society.—July 17, the President (Mr. F. W. Edwards) in the chair.—Messrs. Dicker and Tredray were elected members. The evening was devoted to the discussion of methods of combination printing. The following were suggested:—Draw round the outline of the object to be printed with a thick pen filled with Indian ink. When the ink is dry, block out the remainder of the negative with black varnish, and, when dry, print. The printed image can now be covered with gamboge or other non-actinic medium (which can be removed during washing), and the balance or such portion of the picture as is required obtained from a second negative. Care must be taken to print both portions equally. If any white lines appear round any portion of the finished picture, these must be filled in with colour, care being taken to match the tint of the picture. Alternatively the second negative may have blocked out a portion of equal shape and size to that printed by the first negative. To print skies in pictures where there is not a large quantity of fine foliage against the sky, a print is made on silver paper, and the landscape portion is carefully cut off from the sky with a sharp penknife or scissors, and the two portions of the print allowed to discolour, and used as masks, one being used to cover the landscape negative when the sky is being printed from, the sky negative and the sky portion used when the landscape portion is being printed. This must not be printed too deeply, or they will have the appearance of being in advance of the landscape. The PRESIDENT suggested stripping the negatives with cresco-fylma, and cutting out portions of the stripped films, and combining them on an old negative glass. By this method prints are obtainable by one printing, and a considerable saving of time effected where a large number of prints are required.

Liverpool Amateur Photographic Association.—July 27, Mr. William Tomkinson in the chair.—The following gentlemen were elected members of the Association:—Mr. Thomas A. Collinson, Rev. J. F. Anderson, and Mr. Edward R. Dibden. Mr. J. A. Sinclair (Messrs. Adams & Co., Charing Cross-road, London) showed the latest photographic specialities and novelties, including the "1894" Adams camera, with swing back and rising front, the Ideal cameras (ordinary and twin lens), "Lightning" stand, pantoscopes, aluminium view meter, "Adjustable" shutters, club cameras in brass and aluminium, &c.

FORTHCOMING EXHIBITIONS.

1893.

September 5..... *Royal Cornwall Polytechnic Society, Falmouth. W. Brooks, Laurel Villa, Wray-park, Reigate.
,, 20-21..... *Hove Camera Club. Hon. Secretary, H. Emery, 142, Church-road, Hove, Brighton.
,, 25-Nov. 15... *Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1-31 ..... *Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 9-Nov. ... *Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
November 7-11 ..... *South London Photographic Society. Hon. Secretary C. H. Oakden, 53, Melbourne-grove, Dulwich, S.E.
,, 20-25..... *Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December..... *Madras. The Hon. Secretary Amateur Photographic Society, Madras.

* Signifies that there are open classes.

Correspondence.

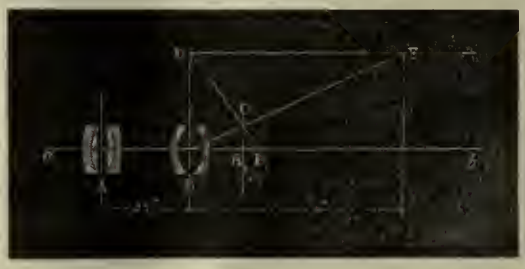
☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

TELE-PHOTOGRAPHIC SYSTEMS FOR MODERATE AMPLIFICATIONS.

To the EDITOR.

SIR,—The appearance of an article on the above interesting subject, from the authority to whom we owe its introduction to the photographic public, leads me to think that you may perhaps find a corner in your JOURNAL for the following items bearing on the matter. The methods here described for ascertaining the positions of lenses and screen, though differing from those in the article referred to, have the merit of being most simple, requiring no complicated calculation, and are likely therefore, to commend themselves to those for whom equations have never had much charm. These methods are the result of studies of my own, and I would not trouble you with them were it not for the fact that nothing similar to them has, to my knowledge, yet appeared in any of the journals.

The first is a diagram, from which the operation of these systems of lenses appears to me to be very clearly shown. In the accompanying



figure, *a b* is the axis of the combination extended away towards the focussing screen. The positive lens at A has its focal plane at A_1 (I have taken for these examples lenses of the same focal length as those referred to in Mr. Dallmeyer's paper, though, naturally, the system is applicable to any others that may be thought of, and set down the drawing to a quarter-inch scale). The negative element, B, of three inches focus, is placed anywhere between A and A_1, so that its focal plane, B_1, may not cross that of A. In this example, the distance of B from A is three and three-quarter inches. In speaking of the distance between the lenses, it is understood that the distance referred to is that between their nodal planes. Perpendiculars are drawn through the nodal point of B and through the focal plane of A at A_1. At any distance from A_1 a part A_1C is taken in this focal plane, representing the size A_1C of an image formed by the positive lens alone. This measurement is purely an arbitrary one, but for convenience sake it should be small. From B_1, through C, draw B_1CD, meeting BD in the point D. The distance BD will now bear that proportion to A_1C which the focal length of the combination bears to that of the positive lens alone—in this case twenty-four to six, or an amplification of four times. The position of the focus screen will be now shown by drawing a line, DE, through D and parallel to *a b*, and a line from B through C to meet it at a point E, which will then mark the distance from B at which the focus of the combination will be found, in this case nine inches. It will be seen that, while the focal plane of A is stationary at A_1, that of B at B_1 follows every alteration of the position of B, and that a line through B_1C will meet BD at a greater distance from the axis of the combination as B moves towards A, and at a nearer point to the axis as B is further removed from A. Therefore, if B be placed at any distance from A, with its focal plane always behind that of A_1, by means of the lines drawn through C, its enlarging effect upon an image produced by A alone, and from this the equivalent focus of the whole (that of A being known), and the distance of the screen from the back lens can always be found. In any case the drawings should be carefully made to as large a scale as possible.

The method above described can be worked out for any combination of lenses, using, of course, the corresponding measurements, and results arrived at in a ridiculously short time, once the simple plan is learnt, and the effects of greater and less separation become so much clearer in a diagram than is possible in the case of a mathematical calculation.

In the second method of calculation I take the focal lengths of the two elements, positive and negative, and multiply them together, placing the result as expressing a fraction, of which the focal length I desire to obtain is the divisor. This result, although apparently of no great value to the process as it represents the distance between the focal planes A_1 and B_1, in the diagram above; but, as Mr. Dallmeyer points out, this factor is by no means an unimportant one, as it affects the results to as great an extent as the very foci of the lenses themselves. Having found this, the distance of separation of the positive and negative lenses is the difference between their foci *plus* this fraction aforesaid. Then follows the last calculation which gives the focus inherent in the elements in their respective positions, and, by subtraction from the focal length required, the back focus or distance from the back lens to the screen. Although apparently complicated, the last calculation is simply this:—The separation of the lenses is multiplied by the focus of the negative lens and divided by the fraction representing the separation of the focal planes, giving as a result the sum which is to be deducted from the equivalent focus decided upon to give the back focus or distance to the screen.

Let us calculate the combination referred to by Mr. Dallmeyer on this basis:—

(1) 6″ Pos. × 3″ Neg. = 18 ÷ 24 equivalent focus required = $\frac{18}{24}$ or $\frac{3}{4}$ separation of focal planes.

(2) 6″ Pos.—3 Neg. = 3 + $\frac{3}{4}$ as above = $3\frac{3}{4}$″ separation nodal planes.

(3) $3\frac{3}{4}$ or $\frac{15}{4}$ + $\frac{3}{4}$ (3 being the focus of negative lens) = $\frac{45}{4}$ ÷ $\frac{3}{4}$ (separation of focal planes) = $\frac{45}{4}$ + $\frac{1}{3}$ = 15 deducted from 24″ equivalent focus required gives 9 inches back focus.

As the degree of enlargement and intensity of aperture can be so easily ascertained when the equivalent focus of the combination and its relation to the focus and aperture of the positive lens are known, these detailed are not referred to.

It occurs to me that with a working intensity of *f*-8 in the positive lens, and four degrees of enlargement or *f*-32 in the combination, no great degree of rapidity can be expected, and that, when circumstances might demand it, a greater separation of the lenses and reduced amplification would be desirable, conducing as they would to enlarging the available aperture, and gaining in rapidity—or are we to take it that definition is likely to be unsatisfactory if a larger aperture than *f*-32 be used.

In the matter of the portability of several negative lenses of various foci to use with a single positive lens or combination, and give various degrees of enlargement, I fancy that, seeing that, in the case of a positive lens of six inches focus, these would require to be all of a power higher than this, and necessarily, if of large diameter, as recommended, of appreciable weight, that the advantage will not be great enough to compensate for these disadvantages, apart from the expense of such a battery of perfectly constructed lenses, and the fact that the beauty of the tele-photographic combination is its power of giving pictures of any size at any distance from an object, subject only to conditions of actinic intensity and available camera extension. Combinations of two negative lenses of dissimilar focus might be made so that they would give three ranges of power, or why not have interchangeable positive lenses with their correspondingly and necessarily modified lengths of tubing, for this latter condition would probably be required in the case of a variety of negative lenses. The same tube length would rarely do for two different lenses. I think that, rather than increase the already necessarily portly size of this useful adjunct to photography, the aim should be to reduce its size as much as possible. As the normal focus of a lens for parallel rays becomes so much increased when used for near objects, I do not recommend a great difference between the power of the positive and negative lenses, as this practically puts it out of the field when used under these circumstances. Where the distance between the nodal planes is small for distant objects, the lens is available for nearer ones without necessarily looking like an astronomical telescope, and every half-inch gained in portability is worth having.—I am, yours, &c.,

Cardiff, July 31, 1893. CHAS. E. HANCOCK.

EXPOSURE, DEVELOPMENT, AND FOG.

To the EDITOR.

SIR,—I have just been reading your leader on the above subject, and, curiously enough, an experience which appears to me to bear directly on the phenomenon in question has just occurred to myself.

Being out with a hand camera and a dozen special rapid plates, I exposed some half-dozen, and, knowing I should not expose any more for a time, I closed the safety shutter of my camera and walked on. After a time another opportunity occurred, and I exposed, as I thought at the time, two more plates, forgetting that the safety shutter was down, so that, in reality, these two plates received no exposure at all.

On reaching home, I proceeded to develop my plates, and all went well, good negatives resulting, until I came to the two unexposed plates, which were treated exactly the same as the others, as I had not then found out the mistake I had made.

The solution, pyro-soda, was poured on, the dish instantly covered and set rocking; but, on looking to see how development was proceeding, I was surprised to find that, instead of the picture being just appearing, the whole plate, rebate and all, was fogged all over, and this in a much less time than the first appearance of the image on a properly exposed plate. The second plate yielded precisely similar results. I was, of course, puzzled at first to account for this, but I soon recollected that I had forgotten to raise the safety shutter.

The question still remained why the plates should have fogged all over when they had never been exposed at all, and the probable solution seems to be as stated in your article, though in my case the plate seems to have broken down in less time than in the case referred to by you.

It may probably be taken for granted that, the more rapid a plate is, the greater tendency it will have towards this particular result, although undoubtedly some makes of plates may be more prone to it than others.

I enclose for your inspection a film taken from one of the plates above referred to, also a print from a plate exposed on the same day and out of the same box, from which you will see that, whatever the true explanation may be, there is no manner of doubt whatever as to the facts.—I am, yours, &c., J. H. BALDOCK, F.C.S.

Croydon.

AMATEURS AND PROFESSIONALS.

To the EDITOR.

SIR,—You have had letters from time to time complaining of the want of unity amongst professional photographers, also hinting at the alleged inactivity of the National Association of Professional Photographers of Great Britain and Ireland in not bringing about the said unity, and, curiously enough, chiefly from writers who have taken no visible part in the work. I am writing to inform your correspondents and the profession generally that a meeting will be held at Anderton's Hotel, Fleet-street, on November 10, and beg that all who are interested in the future of professional photography will attend. The two photographic exhibitions will be open at that date. The time of meeting will be advertised.—I am, yours, &c., THOMAS FALL.

July 19, 1893, 9, *Baker-street, W.*

To the EDITOR.

SIR,—"Pioneer's" reasoning in his latest effusion applies with as much force to the "mob" of amateurs who, according to him, are invading the profession. By the way, the Princess of Wales is a member of the "mob" of amateur photographers; we will, therefore, use his own words to strengthen the said "mob's" position.

Amateurs, "show to your fellow-men that this great art science of photography, of which you are, or ought to be, so justly proud, and which you, as the 'amateur' exponents of, have brought its varied works to such a high state of perfection," shall not be the sole monopoly of a limited number of professionals, but be free to all men, whether for instruction, pleasure, or profit.

As regards his other argument, that the retailing of intoxicating liquors is required to be done under Government licence, it is so appointed to prevent the injurious social results which would spring from its unrestricted sale, and there is not the remotest connexion between that and the art of photography.

We will now further quote from his letter, using it as an amateur weapon ready forged to hand:—

"Another point is almost entirely overlooked in connexion" with the proposed suppression of the amateur, "and that is, the vast army of persons who are employed, directly or indirectly, in the various manufactures and kindred trades" required to supply his wants, &c. . . . . "It behoves us to do all that lies in our power to protect this gigantic industry, and not let its vitality be choked," as it certainly would be, if amateurs were wiped out with "a tax of ten or twelve guineas a year."

I really did not intend to write again to you on this subject, as it looks like seeking notice for myself; but really, as we are on the subject at all, it is as well, if possible, to discuss it thoroughly, and put an end, for a considerable time, to the chronic abuse which the poor amateur receives, and deserves to but a limited extent.

The amateur is here, and he means to stay; professionals must make the best of it, and adapt themselves to the changed conditions of their employment.

If Acts of Parliament were so potent as some think, no trade would suffer from depression, and we would only require a special Act of Parliament for each trade to ensure all-round prosperity. I would recommend certain of your correspondents to study some elementary book on the laws of political economy; also I would recommend to their attention that, if they want due respect to be given to them, they should show it to others, and not look down upon them as members of "a mob," or as a low class of society, for

"The rank is but the guinea's stamp,
The man's the gow'd for a' that."—*Burns.*

—I am, yours, &c., WM. JAS. FARMER.

68, *Blackburn-street, London-road, Blackburn, July* 7, 1893.

To the Editor.

SIR,—In the previous paper under this heading great stress was laid on this fact, that the amateur problem is a very difficult one to deal with, and not the slightest suggestion was intended to be conveyed against the class of amateurs as referred to by one of the correspondents of THE BRITISH JOURNAL OF PHOTOGRAPHY in the issue of the 23rd inst. It is possibly a moot point as to whether a man who makes scientific and experimental photography his hobby and delight is really an amateur at all. True, he may only work for love and not money, but in any way he is not the man who injures the professional photographer, and it was clearly indicated that those who usurped the trade and the benefits appertaining thereto must, for the relief of the professional photographer, be dealt with in some way so as to make the line of demarcation between the two stronger in the future than in the present. If the "miserable work" of some professionals referred to by "Amateur" is the cause of bad trade, then he makes a strong argument for the utter eradication of such men by the examination test as advocated already in "Darkest Photography." If there are too many in the profession, and, as instanced by him, of there being four establishments to a population of 1500 persons in one country town which he knew of, he makes a still further and stronger argument in support of the plan suggested above, and yet he winds up by saying that photography could sustain no greater blow to its development and progress if "Pioneer's" wishes should be realised. The entire pith of the ideas suggested by "Pioneer" is to raise the professional status and weed out the bad from the good, and the substance of "Another Pros.'" letter is strongly in support of the system advocated in "Darkest Photography," more especially in that portion that relates to the examination test. This was originally proposed in the scheme of "A National School of Photography," but when that was first mentioned it was considered too premature (then there was no vast army of amateurs). Now we are told that we are too late. Why? "It is never too late to mend," and, if the aid of the legislature has to be invoked for the benefit of the profession, it only shows to what an amount of importance modern photography has attained. Although we may invent as many new styles of portraits as we may choose, we can never expect any material or lasting benefit till such a time as the whole basis of commercial and professional photography is reconstructed. There are no honours at present to be conferred on the professional photographer, however worthy he may be of them, as is the case in the sister arts of painting, sculpture, architecture, engineering, &c.; but, because they do not exist now, it is no valid reason why they should not be *en évidence* in the near future. With regard to amateurs being received into the ranks of professionalism, any one who follows photography as an additional source of bread-winning can scarcely be designated an amateur, and we only desire to place him on the same level as the professional, and we consider that he should be obliged to satisfy the proper authorities that he intends following it up as a business, and after he passes the test examination he can receive his licence or permit to carry on the business of a professional photographer. Amateurs will then remain within their own sphere, and not clash with the pro. while the latter is earning his means of subsistence, and what the amateurs may elect to do among themselves at their own Society's meetings no one wishes or desires to interfere with, we only want them not to interfere with us. Should, as previously mentioned, any amateur desire to enter the ranks of professionalism, no more obstacles would be placed in his way than any one else's, and therefore they cannot possibly sustain the slightest injury, should the scheme be carried out in its entirety as suggested in "Darkest Photography."—I am yours, &c.,

PIONEER.

To the EDITOR.

SIR,—Mr. A. Levy, of Paris, I notice has contributed a letter on the good old amateur question to the last number of THE BRITISH JOURNAL OF PHOTOGRAPHY. In it he says (speaking of the amateur), "Why, with their knowledge and (superior to all) ingenuity, can they not make up anything portable to change their plates in, &c.?" I should not like to accuse this gentleman of ignorance, but I should certainly say that at the time he wrote it he must have been labouring under a condition of temporary absent-mindedness, or he would most certainly have known what most beginners know, viz., that there are at the present moment plenty of portable changing bags on the market, most of them the inventions of amateurs. So much for the first paragraph of his letter. The next paragraph I have no doubt he considers unanswerable, and he is perfectly correct. Vituperation, however false and acrid, is never worth any one's while to answer, and the chief argument(?), namely, that in former years amateurs used to use tripods for instantaneous work, and now do not, and hence they are unworthy of all consideration, is altogether puerile. There is a certain amount of reason in the next paragraph about amateurs paying for the use of dark rooms (by the way, I have never used one yet that I not been charged for), but even here our friend makes another great mistake. He says that he (the amateur) "will find it as natural to pay for it as he does when he uses a wash room, or asks the advice of a doctor or lawyer." Perhaps it is natural in America to pay the above-mentioned people (and I conclude from his letter that your correspondent is an American), but in England things are different. In England a doctor, even if he has saved your life, is never considered to have an absolute right to any fee, certainly not as much as the grocer, or baker, or chimneysweep. The last paragraph of this effusion does not, as far as I can see, concern the amateur question at all.—I am, yours, &c.,

London, July 25, 1893. ROBERT J. HILLIER.

To the EDITOR.

SIR,—I take it that none of my fellow-workers have any desire to say a word against the painstaking man who carefully works out methods, processes, &c., and freely gives the results of his labours to all and sundry who care to avail themselves of them. This man is only too pleased and gratified to find that his endeavours have proved successful, and looks for no further reward than that his process should prove of service and of practical value. The "Amateur Photographer," as *we* know him, is not related in any degree to this gentleman, whom we are glad to meet, and find many of his ideas happily corresponding with our own, and from whom we can generally learn something of great value relating to our own every-day work, and in clearing away many difficulties we have had no opportunity to ferret out for ourselves. His ideas are always put before us concisely and clearly, and we easily learn what he means. He is in no wise pedantic, and, as we might say, is "clear, plucky, and crisp, or free from fog," &c. We can get along well enough with him, and are happy in his company.

But it is when the very d—— himself, armed with some slides and negatives, comes into your place, and you have to brace on your armour and in every way stand on the defensive, that your gorge rises, and you feel like murder in its most "lingering and boiling oil" form. He *is* a nuisance, and our experience prompts us to inform him that we cannot undertake the work he proposes we shall do on his own terms, &c. This probably loses us the custom of some of his friends, but that we must try to conveniently forget.

I must say this amateur sails under false colours, and actually does injure my business in issuing photographs at a low rate, which he can easily do when he has an income derived from his legitimate business.

Did your correspondent, "F. R. C. S.," take into account the value of the "employer's" services in producing those fifteen hundred negatives—say, three months' proportion of a salary of one or two thousand a year? The professional employed seems to have been a very unbusinesslike person.

"Audacious Operator" comes nearer the source of our trouble when he touches on the idiotic policy of men supplying free sittings, and throwing their work about as though no value whatever should or could possibly be attached to it. As he says, this underselling *is* killing the trade, and compelling men to combine a more lucrative business with their own, which really is one that should be considered as respectable as the professions of medicine, law, &c., instead of which our "social status" ranks somewhere with the local billposter and chimneysweep. Not that their occupations are unworthy ones; honest labour is no degradation. It was only last week one of our boatmen, earning about 18*s.* a week, said, commenting on our work, "Ah, well, there's some funny trades, but anything does for an honest living!"

Who is to blame for this condition of things but ourselves? Why should the average photographer be so abjectly servile that he shall admit his work is unworthy the praise he knows it should attain? Why is he in such a hurry to advertise "One splendid cabinet and three *cartes* for one shilling?" At this rate he must "use up" 2000 sitters before he turns over 100*l.* This at, say, ten sitters a day (which he won't get), and counting Sundays in, would take him 200 days, during which time his rent, wages, &c., would be considerably in excess of his takings. Of course I know he looks for re-orders, but they won't amount to more than ten per cent. on the gross takings, and it doesn't pay, but merely keeps a certain class of sitters out of another man's hands who could get orders amounting to, say, from probably five to twenty shillings from each sitter.

"Silex" says that, because materials are cheaper (he refers to pyro dry plates, &c.), we should drop our prices. How many negatives could we, in those days to which he refers, produce from our Winchester of collodion, our pound of silver, or our glass? And, even with cheapened dry plates, how large do the amounts of our invoices seem for what goes so short a way? The amateur cannot be credited with the lower prices "Silex" mentions; it is merely caused by the law of demand and supply, and where an amateur may use a dozen plates a professional may use hundreds.

Nor do I think "L. C.'s" proposal that we shall adopt, say, the carbon, or any other process, will help us; the amateur would as easily have his prints made by one process as another; he need not print them himself. The carbon is certainly a beautiful and permanent method of printing, but it is not at all difficult to work, and even here the tissue can be procured sensitised ready for printing.

Our only chance seems to be to form a union, or association, which shall insist on no photographer working *below* a certain rate, and I am sure the man getting three shillings for his *cartes* would only be too pleased to be compelled to receive six shillings for the same, for in every way would he be benefited; not only would he be better able to pay

his expenses (for he would lose no custom where prices were raised all round), but he would soon be able to buy better accessories, backgrounds, &c., and have better skilled assistance. The union should be able to grant licences, and determine the ratio of prices in each town, and this each photographer would be compelled to abide by, and it would also license all assistants who could pass a certain standard in *technical* and *practical* proficiency. It is remarkable what a number of untrained young fellows are now in the profession, many even unequal to the task of varnishing a negative; slovenly and dirty in their manipulations generally; and what you, sir, about the time "Silex" writes of, used to call "sloppy photographers." In those days youths were trained to be scrupulously clean in many ways—plate-cleaning, collodionising, sensitising, &c. Of this the modern assistant knows nothing, and seems to believe cleanliness unnecessary.

The National Cyclists' Union has served a very useful purpose for cyclists, and why should not the National Photographers' Union serve the same for photographers? In the case of the Cyclists' Union, the licensing scheme was by many considered impracticable; but, against endless troubles, they have done fairly well, and, to a certain extent, their scheme has done the service expected of it. The method of working, of course, is another story.

The auctioneer keeps his business fairly to himself with his licence, and I think we might manage to do likewise.—I am, yours, &c.,

ANOTHER PROFESSIONAL.

To the EDITOR.

SIR,—Recently a great deal has been said and written as to whether the amateur does, or does not, injure the professional photographer in his business.

Most men are amateurs hanging on to the tail of some profession, which profession they usurp, either in its lower or middle ranks, according to their ability and the light of principle in which they regard what they do.

It is a well-worn saying that "a man who knows nothing is sure to tell it the first chance he gets." The more ignorant they are, the more vain. They *must* have an audience to show all their friends how wonderfully clever they are. Amateur photographers will take you under any conditions, passable or impassable; only, for goodness sake, let them take you. Their portrait work is mostly of a vile character; but their friends will tell you, "So-and-So takes them beautiful." Whether the pictures are so or not, the price is "beautiful," being, in most cases, exactly nothing. Some would object to our claim to being injured in such cases, because we ought to produce better pictures than the amateur, and there can be no question that we *do* take better pictures; but we cannot compete with the price, and when a thing costs nothing—well, people don't look a gift-horse in the mouth.

Nowadays there is scarcely an institution but has its amateur photographer, who does what photographic work he is suffered to do for nothing, or for the good of the cause, he will tell you.

Amateurs are a pestilence upon every profession.

The amateur musician will play your organ for nothing, when some poor professional is down at heels and threadbare for lack of the salary that ought to be paid. He will assure you he does the work for the good of the Church, but that is not true; the fact is, Mr. Editor, he likes to have his sickening vanity tickled. The singer is the same, if not worse. He will scream at you till he nearly drives you mad, if you will only pretend to listen; and you must use all your tact, and sometimes rudeness, to induce him to stop.

All these people only want an audience, and they will perform. They will assure you that they do no harm to the profession, and they do not—to those who are at the "top of the tree"—but they are depriving the more obscure of their livelihood, when time and money have been expended on acquiring the means thereof.—I am, yours, &c.

JOHN RAYNE.

To the EDITOR.

SIR,—Having read with considerable interest the various letters which have been published in your columns relating to the depression in the photographic profession, perhaps I may be allowed to make one or two remarks. Some of your correspondents have not learned to differentiate between photography as a science and photographic work practised for business purposes. Hence, when replying to the remark often heard that amateurs have done professionals harm, they sagely remark that all or nearly all the improvements and inventions in connexion with photography are the result of the labours of amateurs; and Mr. Stillman even goes so far as to ask, speaking of the professionals, "Did one of them discover photography?" Now, I do not think the average intelligent professional photographer who knows anything of photographic history will for one moment refuse to give the amateur his due in this respect. The fact is, and always has been, the professional has to make his living out of the thing, and has not time for the elaborate experiments to which the moneyed amateur devotes his attention. We are most of us glad to use what our scientific investigators give us, and our practice and experience soon enable us to use it successfully. All thanks, then, to the genuine amateur photographer (not the dilettante), who does his work *con amore*, and gives to the world the result of his labours.

But the question as orlginally started is, Has the amateur craze, has the vast army of amateur photographers injured the *business* of photography? Is the present depression attributable to the amateur? To these questions it is impossible to give a definite answer. Undoubtedly the work of the amateur in many cases supplants that of the professional, not necessarily because it is better, though it sometimes may be, but because it is good enough; because, too frequently, the public taste is so bad that a mediocre result for nothing or for cost of materials is preferred to a good photograph at a good price. So far, then, harm has been done, but to what extent? The damage the professional has received in this way is a mere bagatelle to the harm he has done himself and his brethera. The self-inflicted wounds have been oftimes enumerated — price-cutting, indiscriminate gratuitous sittings, turning out of inferior and fugitive work, and lack of enterprise. It was natural that prices should rule somewhat lower as materials and labour became cheaper, but, for some of the starvation prices now asked, photographers have only to thank their own cut-throat policy. No, we may blame the amateur, or the public taste, or anything else we like; but, as Casca says in Shakespeare's *Julius Cæsar*,

"It is not in our stars but in ourselves
That we are underlings."

But this is no consolation to the "poor professional." It does a starving man little good to preach him a sermon on his past follies. We want to alter the present state of affairs as speedily as may be.

The letter of "L. C." in your last week's issue appears to me as practical and to the point as anything I have seen. One of his remarks I take the liberty of quoting, "When your house is on fire do not begin to abuse the man over the way because his building interferes with your ancient lights. On the contrary, take off your coat and look around for a bucket." This is the principle which, acted upon, will lift professional photography out of the mire. Taxation won't do it, boycotting the amateur won't do it, licensing the professional won't do it. Those of us whose hearts are in our work must strive to obtain better technical and artistic results (and, in spite of Mr. Guardia's sneer, many portraits professionally produced now are works of art, although not of the hand camera), we must show more business ability, energy, and enterprise, we must be willing to sacrifice a little for the present in order to educate the public taste so that they may appreciate a higher quality of work and buy it; and we must remember that, as photography as a business has not been depressed in one year or two, we can't raise it again in so short a time.—I am, yours, &c.,

CHARLES HENRY HEWITT.

King's Lynn, July 22, 1893.

To the EDITOR.

SIR,—I have followed with interest the discussion now going on in your JOURNAL, "Depression in Photography." Now, as an assistant who has had fourteen years' experience, I think there is another matter of more vital importance to the profession—that is, how to find a good assistant and how to find a good master. In applying for a situation, I always find the place is described as first class or the best in the town, and the situation will be permanent.

Speaking from my own experience and that of other assistants I have met, in very few cases has that description been justified.

To a man who has been educated in a good house it is, to say the least, just a little depressing to find the best house in the town to be a wooden shanty studio 18 ft. by 12 ft. Now, how are we to know what class of place we are going to? On the other hand, a photographer requires an assistant. He gets lots of applications; three parts are well recommended, and send good references from the best in the town. But how is the master to be better informed than the poor assistant? Generally the man with the most cheek gets the place, and I think I am safe in saying they are the most ignorant, will go for a *moderate* salary, and perhaps have only a couple of years' experience, yet they are able to keep a good man out until he is starving and has to take any poor place he can get.

I think this is demoralising, conducive to bad work, changing of hands, and low salaries. Could we not have a stiff examination that would clear the market of duffers? Let it be like doctors, lawyers, and masters of vessels, liable to have their diploma or certificate taken away; then there would be none but good assistants, and, as a consequence, good photographers.

Hoping that some abler pen will take the matter up,—I am, yours, &c.,

July 2, 1893. ASSISTANT.

[Correspondence on this subject must now close.—ED.]

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange Dallmeyer 2c lens (cost 15*l*. 15*s*.) for good hand camera.—Address, DRURY STOWE, Bedford.

Will exchange Merveilleux half-plate set for hand camera, magic lantern, or quarter plate rectilinear lens.—Address, G. MOORE, Buckfastleigh.

Will exchange ratchet safety bicycle, ball bearings all over, for good hand camera (quarter-plate or 5×4).—Address, G. M. MILLER, 15, Cambridge-terrace, Belgravia, London.

Harrison's head rest, Knox burnisher, ten-inch bar, brass plate lettered "Photographic studio," in exchange for hand camera.—Address, S. E. DAVIES, Broughty Ferry, N.B.

Wanted, good lens for hand camera; will exchange Dallmeyer's whole-plate telescope, new meter, only used a few times, cost 30*s*.—Address, J. ALLEN, 2, Pyrmont, Barber-road, Sheffield.

I will give in exchange a Mawson's cabinet lens, in good condition (but no cap), for a camera and set of Gem lenses in good condition.—Address, J. BARBER, 64, High-street, Loftus, R.S.O.

Will exchange 5×4 camera, with carrier for *carte-de-visit* portrait lens and rapid rectilinear to fit same, for 10×8 or 12×10 camera; difference in cash.—Address, ED. ARTIS, 40, Wesley-avenue, Mutley, Plymouth.

Wanted, 5×4 rapid rectilinear iris diaphragms, in good condition, in exchange for silver Geneva watch, in good condition and working order; approval.—Address, J. K. SMITH, Little London, Rawdon, near Leeds, Yorkshire.

Will exchange Knight's *Pictorial Gallery of Arts*, in two splendid volumes, 4000 woodcuts and steel engravings, in first-class condition, for half-plate camera, without lens or tripod.—Address, C. TAYLOR, 15, Bradford-road, Batley, Yorkshire.

Will exchange new strong oak 12×10 printing frame, Fallowfield's make, for two strong oak whole-plate printing frames, or one whole-plate and one half-plate. Will pay difference.—Address, G. F. JESSETT, 7, Batoum-gardens, West Kensington, W.

Splendid portrait lens, taking up 15×12. Also folding tricycle by Singer & Co., electroplated throughout. Wanted, modern portable outdoor outfit, for groups 12×10 or 15×12; also whole-plate studio universal camera, and 3*c* lens.—Address, LONSDALE & Co., 45, Stroud Green-road, London, N.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

PHOTOGRAPHS REGISTERED :—

William Bond, Norwich.—*Photograph of Norwich from the North.*

John Arthur Draycott, Birmingham.—*Six Photographs of Mr. M. P. Manfield.*

Kate Alice King, Notting Hill, W.—*Three Photographs of the Rev. Arthur Williamson, D.D.*

BLACKBURN.—Would "E 25" please send our publishers his name and address.

M. C. K.—The print seems to be over-printed and over-toned, and also appears to have been exposed too much to light during the toning.

WILLIAM BERRY asks: "Do you consider the work done by the electric retouching pencil superior to the ordinary retouching pencil?"—No.

WASP.—As the coloured supplements to the *Graphic* and similar periodicals are constantly framed and sold by picture-frame makers, we take it that you can do the same without "becoming liable to prosecution."

C. TILY.—1. Dr. Miethe's address is Potsdam. 2. We cannot say whether his teleo-objective is patented in the United States, but believe it is. 3. See the JOURNALS from October 30 to December 4, 1891, inclusive.

R. CHURCHWELL.—The action is not due to the tissue acquiring insolubility. That idea was fully discussed twenty or more years ago. If you make the experiments you propose, you will be satisfied on the other points.

ARTHUR CLAYTON.—The copyright is vested in the author of the work—that is, the one who takes the picture. The other question rests upon the terms arranged and the conditions under which the picture was taken.

ALEXANDER MACINTYRE.—When prints have been well toned with gold, we have known ink stains quite removed by treating them with hydrochloric acid. It will be advisable to try it at first on a print that is of no value.

RUBENS.—If the picture is copyright in Germany, there is little doubt, under the International Copyright Act, that it is also copyright here, as that law confers equal copyright in all nations within the Union, and Germany is.

S. BELLOW.—The formula is impracticable. Twenty grains of gallic acid are not soluble in an ounce of cold water. Its solubility can be increased very materially by the addition of glycerine or of alcohol. Neither of these additions would be harmful.

P. DALEY.—A good article may be relied upon from any of the houses mentioned.

S. J. (Berks).—The chalky appearance of the lights and the blackness of the shadows in the photograph of the interior of the building, are due to very much under-exposure. In the next attempt, if another is made, give five or six times as long, actinometer readings notwithstanding.

A. B. Z. (Bristol).—Any elementary work on photography would supply the information. A formula is given on page 792 of the ALMANAC. The bath must be tested from time to time with the argentometer, and its original strength made up either with crystals of nitrate of silver or a stronger solution.

BUCKINGHAMSHIRE.—If you wish to become, as you appear to do, a pot hunter, and acquire a lot of medals, make it a point to show at all the minor exhibitions, such as little local societies that admit outsiders. By following this course, if you send good work, you will soon acquire plenty of medals.

R. A. C.—It is doubtful if you can legally demand, as a right, though a rate-payer, to enter the church at any time to photograph the interior. However, a polite request to the clergyman will, no doubt, secure the necessary permission, and this will, we imagine, prove more agreeable to all parties than asserting rights, real or imaginary.

AUG. WHEELER.—There is little doubt, as you have told your friend, that the spots are due to minute blisters caused by the hot climate. We should recommend alum before fixing, with a pretty thorough washing between the operations. Slower plates would certainly be better for your friend for general work during the hottest weather.

MR. W. C. HEMMONS asks: "Will you inform me, for the purposes of our proposed exhibition, where I can obtain the addresses of the chief English and foreign papers and magazines relating to photography, and the cost of such a hand-book, if there be one?"—We believe that such a list is published at the cost of a few pence.

B. R. A.—The only way by which the spots or markings can be removed from the negatives is by carefully scraping them out with a penknife. If you are not *au fait* with that kind of work, the negatives should be placed in the hands of a skilful retoucher. The emulsion with which the plates were coated seems to have been defective, and the fault is not due to the operator. The sample negative sent has been destroyed as requested.

CORRECTOR.—Although we have had but little experience with the corrector mentioned, it will certainly be quite possible to use it in conjunction with a focal plane shutter. The nearer it is to the plate the better it ought to work, but this will depend upon the curvature of the concave surface and the thickness of the glass. We know of no one who makes such correctors, but we have no doubt that any lens-grinder would undertake the work.

T. BRADLEY.—There are several causes that will account for the ink adhering all over the paper, and refusing to leave the parts protected from light in photo-lithographic transfers. A very prolific cause lies in the bichromated gelatine becoming partially or wholly insoluble, or non-absorptive of water. This may be due to its being kept too long, or from it having been exposed to the light, &c. Another very common cause is the unsuitability of the negative—the dark parts not dense enough, and the lines not transparent. There are other causes, but these are the more general ones with novices.

J. C. T. complains that all the formulæ published for photographic transfer inks seem complicated and troublesome to work, and asks if we can suggest something simpler and more suitable for a beginner. We can, and that is to purchase the ink ready-made from any of the dealers. The beginner can thus ensure having an article suitable for the purpose, and that is more than can be relied upon with a novice's first few attempts at ink making. All who have had any experience in transfer-ink making know quite well that it is not only a troublesome but a very unpleasant operation without special appliances.

D. DAVEY writes: "Wishing to produce some prints on a very rough drawing—or rather tinted crayon—paper of a warm grey tone, I sensitised some, according to several formulæ, and it was a failure in every case. As soon as the paper was dry the original colour was quite changed, and it had become a yellowish brown with innumerable dark brown and nearly black spots. As different formulæ were tried, and all with nearly the same result, I conclude the paper is at fault. As the tint and surface is exactly what I want, is there anything I can treat the paper with to purify it?"—We fear not. Paper of this kind is made specially for artists' use without regard for any other. However, these papers vary considerably in their composition, according to different makers, therefore it is quite possible that a different make will answer the purpose better. If it is possible to obtain the same tint of foreign make, we should recommend a trial of that.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1736. Vol. XL.—AUGUST 11, 1893.

HALATION, AND METHODS OF PREVENTING IT.

A letter which we have received from Mr. C. E. Pettit, and which will be found on another page, reminds us of the fact that of late considerable attention has been bestowed upon the subject of the preparation of plates which shall give freedom from halation.

Very soon after Mr. G. Marlow had directed the notice of the public to the nature of halation—now over thirty years ago—Major Russell tried numerous experiments with a view to cure the evil, and wrote much concerning it. His first suggestion was to employ orange-coloured glass as the support of the sensitive film. After being developed and fixed, the negative pellicle had then to be stripped from off the glass in order to its being printed from. This was found to prove an effectual remedy; but the trouble and risk of removing the film was recognised, and he overcame this by giving to the plate, of ordinary glass, a coating of non-actinic colour; and this, when dried, was found to answer the intended purpose quite well. This was for dry plates; but, when the wet-collodion process was employed, the same end was attained by pressing a sheet of wet red blotting-paper on the back of the plate.

Things remained in this condition for many years (as they do with the majority of workers up to the present time), when a remedy was proposed by Mr. Carey Lea, and others, in the imparting of a yellow stain to the emulsion by which the plate was coated, a stain which should be capable of being removed in course of the subsequent treatment to which the plate had to be subjected. This stain, in the form of an inert substance, was afterwards discontinued on account of the allegation that it impaired the sensitiveness of the bromised film, and both Carey Lea and Col. Stuart Wortley subsequently gave preference to the iodide which, while believed to be not quite inert when used along with bromide, undoubtedly diminished halation by imparting greater density to the film.

Before proceeding further, we pause for a moment to describe, for the benefit of our younger readers, a method by which they can see for themselves the precise effect produced by placing blotting-paper in optical contact with the back of the plate. Hold an ordinary clean plate of glass obliquely so as to reflect the image of a gas flame from its surface. Examine this attentively, and it will be found that, between the eye and the primarily reflected flame, there are several others, each fainter in succession. If a sheet of the red blotting-paper is pressed against the back of the plate, no alteration whatever in the number of reflected images is produced;] but apply a wet sponge to the paper while still in position, so as to wet it thoroughly, and thus establish optical contact between it and the glass, and instantly all these minor reflected images disappear as if by magic, the primary image alone now being visible. This demonstrates in a very simple and effective manner the advantage of backing the plate as a means of preventing halation. This same kind of reflection occurs when the plate is coated with a sensitive film, and it is the stronger in proportion to the translucence or thinness of the coating. If the plate be very thickly coated with any light-absorbing medium, then will there be no halation of the nature now being described. The experiments described should be made at night.

The imparting of opacity to the film whilst at the same time securing maximum sensitiveness was suggested by us seventeen years ago, the means being double films. Writing on the subject two years later (in 1878), a contributor to our pages, Dr. Nicol, suggested a strongly coloured substratum, which, interposed between the glass and the sensitive coating, should act as an anti-halative until the exposure had been made, when, by a subsequent operation, the colour should be discharged. Curcumine, the colouring matter of turmeric, was believed by him to be the best, or amongst the best, substances to employ. Writing concerning this at the time, we spoke of its superiority to methods of staining the sensitive emulsion then known, but which, for reasons given, had received no great amount of recognition. But, whereas Dr. Nicol had spoken of albumen then employed as the popular substratum, we suggested gelatine as a more suitable one, seeing it would so readily part with the colouring matter when its function had been completed.

Just subsequent to this, the Rev. H. J. Palmer wrote to us saying that, at the last meeting of the Liverpool Amateur Photographic Association, he had stated that the freedom from halation which he had experienced had been proved to be due to the slightly yellowish tinge of the glass plates on which he had spread his emulsion. He says he coated his plates with gelatine emulsions of two kinds, viz., one which gave a very slow but dense film, and one made from Kennett's pellicle, which was moderately rapid. He exposed to the inside and east window of a church under conditions of light and atmosphere which are invariably provocative of blurring in its worst form. The sun was shining brightly, but the wind was in the east and the air filled with haze. In every case the test proved entirely satisfactory.

From the few notes here given, Mr. Pettitt will find that he may experience difficulty in maintaining his patent, excellent although the thing is in itself. We have of late received much correspondence relative to the subject generally, and trust that even such a brief recapitulation as we have given may tend to throw some light upon it. Those who wish to inquire more thoroughly into the matter should read the writings relating thereto of the late H. B. Berkeley and others.

FIXING AND WASHING SILVER PRINTS: MESSRS. GRUNDY AND HADDON'S EXPERIMENTS.

The paper *On the Amounts of Silver and Hypo left in Albumenised Paper at Different Stages of Washing*, read by Messrs. F. B. Grundy and A. Haddon before the London and Provincial Photographic Association on Thursday week, and which will be found in another part of the Journal, is a valuable contribution to our knowledge of a subject which, notwithstanding its extreme importance, has never yet been fully investigated, and consequently not understood. The paper, brief as it is, concentrates within its small space the essence of a series of laborious experiments to determine the influence and action of the fixing and washing solutions upon albumeno-chlo o-nitrate of silver, and although undoubtedly of great interest to the chemist and the investigator, will, we do not hesitate to say, have more value for the practical photographer than any paper read before any society in recent times. We endorse the commendatory remarks made in the course of the exceedingly interesting discussion which followed it, and trust that it will stimulate other investigators to take up the study of many vexed or doubtful points met with in practical photography, and strip them of their obscurity.

Messrs. Grundy and Haddon's objects in carrying out their researches were, to quote their own words, "to determine the time the print should be washed," and to "endeavour to determine the cause of the fading of the finished print." The results of their experiments—the methods and accurate applications of which it would be difficult to take exception to—undoubtedly indicate that they have not been unsuccessful in those objects. Summarising the conclusions arrived at, and taking the experimental data as typical of what actually occurs in the fixation and washing of silver prints, it appears that the fixing bath leaves behind a residuum of silver and sulphur compounds, which, although presumably soluble in water, are irremovable by washing within the limits of from five minutes to nineteen hours. This, according to general photographic practice, we may accept as marking the minimum and extreme periods of washing adopted. While there is, of course, nothing new in this, it is possibly the first time that the power of the fixing bath on the sulphur and silver salts left in a "fixed" print have been accurately gauged.

The principal outcome of these experiments, from the point of view of every-day practice, however, lies in the fact of the ascertained limitation of the power of washing prints, as proved by Messrs. Grundy and Haddon. It will be observed that, after ten minutes, the quantities, small though they are, of sulphur and silver compounds left are virtually irremovable by any length of the washing, two hours and nineteen hours respectively being impotent to subtract more than a washing for ten minutes. Hence, accepting Messrs. Grundy and Haddon's figures as correct and confirmable, we have a much-debated point clearly settled, which in itself is a feature so valuable that the experiments might have rested a claim to enduring interest on that fact alone. Before now, we and others have pointed out that long washing was not only unnecessary, but was provocative of danger to the purity and stability of the print, and it is gratifying to find that view substantiated, while to photographers it should be of the highest significance and assistance.

Arising out of Messrs. Grundy and Haddon's paper are a number of problems which we trust they and other experimenters will take up and endeavour to solve. In the first place, such a thing as perfect fixation of silver prints seems as yet unattainable, and the removal of the presumably soluble compounds left is also by no means thorough, so that the hypotheses of the causes of fading are rendered more obvious than hitherto. Starting from this point, a fresh series of investigations, having for their object the providing of a perfect method of fixation and washing, seems desirable. The precise nature of the compounds left behind, and whether they are retained by the paper or the albumen, singly or in collusion, has also yet to be determined. Here are no questions of mere theory to be debated, but matters of the greatest practical import, which we trust will receive attention now that Messrs. Grundy and Haddon have so ably opened up the subject.

In conclusion, we should like to add our tribute of praise to these gentlemen for the great labour and pains involved in the experiments, which, it appears, extended over several months, and the measure of which cannot be taken by the brief record of the results arrived at. We understand that Messrs. Grundy and Haddon intend not only pursuing this subject, but also that of fixing and washing in connexion with the increasingly popular gelatino-chloride paper. Both for what they have done and for what they intend to do the thanks of photographers are due to them.

INTENSIFICATION.

Although more than one of the newer developers must be acknowledged as having obtained an established footing in practice, it can scarcely yet be claimed that their use is as fully and completely understood under all circumstances as is the case with pyro. It is not our intention to argue the question as to whether pyro owes its continued popularity, notwithstanding its faults, to any inherent superiority over its newer rivals, or whether it is not rather due to the more perfect knowledge of its capabilities that long years of use have given us. It is too often assumed that, because a new developer does not at once establish its undoubted superiority over pyro, therefore the latter must retain its supreme position, whereas it seems more than probable that a wider experience with the newer agents may eventually remove certain irregularities and uncertainties that at present surround their use.

That amidol, metol, and other of the recent additions to our list of developers possess certain advantages over pyro is undeniable, but it is equally certain that there are at present counterbalancing features which, to some extent, restrain their general adoption. Chief of these is the uncertainty, and sometimes difficulty, in securing sufficient printing density, as well as the deceptive character of the unfixed image, which very often leads to serious errors of judgment in the matter of density. But, while we recognise this fact, we must also point out another, namely, that many photographers are misled by the extraordinary clearness and delicacy of the images produced by metol and amidol into a false idea of their being too thin for printing purposes, when such is not the case. We

have known several instances in which negatives have been thrown aside as too hopelessly thin to be of any practical use, but which, on trial, have proved to give very beautiful results. In fact, the general character of these negatives is that which is well described by Messrs. Hurter & Driffield as combining "truthful rendering of tone with minimum density."

At any rate, we have heard far more lately about the necessity for intensification than for a number of years past—that is to say, of systematic intensification. In wet-collodion days it was the custom to develop with iron, and then to intensify or "redevelop" with a different solution of iron or of pyro, with the addition of silver, though it was generally recognised that, where it was possible, a better result was obtained where the end was arrived at in a single operation. On the advent of gelatine plates, many operators followed a similar practice, as, owing to a want of familiarity with alkaline development, density and gradation were difficult to combine by its means alone, and intensification after printing had to be resorted to. The necessity for this gradually disappeared with practice, but seems to be temporarily cropping up again in connexion with amidol, metol, and similar agents.

No doubt there are many users of these new agents who will be ready to declare that there is no difficulty whatever in gaining any degree of useful density, and we are quite prepared to agree with them up to a certain point. But that result can only be ensured by using a solution of such strength as to make it rather expensive. What we want to arrive at is a combination of the ingredients of the developer, which while of moderate strength, suffice to give printing density under all ordinary circumstances with tolerable certainty. So far as our own experience goes, the nearest approach to these conditions is secured with carbonate of potash in preference to any other alkali, carbonate of soda, as generally used, being the worst in respect of vigour of image. The omission of bromide from the developer is another prolific source of their images, since the great energy of the unrestrained solution causes it to veil the shadows of the picture before the lights have acquired sufficient strength.

Both amidol and metol exhibit extraordinary power in searching out feeble effects of illumination, and the reflected light in the camera, even with extremely short exposures, suffices, with unrestrained metol, to produce a veil which would not be apparent under other circumstances. That the result is not due to abnormal reduction, or to over-exposure, is proved by the edge of the plate remaining clear where protected by the rebate and by the veil, where the exposure has been barely sufficient to impress the more feeble details. Where such a veil is produced, it, of course, goes on intensifying with the rest of the image, and so limits the duration of development, and, consequently, of intensity; but, where a moderate addition of bromide is made to the developer, the plate remains clear for a long period without to any material extent prolonging either exposure or development.

What we desire to impress upon our readers is, that, where it is at all possible, it is preferable to obtain density in one operation by the judicious modification of the solution; but there are, of course, circumstances—errors in exposure or accidental variations in the character of the films—that may render subsequent intensification necessary, and then the delicacy and clearness already referred to render this class of image more particularly suited to intensification than even the cleanest pyro image. And, moreover, owing to that clearness, the degree of intensification it is necessary to give is so slight for ordinary subjects, that methods which would be of little use under other conditions are quite available here. Among such methods we may mention as an instance chloride of mercury, followed by sodium sulphite, which, as a rule, adds too little to the strength of the image to be of much practical use, although its freedom from tendency to stain recommends it in preference to most of the mercurial methods.

The first necessity before proceeding to intensification is, of course, perfect fixation and thorough washing. The latter is of no avail without the former, indeed it is only when intensification is attempted that we discover how prone we are to be negligent in the matter of fixing. The practice of passing the negative through two separate baths is one that adds little to the trouble of production and adds considerably to the chance of completeness of action as well as to cleanness and clearness of result; for, if the negative be left in the first bath until *apparently* fixed, and then after a slight rinse transferred to the second, the latter will retain its energy and effectiveness for a far longer period than if it were allowed to become decomposed and discoloured by continual additions of minute traces of the developer. A further safeguard against imperfect fixation will be found in the method of treatment with iodide of potassium mentioned in these columns a few weeks back. This only requires the plate to be immersed for a minute or two in a solution of iodide of potassium after fixing and washing when if any silver remain in the film it will be converted into iodide, and thus rendered visible and show the necessity for further immersion in the hypo bath.

For very slight increase of density there is no more convenient intensifier than the one we have just mentioned, namely, chloride of mercury, followed by sodium sulphite. This does not necessitate the careful and prolonged washing after bleaching that is required when other darkening agents, such as ammonia, are used, although the latter gives a much more vigorous result, and perhaps for general purposes is to be preferred. In this case, however, the washing must be very carefully performed, preferably in a running stream of water, for at least an hour; and the final result will be better as regards clearness if the first stage of the washing be performed with soft water, or, at any rate, water as free from carbonate as possible. If these precautions be observed, the intensified image will be as clear and free from veil as before treatment with mercury, and will, moreover, retain that clearness or translucency that adds so much to the delicacy of gradation of a negative. If the washing be inefficiently performed, there is pretty certain to be a certain amount of veil in the shadows of the negative, as well as a want of transparency in the half-tones.

Where a still greater increase of density is desirable, one of the best methods we have tried is chloride of mercury, followed by the usual amidol developer, containing sodium sulphite. This is as clean in its action as the sulphite alone, but gives a much greater increase of strength, and a peculiar non-actinic colour is given to the image by the addition of a few drops of solution of iodide of potassium in place of bromide as a restrainer. By this means, in fact, a very considerable control over the result is obtained.

We have personally always had a preference for silver intensification, which, although it perhaps requires a considerable amount of care, gives, we think, a better result than is to be obtained by any other means. The requisites are, a very careful washing after fixing, as already mentioned; then the application of a solution of pyro or hydroquinone, acidified with citric and nitric acids, and supplemented by the addition

of a few drops of solution of nitrate of silver. Under this treatment the image gains density with great regularity and evenness, and it can be carried to almost any extent, as, unlike the mercury methods, it is a progressive building-up process; or, if only a very slight increase is required, it is equally easily effected. One thing has to be borne in mind, namely, that the density increases on drying.

After intensification, in order to destroy any possible action of the soluble silver salt on the gelatine film, which might ultimately result in the discolouration of the negative, let the latter be immersed for a short time in a dish of water slightly acidified with hydrochloric acid, and afterwards in a strong solution of sulphite of soda, and finish off with a careful washing.

While the present article has been suggested to us by numerous complaints as to the necessity for intensification with the new developers, we may conclude by expressing the opinion that, as these become better known in practice, the difficulties in respect of density will disappear.

A Suggestion.—A lock of hair, particularly of deceased friends is highly treasured by many. A correspondent suggests as a new style of portraiture, which is so often being asked for, that a piece of the sitter's hair should be mounted upon the portrait and arranged as worn at the time of sitting. Such pictures, he says, would be novel, and also greatly prized, especially after the prototype had departed this life, and adds, would, no doubt, take with the public, as they would be entirely new. We give the suggestion for what it is worth. With regard to the novelty, we had an idea on reading the letter that the thing would not be new, as it had been done before. On referring back, we find that a provisional protection was granted for precisely the same thing more than thirty years ago—namely 1859. This is another exemplification of the old adage, "Nothing new under the sun."

The Photographic Trade.—Although we have, for the present at least, closed the controversy on the depression of business, and amateurs *versus* professionals, letters are still being received on the subjects. One writer, adverting to a remark of ours that the introduction of dry plates had not been an "unmixed blessing" to the profession, says that it must have been little less than one to the manufacturers of them and to the sellers of them, also to the makers of cameras and lenses, as well as the manufacturers and dealers in all goods connected, either directly or indirectly, with photographic material and appliances. Of that there is little question. When photography, as a business, was at its zenith, the consumption of material, the demand for lenses and cameras, and other appliances connected with the art, was nothing in comparison with what it has been during the past few years. "It is an ill wind that blows nobody good." Fortunes in connexion with photography have drifted from one direction into that of another. *Long live photography!*

Disfigured Landscapes.—During the past few weeks a considerable number of letters have appeared in a daily contemporary protesting against the disfigurement of many of the most interesting places in the country by hideous advertisements, and not without reason, as every one who admires nature will agree. A Society has been formed for its suppression, and all must wish it success, and we are even promised legislation on the subject. It is exceedingly annoying to be often unable to take a photograph of a charming bit of landscape without including a repulsive advertisement of some quack medicine or other. When travelling on the Great Western, the fields at the sides of which are greatly disfigured by these obnoxious advertisements, with a well-known R.A., he, while bewailing the defacements of nature, remarked that painters could always ignore them in their pictures, while photographers were often helpless in the matter. They must take the landscape as it appears or not take it at all. The latter is the course photographers are compelled to adopt, and, as a consequence, many excellent pictures have to be foregone.

German Prints.—*Apropos* of trade marks, a question of considerable importance was put in the House of Commons, on Friday last, to the President of the Board of Trade. We say the question is important, inasmuch as it has been, and still is, under the consideration of the law officers of the Crown, though many, no doubt, were under the impression there was no question in the matter at all. It was this, "Whether the law officers of the Crown had yet given their opinion as to the legality of the admission into this country of masses of birthday and other anniversary cards, pictures, and religious tokens, printed in Germany, without any notification of such fact, save on the outside band of a large packet?" The reply was, the opinion had not yet been received. From the large number of this class of prints now in the market, bearing the imprint that they were printed abroad, one would have surmised that even the spirit of the law was being fully complied with. We know of instances where collotypes and costly photogravures have been arrested at the Customs, entailing considerable loss both to the producers and the importers, because each individual print did not bear the imprint "printed in Germany." Is there now a doubt as to the legality of this proceeding? The parcels were duly marked as in the cases giving rise to the question.

Trade-marks Prosecutions.—At the Mansion House Police Court last week, two well-known city firms, Messrs. Dollond & Co. and Messrs. Leslie & Co., were summoned for applying a false trade description to clinical thermometers, implying that they were of English manufacture, whereas they were made in Germany. The prosecution was undertaken by the Board of Trade, but was instigated, we believe, by the Master Barometer Tube-blowers' Association. The prosecuting Counsel stated that the words "Made in Germany" would appear on the instruments when they passed the Customs, but they were only in lampblack, and were easily rubbed out. The defence, in each case, was that the thermometers were purchased for English-made goods. In both cases fines of 10*l.* and costs were imposed. Clinical thermometers are not the only scientific instruments sold in this country that bear no indication that they were made abroad. Thousands of photographic lenses, for example, are imported every year that bear no indication that they are of foreign manufacture, and, what is more, they are often afterwards engraved with the names of English vendors. There is no reason why foreign scientific instruments should not be equally as good as those of home manufacture, and many are, if not superior; but the law says they shall bear the name of the country of origin. If they do not, it is clear the law is being infringed, and it often is; of that there is no question.

SUPPLEMENTARY LIGHTING.

I REFER to this matter, having recently had brought to my notice some effects of this method of working. Like most other neglected photographic processes, supplementary lighting is resuscitated from time to time. A quarter of a century ago the matter was threshed out and dropped; whether it was discontinued because it was of *no* advantage, or because the advantages were somewhat uncertain, I am unable to say; but at first some of our leading men, both here and on the Continent, took it up, and, for a time, believed great things of it. Exposure was to be reduced by half, and marvellously short studio exposures for those days could be made to give excellent results, impossible without the extra light. Coloured glass caps were put on the market, by which the exposed plate could be flooded with light of any degree of actinism at the will of the operator. Small windows were cut in cameras, and glazed with coloured glass, for the same purpose.

Most portraitists gave it a trial, for anything that would shorten exposure was a boon and a blessing when about fifteen seconds was considered an instantaneous exposure. However, it dropped through, and in a couple of years I question if anybody used it except for experiment. The theory was excellent. Why didn't it answer?

Surely, if the preliminary effects of light, *up to the time when it began* to make a faint impression on the sensitive surface, could be supplied, in addition to that passing through the lens, so much time would be saved, and the image cast by the lens would begin to make a *useful* impression from its first contact.

I went into the matter at the time, and tried it in a variety of ways, but the results were not encouraging. If a plate was under-exposed, there was *no* more detail impressed, but a slight *veil*, that gave a *better printing negative*, was developed. Printing an under-exposed negative under white paper seemed to have quite as good an effect, and, as *proper* exposures were always aimed at, the advantage of extra light was not very palpable, anyway, whatever the reason the process was dropped.

Supplementary lighting seems to have another effect, which does not show itself by the production of more detail, but density instead. A *very small* modicum of diffused light, such as is reflected from the inside of a camera that has become somewhat shiny from use, or from the lens mount, seems *not* to fog the plate, but to give rather an increase of density to the negative. The line between fog and density is rather difficult to draw: so many conditions may interfere, especially length of exposure, it would be interesting to know for certain how much light can be used with *advantage*. Of course, with wet collodion the mere matter of density was not thought of, as most negatives underwent redevelopment either by adding silver solution to the first lot of developer, or by pyro and silver solution after the development proper had taken place. Sufficient density with the first application of the developer was scarcely expected; so, under these circumstances, if extreme density *was* conferred by supplementary lighting, it was neglected.

Now we work under different conditions, and it might be worth while to go over the process again. I would suggest to any one owning a stereoscopic camera that a little light colour inside the camera or lens mount, for one half the slide, would show if any advantage is to be expected in the matter of *density* by the supplementary light thus introduced. It stands to reason that, with our rapid plates, it must be *very little*, or it will result in fog instead of density. Anyway, I suggest the idea of trying it to those who have more time and opportunity than I have myself.

EDWARD DUNMORE.

ON THE CONSTRUCTION OF INTERCHANGEABLE LENS SCREW FITTINGS.

[Photographic Society of Great Britain.]

THERE is being established among you a system of standard interchangeable fittings for the attachment of lenses to cameras; a system which will presently enable you not merely to covet your neighbour's lens and to screw it without difficulty in your own camera, but will entirely simplify the attachment of your own lenses, so that you may have on each camera one flange to suit the largest lens you use, and every other instrument will either fit this flange direct or be carried in it by a standard adapter. Moreover, the lens will not, as of old, screw and arrive home with utter disregard to your wishes. One will not have its diaphragm index set up where you need a mirror to read it, nor another down where you cannot see it, and all where you have to hunt for them. They will arrive home in one place which may be of your own choosing.

And, in attaching a lens to its flange, you will not have to seek, in patience or in despair, the suggestion of a tendency toward engagement of the screws. You will place them with their zero marks together, knowing that they will immediately engage on being turned, and that you cannot cross the threads. You will know that exactly three turns complete the engagement, and in removing the lens your mental anguish will be neither protracted nor acute, for you will know precisely when to expect the instrument to fall upon the floor.

The old want of system and uniformity in these things is being gradually dispelled, and one by one lens-makers are realising the importance of adopting the Society's Standards for the benefit of their customers.

Such a change, involving so many personal interests, cannot be suddenly accomplished everywhere; but, to those who view the great inconveniences which will be removed by the general adoption of the one standard, there is no doubt that in the course of time, and with constantly accelerating speed, this change will be accomplished.

I speak to-night on the technical side of the subject, of methods of making and measuring such screws as are applied to photographic lenses for this purpose, and in bringing this part of the subject before the Photographic Society, I venture to think it may prove interesting even to those who are not mechanics. Besides its intrinsic interest, however, the subject is of considerable practical importance to photographers at the present time, because, while they are asking and will continue to ask, for standard interchangeable screws, it is a fact, which I have no hesitation in stating, that the methods of screw-making generally employed by opticians are quite inadequate to secure that degree of accuracy on which true interchangeability depends. Before photographers can attain the full advantages of standards for their lens screws, the mechanical practice of opticians must rise to a much higher level of culture than it has reached at present.

My work in connexion with the Opticians' Conference appointed by the Convention Committee, and as a member of the recent Standards Committee of this Society, has enabled me to judge of the regard which opticians generally pay to the technical work of screw-making, and I see there has existed among us in the past a certain disregard, sometimes even bordering on contempt, for over-much mechanical accuracy.

It is quite natural that the optician, whose study and skill are devoted principally toward designing and fashioning beautiful glass work, should regard too slightingly the constructive work and the skill of the mechanic, the worker in metals, and in the past the need of critical accuracy in screw making has not been widely felt as soon it will be, for the need has arisen with the present cry for interchangeability; and, if we are to secure for photographers and for photography the great advantages for which that cry is raised, our neglect of accuracy must be banished and scrupulous care must take its place. We must all learn the use of true standards of length, and of fine measuring appliances, so that the work of the optician may be supplemented by the work of the skilled mechanic.

I am a young man, and I want to see these standard fittings everywhere adopted and properly made before I am old. For several years in the course of my work I have been deeply interested in improving methods of making and measuring such screws as we contemplate, and I have resolved to publish some of the results of my own work, in order, if possible, to make the way easier for others.

INTERCHANGEABILITY.

There is an important difference which I ask you to observe between such interchangeability as we need with photographic lenses and such as is commonly secured among bolts and nuts and among gas fittings: it is this, that bolts, and nuts, and gas fittings may be forced together with wrenches and tongs, while our lenses must never be subjected to such treatment, they must go together freely and without strain; and we may conveniently distinguish this by calling it a condition of *free* interchangeability.

Now, I should like you to realise what this condition means and involves. Let us suppose that we have fifty lenses, each with a standard two-inch male or external screw, and fifty flanges with corresponding two-inch female screws. These are freely interchangeable, when any lens will screw into any flange without difficulty.

There will be 2500 distinct combinations formed in trying all these screws together. Now, if one of the male screws be large, even to the small extent of only one-thousandth of an inch on its diameter, this will effectually prevent its entering every one of the fifty flanges which are of normal size. It is thus evident that every male screw must be at least as small as the normal or standard screw. In the same way it may be shown that every female screw must be at least as large as the normal. These are the conditions of free interchangeability among screws, and I ask you to note them carefully. The small amount of one-thousandth of an inch is sufficient to prevent the screws going together at all. Errors much smaller than this are still sufficient to prevent free interchangeability; and it is thus evident that extreme care and accuracy should be observed in measuring such screws, and in making and measuring the gauges with which they are tested. Particularly is this evident when we remember that it is sought to make the lenses, not merely of one maker but of all makers, freely interchangeable, and that the various makers cannot readily compare their work or their gauges, but must rely upon the accuracy of the standards of length with reference to which their tools are constructed and periodically tested.

THE MEASURING OF SCREWS.

A screw such as you see in the diagram (fig. 1) has three principal elements:—

(*p*) The pitch of a screw, which in general terms we speak of as coarse and fine, is the distance between two successive threads, or turns of the thread, measured in a direction parallel to the axis of the screw. At present we are not concerned with methods of measuring the pitch of a screw.

(*d*) The nominal diameter of a screw is usually the measure of the full outer diameter of the male screw. Thus, the two-inch standard male screw measures two inches over all, and it is a simple

thing to measure this diameter accurately by placing the screw between the plain measuring faces of a micrometer gauge or measuring machine.

In order to fulfil our condition of free interchangeability, it is necessary not merely that this full outer diameter of a male screw be at least as small as the normal; it is also necessary that upon the sloping sides of its threads and at their base or root, the screw should be everywhere sufficiently small. Equally important then with the full outer diameter in securing free interchangeability of screws is the thread form, which determines the size of the screw on the sloping sides and at the bottom or root of the threads. The form of thread is taken as its cross section in a plane containing the axis of the screw. The diagram shows the form adopted in the Society's Standards, and which is known everywhere as the Whitworth thread. It is a form beautifully adapted to the purpose for which it is chosen. It is planned in this way (see fig. 1): A base line is divided into sections, each of a length equal to the pitch of the desired screw. Upon these sections of the base line, isosceles triangles are formed by drawing lines inclined to each other at fifty-five degrees. A line parallel to the base line and touching the apices of the triangles will stand above the base line ·96 of the screw pitch, and will include another series of triangles between the first and similar to them but inverted as at (A). By means of equal circular arcs, one-sixth of the height of every triangle is rounded off its apex, as at (B), leaving the form of thread as at (C). The depth of the Whitworth thread is ·64 of its pitch.

Suppose that we have a screw already made, and we wish to

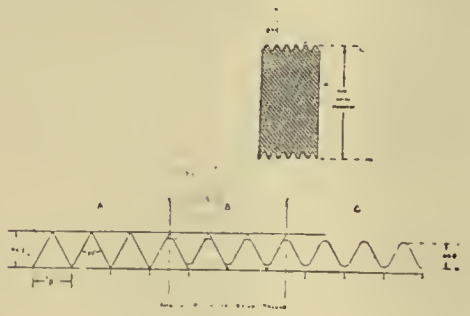

Fig. 1.

measure its thread form. The full outer diameter of the screw is easily measured by placing it between the plain jaws of the measuring machine, as shown at A in fig. 2. This full diameter of the screw is represented by the height of the first thick black line to the right. The depth of thread in any place may be measured by providing the little test piece shown at D, and on a larger scale below in the diagram. This little hardened steel bar of triangular section has its lower edge very slightly rounded, and its measurement, C, accurately determined. When placed along and between the threads

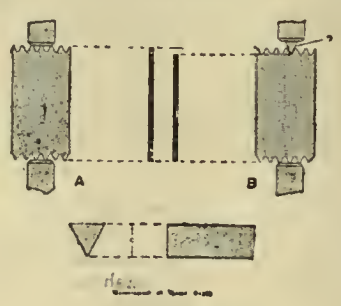

Fig. 2.

of a screw in the direction shown at D, it touches the screw only at the root of the threads, and, by measuring the diameter of the screw, including the test-piece, in the manner shown by the figure, it is easy to determine the depth of thread; for, if we subtract from the measurement so obtained the constant measure, C, of the test-piece, we get a result, indicated by the shorter thick black line, which is less than the full diameter of the screw by exactly the depth of the thread. With due care, and with simple appliances, these measurements may be made correctly within about one five-thousandth part of an inch, which is sufficiently accurate for practical purposes.

The diameter of a screw, as measured on the sloping sides of its threads, may be determined by the aid of a simple application of trigonometry. One easy method, applicable under certain conditions when the angle of thread is known, is to use a small cylindrical gauge placed along and between the screw-threads, so that it bears only against the sides of the threads in the manner shown in fig. 3. The question to be solved by using this little gauge is this—Are the threads of the screw, so to speak, too fat, as at F, or too thin as at T?

You will see that, if the threads are fat, the little gauge will stand too high above their tops. If the threads are thin, the little gauge will sink too low between them. It is a simple matter to discover just where the gauge should stand in relation to the thread-tops, and it is simpler still, and just as useful, to find where it should stand in relation to the base or root of the threads. If the sloping sides of the threads had been continued downwards to form a thread not rounded at its root, but sharp, it would have been of the form shown in fig. 4; and, knowing both the diameter of our little cylindrical gauge and the angle between the sides of the threads, it

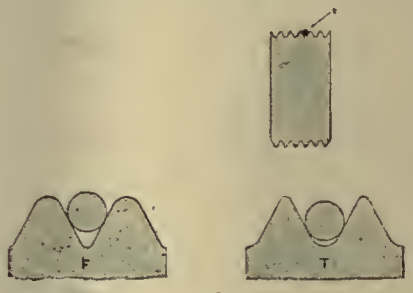

Fig. 3.

needs only a simple application of trigonometry to decide where the gauge should stand in relation to the point P. We know, by the construction of the Whitworth thread, that an amount equal to ·16 of the screw pitch is rounded off the sharp angle to form the rounded

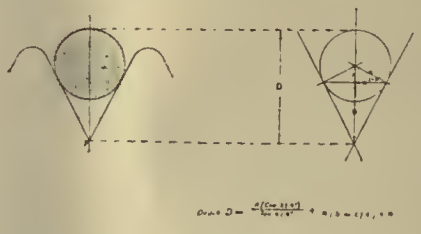

Fig. 4.

root of the thread. Knowing, then, how far the cylindrical gauge should stand above the point P, we can easily find how far it should stand above the base or root of the threads, and how far above their crests.

For practical purposes, the necessary calculations may be made once for all, and I prefer to construct for each pitch of screw to be dealt with a small cylindrical gauge, of such diameter that it shall stand, when in use, one or two-thousandths of an inch, or some such simple recorded distance above the crests of a perfect or normal thread.

The radius of such a gauge for this purpose may be found by the formula:—

$$\frac{1{\cdot}25\,d - p}{3{\cdot}1656},$$

where d is the depth of thread, and p the desired convenient projection of gauge above the crests of the thread. The main features of this problem are shown in the diagram (fig. 4).

If it be necessary to measure the angle between the sloping sides of a screw thread, it may be done by using a second gauge, small enough to lie between the threads close down at their root.*

W. Taylor.

* The use of trigonometry for this purpose is naturally not new. It is employed in a very different way in the measurement of the Sellers form of thread by Messrs. Pratt & Whitney, of Hartford, Conn., in whose works I have had the pleasure of seeing it applied. The use of small cylindrical gauges such as I have described was first suggested to me by Mr. Barber, the superintendent of Messrs. Whitworth & Co.'s gauge department; but, so far as I am aware, the application in the way I have explained is novel.

(*To be continued.*)

DOUBLE TONES IN GELATINO-CHLORIDE PAPERS.

One of the most frequent imperfections which I meet in gelatino-chloride printing-out papers is that there is a marked double tone. This defect is most apparent in the half-tones of the print, and especially noticeable at the edges of vignettes, and, in fact, in all portions of the picture where there is a transition in gradation from half-tone to a lighter tint.

I frequently hear this defect attributed to the use of sulphocyanide of ammonium as a toning adjunct, and I have myself found, at various times, that a sulphocyanide toning bath would give it. As a matter of fact, I am inclined to believe that the use of sulphocyanide does predispose to this defect, and mainly because it is infrequently used with a small enough proportion of the salt to the water, and with an insufficiency of chloride of gold to do the toning work with facility. This is a point which it ought hardly to be necessary to emphasise, as the makers of P.O.P. have frequently drawn attention to the necessity of not overdoing the quantity of sulphocyanide per ounce of water.

It need not be inferred from this that a sulphocyanide bath, properly constituted, will not make good, even, and *single-toned* prints in gelatino-chloride; on the contrary. Nor, on the other hand, are other toning baths free from the trouble. Generally speaking, it may be taken that a double tone in a printing-out paper indicates one of three things:—

1. Insufficient gold.
2. Too large a proportion of the toning adjunct.
3. The use of a partially exhausted bath.

Turning attention for the moment to the first cause, it is tolerably certain that an emulsion paper requires more gold to tone a given number of square inches of surface than does ordinary albumenised paper. This, instead of being a weakness, may well be claimed a strong point for gelatino-chloride, for a strongly substituted gold image is likely to be more stable and permanent than a half-toned one. The question of the cost of production is hardly one which should enter into the question at all, although it is, *cæteris paribus*, a factor. As a basis for estimating, we may assume that, under the best conditions, a sheet of albumenised paper will require one grain of chloride of gold to tone it to a warm colour. I don't think we can expect to tone a sheet of gelatino-chloride paper with less than three grains, but the extra cost spread over the prints is of no importance, compared with the advantages of the emulsion paper, such as the keeping qualities and evenness of coating. This latter is a point of great importance when we remember that every sheet of our old friend albumen had a thick end, and a corresponding thin one, due to the draining of the salted albumen during the drying process.

Not only must there be a sufficiency of gold, and not an excess of sulphocyanide, but the solution must be sufficiently concentrated to change the colour of the prints in a reasonable time. A prolonged toning with gelatino-chloride papers generally means that double colours are obtained.

I have recently seen some very quick toning baths worked with bicarbonate of soda, chloride of gold, and water only. The formula stands about—

Chloride of gold	1 part.
Bicarbonate of soda	20 parts.
Water	480 „

In such a bath the prints, previously well washed, tone in a phenomenally short time—under two minutes. But the tones thus obtained are, to my mind, not very attractive, ranging towards coldness and greyness. There is also the added disadvantage that, with so rapid a change in colour, it is to a large extent impossible to secure other than one tone, viz., the limit to which the bath will go. Moreover, there is an inclination to over-tone, or to eat away the lines of demarcation between the lighter tones, or at the edges of vignettes.

This trouble with the edges of vignettes and of the lighter tones is not by any means restricted to printing-out papers, in which it might be supposed to be caused by a possible mixture of sensitive salts in the emulsion such, as, say, the chlorides and citrates. It might be plausibly argued that the discolouration of the finer edges is due to a slight separation or imperfect admixture of these salts, and not to the toning action at all; in other words, that such an emulsion is but a mechanical mixture and not a chemical compound. It is quite possible and even likely, that an irregularly constructed emulsion would suffer from such a defect; but it must also be borne in mind that all photographic images first show signs of deterioration in this same part, viz., in the lines of demarcation between the finer tones. This is only another way of stating that chemical action commences in these portions of the picture, and the defect has probably come within the observation of many of my readers when reducing a negative with hypo and ferridcyanide of potassium. The action, if too prolonged, or caused by too energetic (strong) solutions, takes effect unduly, and often disastrously, at the junction of the finer tones.

We are therefore justified in concluding that this defect, for I do most certainly view it as a defect both from the technical and artistic point of view, is not inherent in the paper or in any particular toning bath, but only indicates an unsuitable strength of the chemicals used, and this excess is most probably *of the toning accessory*. I mean the sulphocyanide, or acetate, or bicarbonate, or whatever be used.

This conclusion is emphasised by the action of the combined toning and fixing bath. For instance, a combined bath, containing, say,

Water	5 ounces,
Hypo	1½ ounces,
Acetate of lead	120 grains,
Sulphocyanide of ammonium	30 grains,
Gold chloride	2 grains,

will work in a very satisfactory manner for the first time, but afterwards toning will only take place in a perfunctory manner, the half-tones and less tones changing whilst the deep shades remain about their original colour. The gold having been exhausted to a large extent leaves for the second essay an excess of the toning adjuncts, which are, with the remaining gold, only able to attack those portions of the print where chemical action takes place most easily.

Seeing that a combined bath deposits the gold in so facile a manner, I am surprised to hear it maligned now and again. Used only *once*, so as never to permit the possibility of the intricate chemical inter-action between the hyposulphite and the acid products of the double decomposition resulting from the toning, I do not see any greater risk of impermanency than with separate baths.

It has never been shown that the proportion of faded prints was greater, with the old toning and fixing combined, in the days of plain salted paper, than in later days with what is claimed to be the more scientific method. For my part, I should be inclined to expect greater permanency from gold toning deposited upon the fixed image—for that is what a combined toning bath amounts to—than from a gold-toned image afterwards fixed. In neither case can the hyposulphite dissolve away more than a small part of the reduced silver in the image: but, whilst in the separate baths, the fixing solution may take away what may be described as part of the foundation of the image, viz., that upon which the gold has been deposited; in the combined bath, the fixer robs the image of all the reduced silver which it has the power to do, before the gold is deposited in exchange for the remaining metal, viz., that which the hypo has failed to dissolve.

In addition to this, as the prints have to be carried to a further depth in printing for the combined bath, there is an added chance of a greater deposit of metal which may be considered a further guarantee of standing powers. With a combined bath used but once, and not exhausted by excessive work, I have found no tendency to double colours in gelatino-chloride papers. To economise, only sufficient solution need be used to produce the desired effects.

S. Herbert Fry.

ON THE AMOUNTS OF SILVER AND HYPO LEFT IN ALBUMENISED PAPER AT DIFFERENT STAGES OF WASHING.

[London and Provincial Photographic Association.]

Any one studying the literature of photography must be struck with the diversity of opinion expressed by different workers on the important points of fixing and washing prints, some recommending neutral and others alkaline hypo, and the strength of the fixing solution varying from five to thirty per cent., the length of time the print should be washed varying from one to twenty-four hours.

The danger of an acid fixing bath and its tendency to yellow the whites of a print, and in addition its doubtful fixing power, was first pointed out by Mr. J. Spiller in a paper he read before the Photographic Society of Great Britain on January 14, 1865. Mr. Spiller in his paper says that "a hint was thrown out by Messrs. Davanne & Girard to the effect that the so-called 'pure whites' of the albumen prints still retained a small proportion of silver in an insoluble condition, and most probably in the form of sulphide."

Further on, the author says: "My experiments went to prove that the metal was retained in the whites of the albumen print, and indeed

in all parts of the coating, in the form of an argentic organic compound, colourless, unalterable by light, and comparatively insoluble in hyposulphites and other fixing agents. It could not be a simple sulphide, for the test by which I discovered its existence in the paper was the production of a brown stain upon moistening the white surface with sulphide of ammonium." In a paper in the *Photographic News* for October, 1862, Mr. Spiller recommended the addition of carbonate of ammonia to the ordinary hyposulphite fixing solution, for the double purpose of preventing by its alkalinity any chemical change or decomposition of the double hyposulphite; and, secondly, of directly aiding by its special solvent properties in the removal of this organic compound of silver.

In carrying out this research, we had two objects in view: firstly, to determine the time the print should be washed; and, secondly, to endeavour to determine the cause of the fading of the finished print.

Three sheets of albumenised paper from the same quire were sensitised on a fifty-grain neutral solution of nitrate of silver and allowed to dry in the dark. These were then cut into pieces 5½ in. × 8½ in. The pieces from one sheet were marked A, from the next B, and from the third C.

The paper thus cut up and marked was washed for ten minutes in running water till all free silver had been removed.

Two of these pieces, taken from different sheets, which could be easily recognised from the letters on the back, were placed on one side, in order to determine the amount of sulphur originally present in the paper and also the amount of silver that had to be removed by the fixing agent.

The remainder of the paper was placed in a pint and a half of a twenty per cent. hypo bath; and, as this gave a little more than two ounces of hypo per sheet of paper, we consider we were on the safe side, as Captain Abney says that one ounce of hypo will fix three sheets of paper.

The hypo bath was tested before and after use, and was found to be slightly alkaline to litmus. The temperature was 22·4° C.

The prints were kept in the bath with constant changing for fifteen minutes. Two pieces (again from different sheets) were then taken and allowed to drain for five minutes, and the total sulphur and the remaining silver to be removed by washing determined.

The remaining pieces were then placed in a large vessel filled with water and into which water was constantly flowing. The temperature of the water was 13° C. During the first hour the pieces of paper in the water were constantly turned over in order to prevent them sticking.

Two pieces were removed at the end of 5, 10, 15, 25, 40, 60, 90, and 120 minutes, and 19 hours, and the amounts of silver and sulphur remaining in them determined.

The estimation of the sulphur and silver in the papers was carried out as follows:—In each case the two pieces of paper were allowed to drain for five minutes, and then torn up into small pieces and placed in a large beaker, with a mixture of 100 c.c. of nitric acid and 200 c.c. of strong hydrochloric acid (free from sulphur), covered with a dark glass, and heated on a sand bath till the paper was completely destroyed. The solution was then taken down to dryness, and 250 c.c. of pure distilled water and three drops of hydrochloric acid added, and the whole heated to boiling, allowed to cool and filtered, and the filter paper and beaker washed with boiling water. The filtrate was heated to boiling, and chloride of barium added, which precipitated all the sulphate present as barium sulphate. This was then collected on a filter, dried, and weighed in the usual way, and from this the amount of sulphur present in the paper calculated.

The chloride of silver on the filter was then dissolved out with ammonia, and precipitated by means of nitric acid, filtered off and treated in the usual manner.

The figures obtained are as follows:—

1.	Weight of sulphur in original paper	·0050	grammes.
2.	„ in water adhering to paper	·000032	„
3.	„ in paper fixed but not washed	·2243	„
4.	„ after 5 minutes' washing ..	·0063	„
5.	„ 10 „ ..	·0045	„
6.	„ 15 „ ..	·0048	„
7.	„ 25 „ ..	·0044	„
8.	„ 40 „ ..	·0043	„
9.	„ 60 „ ..	·0046	„
10.	„ 90 „ ..	·0047	„
11.	„ 120 „ ..	·0045	„
12.	„ 19 hours „ ..	·0047	„

The amount of sulphur in original paper has been subtracted from results 4 to 12 inclusive.

1	Weight of silver in paper unfixed....	·0734	grammes.
2	„ „ fixed but not washed ..	·0086	„
3	„ „ after 5 mts. washing	·0051	„
4	„ „ „ 10 „	·0035	„
5	„ „ „ 15 „	·0037	„
6	„ „ „ 25 „	·0037	„
7	„ „ „ 40 „	·0033	„
8	„ „ „ 60 „	·0036	„
9	„ „ „ 90 „	·0038	„
10	„ „ „ 120 „	·0040	„
11	„ „ „ 19 hours „	·0039	„

From these figures it will be seen that after five minutes' washing 97·2 per cent. of the sulphur originally present has been removed, after ten minutes 98 per cent., and that, however long-continued the washing, no more of the sulphur can be eliminated. Turning to the silver, we find that as the paper comes from the fixing bath it has lost 88·3 per cent. of its silver; after washing for five minutes, 93·1 per cent.; and, after 10 minutes, 95·3 per cent. After ten minutes' washing the amounts of silver and sulphur remain constant.

It is evident from these figures that the permanency of a print does not depend so much on the washing it receives as on its thorough fixing; and we are strongly of opinion that the best way of removing all the silver is not by using two baths of hypo in succession, but by washing for about five minutes after the first bath, and then soaking in a second fresh bath of hypo.

In what form the silver occurs in the paper, whether as the insoluble $AgNaS_2O_3$, or the soluble $Ag_2Na_4S_2O_3$, held in a sort of "loose combination" with the films of the paper, we are unable to state. However, the fact remains that, after a more thorough washing and fixing than prints generally get, ·246 of a grain of silver remains in each 22 × 17 in. sheet of paper; and this, which is probably in the form of hyposulphite in the presence of light and organic matter, is reduced to silver sulphide, and will easily account for the yellowing of the whites of prints after a time.

We had hoped to determine the silver and sulphur in gelatino-chloride paper, and the silver in paper that has been treated to several baths of different composition; but, owing to the length of time required to carry out these experiments, we have been obliged to defer the investigation of those points for a future occasion.

F. B. Grundy and A. Haddon.

PRACTICAL REMARKS ON PHOTOGRAPHING DIFFICULT INTERIORS.

III.

In previous articles I referred to various classes of interiors, the photographing of which was possible by means of daylight. In numerous cases, however, a worker has to undertake subjects in situations where not a ray of daylight enters, such as dark vaults or underground workings, bonded stores, and many similar places frequently to be met with in all large cities. When such have to be dealt with, some system of artificial lighting has to be resorted to, and, with proper arrangements, made beforehand, and the adoption of a suitable method of illumination, most excellent results are obtained in situations where darkness alone prevails.

Somewhat recently it has fallen to my lot to photograph a good many of these subjects by means of artificial light, and I hit upon a plan or system of working that has yielded most satisfactory results.

What is known as the modern system of flashlight photography or mode of lighting is not so well adapted for photographing large spaces, such as caverns, bonded warehouses, vaults, &c., as for such subjects as small rooms, or objects situated somewhat near the camera; but when interiors, such as those having a great depth, as many of the bonded warehouses and other similar classes of subjects often have (for frequently as much as hundreds of yards in length have to be dealt with), then recourse has to be had to a different method of lighting.

In undertaking dark interiors of any great extent, one of the chief factors towards success is ventilation, or the obtaining of good currents of air. When such exists, a worker is at once master of the situation; without such, considerable difficulty is liable to ensue. The question of ventilation is most important, and whenever such can be improved, or aided even to the slightest extent, a worker should never neglect to do his utmost to assist in getting up a good current of air.

I have known instances, when the atmosphere was dull and heavy outside and no wind blowing, that it was quite impossible to undertake such work in difficult situations, and a postponement had to be made until not only a windy day, but a day when the wind came

from the desired quarter, for not only must the air currents be sufficiently pronounced, but they must be passed in the proper direction. A very useful little instrument, which in my hands has proved of great value in this work, is the anemometer. With its aid the faintest current of air can be detected.

The reason for so much attention to currents being necessary will become at once obvious to those who understand the necessity of guarding against the overlapping of smoke generated by the burning of the illuminating agent or powder. And when it is considered that at times prolonged exposures are required even with artificial light, to get which considerable quantities of powder have to be consumed, very large volumes of smoke are thrown off, and, were such to get wafted forward or in front of the lens, the result would be failure. Hence the importance of carefully studying the air currents, so that all smoke caused by the burning of the illuminating powder be carried backwards, and thereby not interrupt the view.

I have said in some cases prolonged exposures require to be given. By this I mean long exposures when compared with modern ideas of flashlight. In some instances, where deep penetration into dark recesses had to be dealt with, I have burned large quantities of powder in varying situations, the time occupied in the combustion being several minutes. This means large volumes of smoke being given off, but when such was carried outside the field of view no harm resulted.

A worker who undertakes this class of work should provide himself with several well-formed metal saucers, not too high at the sides: they are most useful for burning the illuminating powder in, and prevent all possibility of danger from the ignition of the powder. They are very necessary, for in this kind of photography it is a great comfort to be able to feel that, no matter how much slow-burning powder has to be used, or what extent of flare or blaze takes place, that there is absolutely no cause for anxiety during the time such is blazing merrily away. When all has been carefully arranged beforehand, and an operator knows for certain that there is no danger from fire, the work is done with comfort. On the other hand, if gone about with makeshift arrangements and apparatus, such as burning the powder on a plate or piece of wood, it is just about ten to one, long before the powder has burned itself out, the worker will have seen something to set up a proper fright, not only as far as he is himself concerned, but all others who might happen to be near. With proper metal saucers, securely situated, there is no need for fear.

I have said that the magnesium flashlight is no use for these dark interiors. After a good many trials I am convinced there is no mixture better suited for prolonged exposures than what Messrs. G. Mason & Co., of Sauchiehall-street, Glasgow, specially supply for this purpose. Of what it is composed I am not aware. All I know is, Mr. Carmichael, so long connected with the chemical department of this firm, has the formulæ, and will at any time prepare freshly made up samples for those desirous of photographing by its means. The light yielded is most brilliant, second only to the magnesium; its great fault is the large quantity of smoke thrown off; but, as I have referred to the manner of driving this outside the field of view, this objection can be set aside.

Let me now describe somewhat briefly the *modus operandi* of photographing a dark vault with the aid of the powder referred to.

In the event of the vault being of any great depth, a considerable quantity of powder will be required; possibly one and a half pounds, divided into three portions of half a pound in each saucer, will not be too much to employ. At the outset it is well to understand that a liberal supply of ammunition is always advisable, and, if it seems that the quantity employed is burning too long, the error is on the safe side, and can be easily remedied by capping the lens when the time is judged sufficient. Therefore never stint the supply of powder; it does no harm, and can be allowed to burn itself out.

As a rule, three lights will not be found too much, and, when such are used, the utmost care must be observed that they are placed behind the camera, or, rather, in no way in advance of the lens. Very good results are obtained when two side lights are burned at equal distances apart from each side of the camera a few feet behind the line of the lens, whilst a third is placed on a higher level—say, several feet above the camera, and, of course, somewhat behind it. An ingenious worker will have but little difficulty in rigging up convenient supports to hold the saucers containing the illuminating powder. A very convenient article to use for the rear centre light is a set of house steps, whilst a few old boxes piled one on top of the other serve admirably for the side lights. It sometimes happens that advantage can be taken of certain situations where lights are capable of being burned in advance of the camera at some distance forward. Care, however, must be taken that such are well screened from the lens, and the light from such only projected forward or on to the side; in all cases, however, the smoke must be carefully thought of, guarded against, and currents of air arranged to waft it away from the view of the lens.

All these arrangements should be judiciously gone about with the aid of lamps or other suitable lights, and, when the camera is brought into play, the focussing should be carefully done with the aid of a lamp, the flame of which makes a capital object to focus on. The lamp can then be moved about, and the amount of view included in the picture easily seen on the ground glass when the lamp is placed on both sides of the view. In all interior work wide-angle lenses are most useful, and I have found that, when using such in conjunction with artificial lighting, a more open aperture in the lens is required than would be the case when operating in daylight; even with *f*-16 or *f*-22, it is almost impossible to over-expose a dark interior when using artificial light. In all cases my best results have been got with the lens working with the fullest possible aperture; with such a quantity of powder as I have stated, viz., one and a half pounds divided into three portions, the illumination will be very brilliant, and a most actinic light produced from this excellent mixture; the duration of time which each separate quantity will take to burn varies very little, each portion, if carefully built up in a cone shape in the saucer, will most likely take from forty-five to sixty seconds to burn itself out, and such should yield a fully exposed negative on most dark interiors.

Now as to plates. I have recently made a series of tests on ordinary and isochromatic plates, and was surprised at the difference in results obtained. To get at the best plate to employ I made several exposures with two cameras, under precisely similar conditions as to aperture of lenses; in all cases both kinds of plates were exposed simultaneously to the same light, and the cameras were placed almost side by side. The best results were obtained on fast isochromatic plates, backed with asphaltum. The brand I used was Ilford, although it is quite possible other isochromatics would have shown the same result. The difference, however, in favour of the isochromatic plate over the ordinary bromide was most marked, and really, in some instances, astounding. In all cases, however, the best results were got when nearly the full aperture of the lens was used. This being the case, the focussing requires especial care; but, when drawn well forward and the lamp is used to focus by, excellent results are obtained when using a lens that well covers the plate.

When all is in readiness for the lights to be burned, it is well to call in the assistance of a couple of friends, and, with the lens uncapped and the shutter of the slide drawn, proceed to deliberately instruct the assistants what to do. I know of no better way of setting light to the powder than by the means of the good old fusee; any tobacconist will supply a box for a copper. Hand one each (I mean a box full) to each of the assistants, and proceed to say, "Take fusee." They reply, "Yes." Then give the order, "Light fusee." They reply, "Yes." Then give the order, "Place fusee in powder," and they reply, "Yes," at the same time dropping it neatly on the top of the powder in the centre of the cone. When this is systematically gone about, the three lights will blaze up at the same moment, and second after second gain in intensity, until the vault is lit up in a most wondrous manner, the lights continuing to burn with great brightness for about a minute, according to the quantity of the powder used. And now, at this stage, a worker will appreciate the need of giving some thought beforehand to the ventilation and air currents. Dense volumes of smoke will be thrown off from each light; but, if the currents waft the smoke to the rear, all will go well, and all in front of the camera will be one blaze of brilliant light; but, should by any oversight a door or window be left open whereby the air currents are interfered with and the smoke overlaps forward, all your labour is lost, and the work must be done over again.

Some little thought should be given to the position of the lights so as not to cast too dark shadows, but carefully worked out. Negatives quite equal to daylight exposures will be obtained.

The main points to give heed to are first the air currents. Secondly, a liberal supply of powder burned in suitable positions slightly in the rear of the camera. Thirdly, use a liberal supply, and light the different saucers simultaneously. The cone shape of the powder is easily obtained by pressing on the top of powder a cup or basin.

T. N. Armstrong.

THE PLYMOUTH COVENTION: REPORT OF THE DELEGATES OF THE PHOTOGRAPHIC CLUB.

[Read at the Club, August 2, 1893.]

The Photographic Convention of 1893 has come and gone. To sum up its results in a few words, we may say: Socially it has been a success; from a photographer's point of view, a failure.

Without precise instructions from the Club as to our duties, we have concluded to state our personal opinions for what they are worth, and to give you a brief diary.

The actual programme has, doubtless, come before you, the press having given full publicity to it, as also to the Convention papers. Our part we conceive to be to give you a personal report.

To us the most noticeable feature was a poor attendance. This is a matter for regret. That a gathering which promises and supplies such exceptional opportunities for recreation and intercourse should not be able, out of the thousands of amateur and professional photographers, dealers, &c., to attract more members, is a matter which merits the serious consideration of the Committee of the Convention. We are inclined to attribute much to the date of meeting, and to hold it a cardinal error to have fixed upon one of the busiest weeks of the year, the week of half-yearly accounts, when a majority of business men are intent upon the adjustment of their books. An inconvenient date is not only unfortunate for those unable to go at such a time, but it is even more so for others who, intending to meet old friends, attend, and are disappointed.

There is still another grumble to which, as Englishmen and your delegates, we feel entitled. It is the continued folly of attempting to do too much in one week—too much on each day. The Committee should have experience enough by this time to know that photographers do not want a week of hurry-scurry, but a holiday, and also that most photographers like leisure and opportunity to take pictures when they take their pleasures, even if they take them sadly—the pleasures, not the pictures, which, by the bye, is not characteristic of Conventioners. This year the opportunities were too few, and this was the more tantalising because the pictures were there in abundance, and only leisure was required to work. In fact, an 1893 Conventioner's diary might read as follows:—

Monday.—Journey down. Pleasant day in train. Gloated over a large supply of plates.

Tuesday.—Boat excursion. Rain saved plates.

Wednesday.—Listened to Convention papers. No exposures, but exercised changing box in the bedroom at night.

Thursday.—Excursion through fine country. No stops, so saved plates.

Friday.—Good boat excursion. Reaction too much. Shot plates at everything and anything.

Saturday.—Rail home with, unexposed plates.

Result.—Severe economy in plates.

And now, abandoning this sad hypothetical case, we descend to the Conventional—one week's work.

Monday.—We arrived just in time to dress and rush to the open meeting and reception. This function, honoured by the presence of the Mayor of Plymouth, was held in the Art Gallery, the rooms of which, though small, are suitable and convenient. Here was contained the Exhibition, without which—but for some reason which to your delegates is inscrutable—no Convention is complete. About fifteen firms were represented, and enlargements predominated. There were no noticeable novelties, and it would not have been a matter of any difficulty to select the best exhibit. The Mayor welcomed us in a hearty speech. Then the general President of the Convention, Mr. George Mason, followed with his address—practical, lucid, and Scotch. Afterwards lantern slides were shown upon the screen. Amongst the exhibitors were Major Lysaght, Messrs. York, Cembrano, Hindley, Welford, &c., and many of the slides were exceptionally good. After the formal meeting was closed, an informal adjournment of the male Conventioners was made to one of the local hotels. The fragrant weed and social glass, the merry quip, jovial song, and the tall (and still growing) yarn made all present forget that time was flying, and that the pleasant labours of the morrow called for refreshing sleep.

Tuesday was to have been the day of days, when, as the guests of the local clubs, who treated us most hospitably, we were to have enjoyed the pleasure of a steamer trip in the waters in and about Plymouth. Unfortunately, rain interfered, and somewhat marred the excursion. Still, we adhered to the programme, and it is high testimony to the efforts of Mr. Hansford Worth, the local Secretary—to the beauty of the surroundings and to the jolly dispositions of Conventioners—that, the rain notwithstanding, we enjoyed the trip.

Wednesday was devoted to business meetings, photographing the group of members—always an important function with Conventioners—and the reading of papers. Threatening at first, the weather became finer as the day wore on, and, with its change in mood, Conventioners were drawn away from serious considerations to enjoy the sunshine and the surroundings. The photographing of the group concluded, and lunch discussed, papers at the Art Gallery became the order of the day; but the Gallery was sultry and oppressively hot, and the attendance of members—never large—became smaller by degrees and beautifully less, whilst the temperature rose by tens of degrees.

We think that, if the Convention is to remain anything more than a social and photographic outing, the arrangements for the reading, discussion, and reporting of papers at the Convention will have to be revised. Except so far as the publicity of the press is concerned, the meeting for the reading of the papers was a fiasco. Too many were attempted; consequently it was a rush against time. The discussions were inadequate, and the reports of the discussions, to our mind, very incomplete. Why cannot the Convention issue an official report of its own, after the manner of the Photographic Club?

On the Wednesday evening there was another reception—at Devonport this time—another lantern show, and more papers. The first discussed, *à la* tea and coffee, the papers taken as read, and the lantern show, a lucid interval.

Thursday.—The Royal Wedding-day. The favourite excursion was that to Totnes by rail, thence by steam launch down the Dart to Dartmouth, thence by rail to Plymouth. As a trip to see the country, charming; but, for photographic purposes, the excursion was disappointing. There was no opportunity, save a brief one in Dartmouth after lunch, for taking pictures. Like the restless spirits of which we read in Dante, we were driven at high speed from place to place; no photographic opportunity was ours.

In the evening there was a meeting for papers, but the Wedding festivities on the Hoe and in the Sound prevailed. Like truth, which is also said to prevail, they were great. The view from Plymouth Hoe is a lovely one at all times, but on this special occasion, with the ships illuminated, bonfires on the surrounding hills, search-lights from the men-of-war in the bay, and jollity all round, the sight was most impressive.

Friday.—Three excursions divided the Conventioners. Those who with your delegates decided to visit the Cuttewater Hooe Lake and the Sound had the most pleasant excursion of the whole Convention. The steamer at our disposal was commodious and convenient, and we had ample opportunity of making exposures to our hearts' content; we thoroughly enjoyed ourselves.

In the evening the Convention dinner was successfully carried out. Afterwards music and recitations completed a very pleasant and enjoyable day and practically brought to a close the 1893 Convention.

Saturday.—All excursions were abandoned for this day. This gave us the opportunity to roam about the quaint streets and quays of Plymouth as we liked, and we obtained some of the best pictures on this last day.

In bringing our report to a close, we hope to see the Convention strengthened by certain alterations in the arrangements.

Besides, the points to which we have already alluded as requiring attention, viz., a more convenient date, an official or authorised report, we think there is still too much attempted in the time at the Convention's disposal, too many items of interest crammed into the week. As regards the excursions, the general Committee might make suggestions to the local Committee embodying the general experience of previous meetings and the requirements of the members. A local Convention Committee must always, and of necessity, be inexperienced as far as the requirements of Conventioners is concerned, for we meet but once and then pass on. But in the general Committee wisdom must have accumulated by now! In addition, we believe it would be to the general advantage of the business portion of the Convention—by which we mean the papers and discussions—were taken all together, *de die in diem*, instead of being sandwiched, as now obtains, between distracting entertainments.

And now, in conclusion, let it not be said that we are not grateful for the efforts made to please us. The energetic Local Secretary, Mr. Hansford Worth, and the local societies whom he represented, are to be congratulated on having beaten record for hearty and well-directed hospitality. Towards our Plymouth hosts and friends, if they will permit us the familiarity, we can only have sentiments of gratitude for the successful efforts which they made to entertain us, and their kindness will ever be one of our most pleasant recollections.

We have but one word to add—a member of this Club is the Hon. Secretary of the Convention. Mr. Cembrano is the right man in the right place, and to him the success of the Convention is largely due. We find it a pleasure to be allowed to express what we believe is the universal sentiment amongst Conventioners, hearty thanks for his energetic work in the past, and the hope that he may long stage-manage our photographic holiday.

We trust, gentlemen, that we have carried out our delegation to your satisfaction, and we hope that next year you will be able to dispense with such services by attending the Dublin Convention *en bloc*.

(Signed) J. Guardia,
S. Herbert Fay.

CONFERENCE OF JUDGES OF PHOTOGRAPHIC EXHIBITIONS.

The following is an official report of the late meeting of Judges :—

It having been decided by the Committee of Delegates of Affiliated Societies that it was advisable to hold a conference of Judges of photographic exhibitions to agree upon certain lines of action to be followed in judging, and to offer suggestions for the guidance of societies with regard to exhibitions, a committee was appointed to carry out the necessary steps for calling the same together, and a circular letter was forwarded to thirty-eight gentlemen whose names were well known as Judges, and an invitation to attend the meeting was addressed through the columns of the photographic journals to anyone who had acted in that capacity at least four times at open photographic exhibitions.

Permission having been obtained from the Council of the Photographic Society of Great Britain, the meeting was duly held on Tuesday, June 20, 1893, at the Society's rooms, No. 50, Great Russell-street, W.C. Captain W. de W. Abney, C.B., R.E., D.C.L., F.R.S., P.R.A.S., in the chair.

It was at the outset agreed that the decisions should take two forms: (*a*) Rules which those present should consider as binding upon themselves, and without the observance of which they should refuse to judge; (*b*) suggestions, which should take the form of recommendations to committees or other bodies who may have in their hands the organization of exhibitions.

Both the rules and suggestions were carried in most cases unanimously; in no case did the minority against any rule exceed two.

(*a*) Rules.

1. The Judges' decision shall be final.
2. The Judges shall have full power to withhold any award.
3. The Judges shall have power to exclude all persons from the room while judging.
4. The Judges' expenses shall be paid.
5. It shall be stated in the prospectus that the awards are placed *in the hands of the Judges*, or *at the discretion of the Judges*.
6. The Judges shall not adjudicate upon pictures exhibited as produced with wares of special trading firms.
7. Pictures which have previously taken awards at open exhibitions shall be classed by themselves.
8. Each picture of a set which has been collectively medalled shall be considered for competitive purposes to have received an award.
9. An award shall be made to one picture only except where, from the nature of the subject, the picture bears an obvious relationship to one another.
10. There shall be no distinction between amateur and professional.
11. No production of any kind whatever from the same negative shall receive more than one award, except as defined in Rule 7. This includes lantern slides, enlargements, &c.
12. No award shall be made to a lantern slide until it has been projected on the screen.

(*b*) Recommendations.

13. When Judges have to spend the night away on account of distance, they should not be lodged at the house of a competitor.
14. The Judges should have power to give extra awards where they may think fit.
15. In order to enhance the value of awards their number should be limited.
16. The Exhibition Committee should not accept offers of awards from trading firms.
17. The number of classes should be kept as small as possible.
18. No award should take the form of a money prize.
19. No exhibit at the same exhibition should receive more than one award.

NOTES ON A TOUR IN THE HIMALAYAS AND ON THE NORTH-WEST FRONTIER.

I.

Having just returned from a seven months' tour in the Himalayas and on the Affghan frontier, in which photography was my main object, perhaps a few notes on my experiences may not be uninteresting to others who are thinking of taking their cameras with them to distant countries.

The first consideration must always be the size of the plate to be taken. The more certain a man is in his results, the larger the plate he can take, naturally will give him the finest picture. It is worth while, for instance, for Signor Sella, whose most exquisite Alpine photographs so far surpass all others, to take with him to the Caucasus 120 15 × 12 plates, for he knows he will bring back 120 good negatives, and the extra weight and difficulty of carriage involved in using these large plates is amply repaid by the perfection of the result. I would, then, always advise any one aiming at high results to take with him the largest plates that he can, and the size of his plates will depend then, first upon his confidence in himself to produce good results, and secondly in the equally important question of carriage. In journeys off the beaten track one's means of transport always consists of either mule carriage or coolies, and the loads have often to be made up so that they are capable of being carried either by one or the other as they may offer. A mule in the Himalayas will carry 160 lbs., and a coolie 50 lbs., the former costing 12 annas a day (say 1*s.*), while the latter get 4, 5, or 6 annas a day according to the length of the march. Mules, consequently, are rather cheaper, and, being hired for a fixed period, the use of them avoids the daily bother of engaging coolies. Against these advantages you have the facts that the mule can only go where there is a mule road; secondly, that you carry many more of the precious eggs in one basket; and, thirdly, that on the rough hill paths coolie carriage is much safer than mule carriage. Never once did I see any of the wild hill men ever falter or stumble on the worst of paths, and his load on his back was as carefully carried as himself; whereas the frequent sight of the string of mules staggering down a steep hillside, bumping their loads against overhanging rocks, plunging over the slippery boulders as they forded the stream and scrambling in rushes up the stony opposite bank, was a picture that often made one tremble for the fate of one's plates.

Many will say, Why not avoid all this by carrying celluloid films instead of glass plates? and I must confess that, after my own experience, I find it extremely difficult to give any definite reason, except that I fancy, and it may be only a fancy, that on the whole there is less liability to error in working with glass plates. My experience in this trip was confined to six dozen whole-plate films and eighteen dozen whole-plates. The weight of the former is 4 lbs., the weight of six dozen of the latter 27 lbs. The films require no packing, they are most easily taken out of their envelopes, one by one, as required, exposed, and put back with the same ease, whereas the hours spent by night in one's tent after a long day's march, taking plates out of the slides, numbering, packing away in their paper wrapping and boxes, unpacking the fresh plates (which are always required in broken numbers), and filling the slides, will never be forgotten. It used to take me two hours to get this properly done, and yet, in spite of all this, when it comes to developing the negative in the dark room, I am always hopeful of better results from a plate than from a film. The chief practical difficulty with a film is the want of a really good film-carrier, which, while simple and easy to use, will keep the film absolutely flat. After searching in vain for this in London, I went without any carrier, simply trusting to the dryness of the Indian air to keep the emulsion side of the film concave, while a thin sheet of wood backing (such as used formerly in Eastman paper negative carriers) nipped the edges of the film against the rebates of the slide and pressed it flat. A detail must, however, here be noted, that the single spring, as fitted to most metal dividing flaps of the dark slides, must be removed, as its pressure will bulge out the thin wood backing and the film in the centre, and springs on each edge, to press against the rebate of the slide, must be substituted.

This arrangement will answer in a dry climate, with sizes up to whole-plate, though, in spite of special care being given to putting the films in quite flat, two or three of my film negatives were much spoilt owing to the buckling of the film throwing certain portions of the emulsion out of focus. I used glass plates as a rule for the most difficult and delicate scenes, and the films (which were more rapid) for strong and close subjects; and, though I fancied that the films were less successful in the difficult subjects, yet I must admit that many of them are quite as beautiful in detail and delicacy as those on glass, and, given a good film carrier, there ought to be no reason why a well-coated film should not equal a well-coated glass plate.

The size of the plates that I took was whole-plate; perhaps the most suitable all-round size, though, as I said before, I regret sometimes, in view of the negatives that I brought back, that I did not take a larger one.

(*To be concluded.*) F. St. J. Goad, B.A.

Our Editorial Table.

Adams & Co's. View Meter.

This view meter is so constructed as to show any reasonable width of angle of nature set in a square frame. The lenses (a convex eye-piece and a concave field glass) are so adjusted as to show the scene with sharpness, the amount shown being determined by the drawin

out of the sliding tube containing the lenses. It is adaptable for various lenses. The directions for using it are to unscrew the larger ring, when the sliding tube can be easily withdrawn to distance required. Then focus a view on the focussing screen of camera, noting exactly how much the lens takes in; then look at the same object through the view meter, and slide the tube until it shows the same

amount of view as appears on the camera screen; then scratch a mark on the tube, and make a note of the lens it refers to. Each lens can be registered on the tube in this manner. The sliding tube is fixed by screwing up the larger ring. The above is, of course, only necessary in order to register the user's various lenses; as, when once done, it is merely necessary to use the view meter by setting it at the various marks to see which lens is the most suitable.

This view meter shows at a glance, and without necessitating the setting up of the camera, precisely how much of a scene will be included in the picture to be produced by any given lens, and it forms a handy pocket appliance for seeing pictures in natural scenery, even when one has no camera with him at the time.

The Eastman Company's Mounting Mediums.

There are two classes of this admirable mountant. One of these is in a semi-pasty condition, and when applied to a print secures it to the mount with extreme tenacity. The other is of a more gelatinous character, and the directions for its use are to place the bottle containing it into hot water until the medium is quite liquid, then apply to the back of the prints, which must be quite dry, with a stiff brush. They are put up in wide-mouth bottles with screw-cap metallic covers.

News and Notes.

Manchester Photographic Society.—August 12, Alderley (Ramble)

Northern Photographic and Scientific Association.—August 12, Chigwell.

Photographic Club.—August 16, *Home Portraiture*. 19, Outing to Ongar.

Hackney Photographic Society.—August 15, *My Toning Bath*, by Mr. W. D. Welford.

Gosport Photographic Society.—August 19, Carisbrooke. Leave Portsmouth Harbour at twenty minutes past one.

The London and Provincial Photographic Association has printed and issued a list of members, the number of the latter being about 150.

London and Provincial Photographic Association.—August 17, Delegate's Report of the Photographic Convention of the United Kiogdom.

Messrs. Percy Lund & Co., of Memorial Hall, E.C., have issued a catalogue of apparatus and materials for process work. It is fairly complete, and should prove useful to process workers.

Manchester Amateur Photographic Society.—August 12, Warburton and Ship Canal. Leader, Mr. Drinkwater. Train, Oxford-road Station, five minutes past two. (Book return to Heatley.)

We have received the new edition of the *Traité Elémentaire de Photographie*, by M. G. de Raymond (Paris: Albert Aivas, 39, Rue Vivienne). It is a clearly written and concise guide for the beginner, who should find it extremely useful.

Newcastle-on-Tyne and Northern Counties Photographic Association.—Next Out-door Meeting to Alnwick on Thursday, August 17, under the leadership of Mr. M. Anty. Train leaves Newcastle at twenty-five minutes past nine a.m. for Alnwick.

Leytonstone Camera Club.—August 12, Richmond Park. Leader, Mr. Aubrey Thompson. The Club will proceed by the train leaving Waterloo, L. & S.W.R., at three o'clock, arriving at Richmond twenty-one minutes past three. Open Social Evening at headquarters, eight o'clock.

Mr. Williams R. Kennan has taken larger premises at No. 41, Grafton street, opposite Chatham-street, Dublin.

Mock Suns.—Mr. M. Glover, of 124, Stephen's-green, Dublin, writes to *Knowledge*, enclosing two photographs of a mock sun which he observed at Dublin on the evening of June 30 last. The phenomenon was first noticed about half-past seven p.m., and remained visible for about twenty minutes. The photographs were made with very short exposures, and show the sun's disc seen through cirro-stratus cloud, with a spurious image of the sun also seen through clouds at a distance of about 25° from the sun, and at about the same altitude above the horizon. A similar image was seen by Mr. Glover on the left hand of the sun, but it had faded away before the photographs were taken.

"Photographic English 'as She is wrote.'"—The following circular refers to a new French print-out paper recently put on the market. It is conceivable that some French instructions compiled by English writers may read just as quaintly. "With this sensibilised paper, whose manipulatiou is easy and speedy, you obtain proofs giving vigour, depness, and fineness. Warm hot-pressing, the proofs are more beautiful than those made with albuminized paper. Dry on an ebonite or ferrotype plate, it gives an enamelled surface. Dry on a depolish glass it gives a dead surface as nice as the platina. Every way of virago in use for aristotypique paper can be utilised, nevertheless we recommand the combined virago. You can préserve it several months in taking care to keep it off from ligth and dampness, and carefully put it again in the pocket like we deliver it. Do not care of the slight yellow colour that can get the paper, because that desappear to the fixage."

Messrs. Taylor, Taylor, & Hobson write: "Frequently within the last few months we have received complaints of instruments being sold as of our manufacture when they proved to be otherwise. In some cases the goods were misleading copies of our instruments, and in others they had been represented as ours through misunderstanding and want of care. It is our unvarying practice to engrave upon every lens we issue our name and address and a registered number, and no lens is genuine unless so marked. Upon such small instruments as our circular spirit levels, however, on which it is not convenient to do this, we now impress our newly registered trade mark, of which we enclose an example. This contains the firm's initial, 'T. T. & H.,' upon one heart with a finely engine-turned ground, significant of the precision in mechanical practice which we study to observe. The whole is surrounded by a circle, that which is without beginning or end, a symbol of perfection, which is our aim."

Secretaries of Societies may derive a hint as to subjects for discussion from the following list, which recently constituted the "Question-box" Meeting of the Manchester Amateur Photographic Society:—1. In developing a plate, how is it known when the proper density has been obtained? 2. Why should prints from stereoscopic negatives require to be transposed—*i.e.*, left to right and *vice versâ*? 3. Which is the best backing to prevent halation? 4. How can halation be avoided in interiors and woodland views without backing, and should the plates be over or under-exposed? 5. Does halation ever occur in films? 6. What quantity of water should be added to a saturated solution of hypo for fixing (*a*) plates and (*b*) prints? 7. Can any member show how to mount prints without the mountant appearing either upon the surface of the print or upon the margin of the mount? 8. What is a practical way of binding a lantern slide? It sometimes takes me twenty minutes to bind a single slide. Will one of our lantern-slide makers say a word on the subject, and show how it is done? 9. Has any member used the new "printing-out lantern-plates," and with what result? 10. Why is it recommended to add ammonia to the fixing bath for prints? 11. Wanted a *simple* toning formula. 12. Which is the best snap-shot developer—pyro, eikonogen, amidol, or metol? 13. What is the best developer for bromide enlargements? 14. What is the best method of drying a negative quickly? 15. How are over-exposed prints on P.O.P. to be dealt with before toning? 16. I sometimes perpetrate an alleged "portrait," but find that the "sitter" is disturbed either by the removal of a lens cap or the *click* of a Thornton time shutter. Is there any simple method of working a *cheap* and *noiseless* arrangement behind the lens and *inside the camera*? I should be glad if those of our members who devise "home-made" apparatus from time to time would turn their attention to this, and give the results of their labours?

RECENT PATENTS.

PATENTS COMPLETED.

Improvements in Photography.

No. 11,175. Henry Van der Weyde, 182, Regent-street, Middlesex. *May* 13, 1893.

My invention relates to an improvement in photography, particularly portrait photography, and has for its object to enable the photographer to idealise, to a certain extent, the subject without sacrificing the fidelity of the portrait, and so remove the artistic reproach under which photography has always suffered, that it is incapable of foreshortening without exaggeration (*e.g.*, a hand or foot extended towards the camera) and cannot give that appearance of dignity to a figure which a master in portrait-painting is able to impart by slightly enlarging, reducing, or otherwise modifying, certain portions of the figure.

My improvement, therefore, has for its object not only to enable the proportions of certain parts of the subject to be varied, for instance, to reduce the size of a lady's head, or increase the length of her neck or waist, or of the

skirt of her dress, or to lengthen a gentleman's legs, for the purpose of imparting greater dignity to the figure, but also to correct the distortion due to the effect of foreshortening, or to produce other effects, whether artistic or grotesque—such, for further example, as to cause the apparent rotundity of an obese figure or face to be diminished, instead of being exaggerated, as is usually the case in a photograph, or the size of the hands to be diminished, or the fingers to be lengthened or tapered, or the eyes to be enlarged and the size of the mouth to be reduced, without necessarily altering the shape, size, or expression, or changing the character of the other features, or sacrificing the likeness of the portrait, all these artistic modifications being quickly effected and visible to the manipulator, so that their effect can be readily appreciated, the degree of modification obtainable being almost infinite.

It is preferable to apply my invention in the copying or enlarging of an ordinary transparency, negative, or photograph, with which comparison of effect may be readily made with a view to avoid undue distortion, but the invention is equally applicable while photographing the original subject.

For the purposes of caricature, the image can be so distorted as to produce the most comical effects, such as exaggerating the head, diminishing the lower member or lengthening or broadening the whole figure, or contorting it into eccentric attitudes.

In landscape photography a great variety of artistic effects may be obtained according to the direction in which the distortion is effected; for instance, a picture of ordinary landscape proportions can be photographically distorted or altered in its proportions to fit any frame, even an elongated upright panel, without losing any of the details.

The method whereby these modifications or distortions are effected consists in interposing between the subject (whether it be a person, landscape, picture, photograph, or negative, to be copied or enlarged) and the photographic lens, or between the lens and the sensitive plate, of a transparent medium having lens-like properties, so as to vary the direction of the whole or any portion of the rays of light according to the effect to be produced.

The curvature of the lens-like medium would, of course, depend upon the effect it is desired to produce; for instance, for the purpose of varying the relative proportions of the whole or part of the image, say, the lower half, in one direction only, the curvature of the lens would be in one direction, but for altering the proportions, or changing the shape of the isolated details, lens-like surfaces of spherical, oval, regular, or eccentric curvature would be used, and, to prevent any shadows or lines of demarcation being visible on the picture, the curvatures of the lens-like surfaces would be reversed or otherwise gradually merge with a plane surface, so as to allow the distortion or modification produced by the interposition of the lens-like surface to melt or flow into the surroundings.

For the purpose of varying in a more or less conventional or general way the broader proportions of the subject, I would employ lens-like media formed partly with plane and partly with curved surfaces, such media being formed beforehand and kept in stock for general use.

For this purpose glass plates having curved or partly curved surfaces or lenses cemented to glass plates, or independent lenses supported in any suitable manner, would be used, but for artistically varying the smaller details of the subject it is necessary to prepare a special lens-like medium for each particular subject, and my invention comprises the novel method of artistically preparing such a medium, and the novel application of the material employed for the purpose.

For the purposes of this part of the invention, it is necessary to have a clear transparent crystalline material, whose surface is capable of being easily scraped, engraved, or fashioned by melting at the ordinary, or at a very moderate, temperature, without necessitating recourse to the troublesome operation of polishing.

Amongst other substances available for this purpose, I especially claim the employment of ice in the form, say, of a plane slab of moderate thickness, upon the surface of which I operate by means of tools of suitable curvatures, it being sufficient to apply the tool to the surface of the ice in order to cause the latter to be locally melted by the conduction of heat from the tool itself.

For the purpose of operating on the surface of the ice, the slab would be placed in the same position with regard to the subject and to the eye of the operator as it will occupy in regard to the photographic lens in the operation of photographing, the subject being clearly visible through the slab, so that the necessary modifications of surface may be effected in correct local position to produce the effects desired.

In order to preserve the ice during the operations of working on, and photographing through it, the ice slab would be enclosed in a sort of frame containing a freezing mixture, by which to cool the surrounding atmosphere sufficiently to prevent the melting away of the ice.

My invention further has for its object to impart to a photograph the effect of a line or other engraving, in which the modelled effect is produced by deviations and variations of breadth and spacing of the lines.

For this purpose I prepare, as last-above described, a lens-like surface in correct relation with regard to the outlines and details of the subject of the picture; but, instead of photographing the picture through such lens-like surface, I photograph a surface upon which an engraved line or stipple tint has been printed, the effect being to produce a negative in which the wavy line effects are produced by the local distortion of the lines to correspond to the outlines and contours of the picture, so that, by stripping such negative and superposing it upon the negative of the picture, a compound negative will be formed, in which the engraving effect will be superposed in the form of white lines upon the soft gradations of the photographic modelling, or in black lines by the process of double printing.

Claims:—1. The herein-described process of locally modifying the dimensions of the image in the operation of photographing, copying, or enlarging, by causing the light rays transmitted from a portion or portions of the original subject, negative, or picture, to be refracted through a lens-like medium, interposed in the pencil of rays either before or after transmission through the camera lens, substantially as specified. 2. In the herein-described process, the employment, in combination with a photographic camera, of a refracting plate, having a local lens-like portion, whose curvilinear surface flows or graduates into the plane surface or surfaces of the plate, the plate being interposed in the pencil of rays before or after transmission through the camera lens, whereby to cause certain of the rays to be so deflected as to produce local modification of the image photographed in the camera, substantially as specified. 3. In the herein-described process, the employment, in combination with a plane plate of glass, of plano-convex lenses, whose curvatures are reversed so as to gradually flow into, or merge with, the plane surface of the plate to which they are caused to adhere, as and for the purpose specified. 4. In and for the purposes of the herein-described processes, the method of fashioning a refracting medium so as to produce therein a local plano-concave lens, which consists in superficially and locally melting the plate, substantially as specified.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 14	Darlington	Trevelyan Hotel, Darlington.
,, 14	Dundee Amateur	Asso. Studio, Nethergate, Dundee
,, 14	North Middlesex	Jubilee House, Hornsey-road, N.
,, 14	Richmond	Greyhound Hotel.
,, 15	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 15	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 15	Hackney	206, Mare-street, Hackney.
,, 15	North London	Canonbury Tower, Islington, N.
,, 15	Paisley	9, Gauze-street, Paisley.
,, 15	Rochester	Mathematical School, Rochester.
,, 16	Bury	Club Rooms, 13, Agar-street, Bury.
,, 16	Leytonstone	The Assembly Rooms, High-road.
,, 16	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 16	Southport	The Studio, 15, Cambridge-arcade.
,, 16	Southsea	3, King's-road, Southsea.
,, 17	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 17	Glossop Dale	
,, 17	Hull	71, Prospect-street, Hull.
,, 17	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 17	Oldham	The Lyceum, Union-st., Oldham.
,, 17	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 18	Cardiff	
,, 18	Croydon Microscopical	Public Hall, George-street, Croydon
,, 18	Holborn	
,, 18	Leamington	Trinity Church Room, Morton-st.
,, 18	Maidstone	"The Palace," Maidstone.
,, 19	Hull	71 Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 3,—Mr. T. Bolas in the chair.

Mr. H. M. Steinmetz was elected a member.

Mr. E. H. Bayston showed an example of outdoor photography taken against a plain background, an umbrella being used to cut off some of the top light.

"AMOUNTS OF SILVER AND HYPO LEFT IN ALBUMENISED PAPER AT DIFFERENT STAGES OF WASHING."

A paper on this subject, by Messrs. F. B. GRUNDY and A. HADDON, was read by Mr. GRUNDY [see page 511].

The CHAIRMAN said that members must feel much indebted to Messrs. Grundy and Haddon for their interesting paper, and, as a chemist, he suggested that one could not measure the work involved in the paper by the length of time taken to read it. It threw light on one of those matters which had been in darkness for the last fifty years, as to whether there was a gain by long washing or not. In fact, there was no point in photographic chemistry which had been so badly treated as this. We found people vaguely stating that long washing was supposed to be unfavourable, others that it was favourable. Now we had some real light thrown on the subject. The outcome, as far as the elimination of silver and sulphur was concerned, was that it made practically no difference whether one washed for ten minutes or nineteen hours. He would like to ask how far the pieces of paper had been agitated and pressed in the washing.

Mr. A. HADDON said the water was kept running from the tap, and the paper changed over. At the end only six pieces of paper were left in. There was no danger of sticking together.

The CHAIRMAN said that seemed satisfactory from an experimental point of view. In some systems of washing, pressure was applied, and it would be interesting to know if that would shorten the washing process.

Mr. HADDON had no doubt that, by the use of lukewarm water, five minutes' washing would suffice.

Mr. W. E. DEBENHAM said that the first thing that struck him was that this was the sort of paper which did credit to the Society it was brought before, and it was one that was really wanted in photography. If investigations of this kind had been made earlier, the complaints of the fading of photographs might have not have been so frequent. Short washing was suggested to him (Mr. Debenham) by the fact that his Monday prints did not look so bright as others because they had been left in over Sunday. The long washing seemed to weaken them, and decomposition presumably set in. He then tried shorter and shorter washing, and finally, though he did not come down to ten minutes, he considered that half an hour with occasional changing and squeegeeing would wash a print as well as it could be washed. Much depended on the number of prints, and the size of the vessel, and the amount of movement given to the prints during the time. In Messrs. Grundy and Haddon's case we understood that the movement was thorough. It would be particularly interesting to hear how ammonium carbonate affected the washing—whether

we had salts of silver and sulphur left in the paper after it. He would also join sulphocyanide to the question as to how far that treatment assisted in removing the residuum which, so far, they always got. Now that gelatino-chloride paper was very much taking the place of albumen, to make sure some fresh experiments would have to be made with that; so far, their similarity was very great, and we could take it that what covered one would go a long way with regard to the other.

Mr. A. COWAN thought that the discrepancies shown in Messrs. Haddon and Grundy's tables might be due to the different thicknesses of albumen on the paper.

Mr. DEBENHAM inquired as to the effect of lime in the water. It was said to have a preservative effect, and yet, judging from what had been said as to the effect of traces of sulphate of lime, he would like to know how that came in. Was it capable of decomposition?

The CHAIRMAN did not think the small quantity of sulphate of lime formed would practically affect a photograph.

Mr. DEBENHAM had found that prints treated with lime did last better.

Mr. HADDON observed that, in the cases of Solio and P.O.P., there was a substratum of sulphate of barytes, and that was a very insoluble salt.

The CHAIRMAN said that sulphate of lime was readily reduced by organic matter to sulphide of calcium, which he did not think held good with barytes sulphate. He had known cases where it had not been reduced when in contact with organic matter. Ordinary water when kept in a closed bottle would soon smell of sulphuretted hydrogen from the reduction of sulphate of lime.

Mr. HADDON said it would be useful to submit a certain portion of the paper to a lime bath before toning and fixing, and observe the effect.

Mr. H. M. SMITH said that he knew of one large firm of portrait photographers who always washed their gelatino-chloride prints in warm water, and their prints had stood for a long time in show cases without showing signs of deterioration.

Mr. A. M. LEVY said Messrs. Haddon and Grundy's paper seemed to be entirely satisfactory and conclusive, and bore out the statement of Stas that a great number of silver salts seemed to arrive at a period when you add a quantity of precipitant to the silver salts and no precipitation took place. The only exception was bromide of potassium. Taking the mean of the figures given in the first table, it was ·0037, and thus we might arrive at the conclusion that we had left ·0037 of silver in a piece of paper after washing it. There was a strong tendency of some kinds of salts to adhere to paper, and it was difficult to remove the last traces of them; some alkalies were impossible to remove, cupric oxide precipitated as hydroxide for instance. Silver and sulphur were left in the paper to react on each other. The "action of mass" was favourable to the removal of silver, but they arrived at Stas' point that a soluble compound was not formed, which was probably due to the interfering action of the paper itself. He thought most salts could be removed by prolonged washing. Hyposulphite of silver was really soluble, and should not have more tendency to adhere to the paper than other salts. He should think that if it were really formed they should be able by washing to remove it.

Mr. F. B. GRUNDY thought the "action of mass" might come into play; but possibly the amount of silver was not appreciable enough for that action.

Mr. LEVY replied that there was a mass of hypo compared with the little silver left. A soluble salt was formed which they did not succeed in removing by washing. Was the silver really present as hyposulphite?

Mr. GRUNDY asked, What else it could be?

Mr. LEVY replied, Why not metalloidic silver, formed in the pores of the paper itself? Hyposulphite of silver in contact with a porous substance and with air having every chance of access to it, would most likely decompose, and possibly metalloidic silver and some insoluble compound of silver be formed.

The CHAIRMAN suggested that it might be possible to ascertain whether the silver could be dissolved out. Bisulphide of carbon would not do for the purpose, as traces of sulphur would be formed by its own decomposition.

Mr. LEVY said there might be silver in an allotropic form, when it would not be dissolved.

Mr. DEBENHAM asked if it would complete the experiment if paper without an inorganic substance were sensitised, and, after fixing with hypo, what was left ascertained?

Mr. GRUNDY said it was not certain whether the albumen held the silver, and he had thought of coating plates of glass with it to ascertain whether it was so or not.

The CHAIRMAN suggested the separation of the paper and albumen and the determination of the quantity of silver left in each and the ratios between the two as a rough method. It would be interesting to repeat the experiments on plain paper.

Mr. HADDON said he and Mr. Grundy had that in view, as well as with glass coated with albumen.

After further discussion, a vote of thanks was passed to Messrs. Haddon and Grundy for their paper, the latter gentleman incidentally remarking that the experiments had extended over six months, and that several Winchesters of nitric and hydrochloric acids had been used in them. The experiments, if continuously worked at, would have taken at least a fortnight.

Northern Photographic and Scientific Association.—August 1, the President (Mr. Robins) in the chair.—Mr. F. W. TEVERSHAM read a paper entitled the *Bacteria found in Water*. The lecturer limited his remarks to the morphological characteristics of non-pathogenic or innocuous germs, as he believed that Professor McFadyean would, at a later date, deliver a lecture on pathogenic or disease-producing germs. In his concluding remarks, Mr. Teversham paid a high tribute to the excellent arrangements made by the London water companies, who did all that was in their power to supply the metropolis with pure and wholesome water. The CHAIRMAN deprecated the practice of passing a vote of thanks to a member of the Association, because, he said, in the first place, it was too formal to be sincere; and, in the second place, it would tend to convert the Association into a mutual complimentary Society. Nevertheless, he felt sure that Mr. Teversham had spoken to a very appreciative audience, who would profit by the lesson they had learnt that evening. Mr. TEVERSHAM said he quite agreed with what the Chairman had said, and went on to say that he hoped, at a later date, he would be able to let the Association have the benefit of any further bacteriological experiments which he had undertaken. An ingenious little instrument, the ellipsograph, was exhibited and explained by the inventor, Mr. J. R. Hicks. A patent catch for tripods, the invention of Messrs. Spratt Brothers, was also exhibited. It was announced that the next ordinary meeting will be on Thursday, August 17, when some views in Devonshire will be shown.

Hackney Photographic Society.—August 1, Mr. W. J. Hensler presiding.—Members' work was shown from Messrs. Barnes, Cross, Fort. Haukins Hensler, Nunn, Puttock, and Roofe. Mr. Barnes showed a negative, a portrait, which was spotted all over the face. A member suggested that it was some incipient skin disease, but it was negatived by having the same spots over the eyes. Mr. Nunn showed a bromide paper print developed with amidol, and asked what caused it to have a yellow tint in places (not stains). No satisfactory reply could be given. Question Box: "What action takes place when an exposed plate is first placed in the alkaline solution only, previous to pyro?" Reply: "A mechanical action only, by which the alkali penetrates deeper into the film, so that when pyro is added more detail is ensured." A case lined with ruby cloth from Messrs. Doublet was shown for storing untoned prints. Mr. Hensler showed a lantern plate, of which he had many similar, which, on developing, was veiled over, and which a clearing bath would not remove. It was a special, bought over twelve months ago. Messrs. Cross, Haukins, and Hudson had had the same experience; no doubt they came from the same batch. A discussion then took place as to in what way our Saturday outings might be improved. Some practical suggestions were made.

Brixton and Clapham Camera Club.—August 1, Dr. J. Reynolds, F.R.G.S. (President), in the chair.—Mr. Morgan attended on behalf of Messrs. Fuerst Bros., and gave a demonstration upon the methods of using the new developers, amidol and metol. He advised amateurs to use the separate developer mixed as stated on the instructions issued by the Company. For bromide work the concentrated solution should be used at nearly its full strength if a black image is required, further dilution giving a cold, grey image. The exposure for plates, &c., should be reduced to half of what would be given were pyro used as developer. Very much over-exposed plates tend to produce fog, but it will be entirely absent if the exposure is not excessive. In using these developers to develop plates, bromide paper, and lantern slides, the members of the Club were pleasantly surprised at the entire absence of veiling and stains. Mr. Morgan stated that the hands will not be stained unless the dry chemical is touched. The solutions may be used over and over again, Mr. S. H. Fry having developed as many as twenty half-plates in two ounces. At the conclusion of the demonstration, a vote of thanks was passed unanimously for Mr. Morgan's thorough explanations of the methods of working these developers, and several members promised to take up amidol and report the result in due course. The next meeting of the Club will be held on August 15, when the Paget Plate Company will give a demonstration before the members of the Club. Photographers residing in the locality are cordially invited. One of the Committee of Instruction, Mr. Edwards, will be present to answer any questions upon photographic subjects which may be put by any members requiring elementary information, and it is hoped that all beginners will fully avail themselves of the opportunity thus afforded.

Rotherham Photographic Society.—August 1, Dr. Baldwin (President) in the chair.—Good attendance of members. The business included the competition arrangements for present year. It was agreed that there should be classes for excursion work, untouched negatives, prints, lantern slides, most artistic photograph, and hand-camera views. It was announced that the room in the Rotherham Public Museum, placed at the disposal of the Society for exhibition purposes, had been opened. The work displayed, although somewhat hurriedly prepared, had been very favourably spoken of.

Sheffield Photographic Society.—August 1, Mr. E. J. Chesterman in the chair.—Mr. B. J. Taylor and Mr. E. Beck were appointed delegates to represent the Society on the Council of the Affiliated Societies of Great Britain, after which the prints of the photographic exchange were submitted to a severe but good-humoured criticism, which will, no doubt, lead to good results, and be for the benefit of the Society generally.

FORTHCOMING EXHIBITIONS.

1893.

September 5..... *Royal Cornwall Polytechnic Society, Falmouth. W. Brooks, Laurel Villa, Wray-park, Reigate.

,, 20-21 ..... *Hove Camera Club. Hon. Secretary, H. Emery, 142, Church-road, Hove, Brighton.

,, 25-Nov. 15... *Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.

October 1-31 ..... *Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.

,, 9-Nov. ... *Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.

November 7-11 ..... *South London Photographic Society. Hon. Secretary C. H. Oakden, 53, Melbourne-grove, Dulwich, S.E.

,, 20-25..... *Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.

December ..... *Madras. The Hon. Secretary Amateur Photographic Society, Madras.

* Signifies that there are open classes.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

TELE-PHOTOGRAPHIC SYSTEMS FOR MODERATE AMPLIFICATIONS.

To the EDITOR.

SIR,—It is gratifying to find a communication from another student of tele-photographic systems in your last issue. No one could welcome more cordially than myself suggestions for simplifying technical expressions or interpretations of formulæ into clear language. My thanks are due to Mr. Hancock for this intention.

This gentleman's diagrammatic interpretation of Rule I. given in my paper will serve to impress it upon the minds of all who may interest themselves in the position of nodal points and planes in lens systems. It is needless to say that there are two such points in both positive and negative lenses; but, as we are concerned with only one in each, for purposes of calculation or the construction of the diagram, the second may be ignored, but their positions must be very accurately known and set for practical use.

It has already been shown how very powerfully a *small* difference in the separation of the nodal planes affects the equivalent and back foci. Now, if these positions were very accurately marked upon the mountings, and callipers used to set the separation—after which the calculation or diagram were to be made—I venture to think the labour involved in ordinary practice would be considerably greater than the simple measurement (*i.e.*, back focus) required in Rules III. and IV. already given.

Since writing the paper, I have tried to still further simplify the matter for the average photographic worker who may not have time to devote specially to the study of optics, but who, nevertheless, knows the appearance of an image on the focussing screen, and is familiar with the meaning of "equivalent focus" and "intensity" as applied to a lens.

In the first place, the foci of the positive and negative lenses, or their ratio, only need be known. In the construction recommended the positive is twice the focus of the negative.

Now screw the lens on to the camera, place the screen at a distance from the back (or negative lens) at least the measurement of the diagonal of the plate used (this in order that the plate may be covered), but as much further away as one chooses. The focus for the chosen position of the plate, wherever it be, is then always made by the rack-and-pinion movement on the mounting. In this manner a choice of the amount of subjects included and its size can be made. When this is decided upon, lift aside the focussing screen and measure the distance between its (focussed) position to the cell of the negative lens that projects a short way inside the camera.

Multiply this distance by two (as the ratio between the foci is 2 : 1) and add the focus of the positive lens. This is the measurement of the "equivalent focus."

General Rule to find the Equivalent Focus of any Tele-photographic Lens.—Multiply the back focus (chosen) by the ratio the focus of the positive lens bears to that of the negative lens, and add the focus of the positive.

We have seen that, when the "equivalent focus" is known, the magnification and "intensity" of the system are also forthwith expressed. In the case cited in the illustration, back focus = 9", twice this = 18"; add the focus of positive, 6" = 24" equivalent lens. Thus the magnification is four times, the intensity of the positive lens alone = *f*-8, and hence, for the chosen extension of camera, the intensity of the tele-photographic system = *f*-32.

Mr. Hancock makes a slip in the last paragraph but one of his letter anent the intensity of the system. It is true, as stated, that with a magnification of four times a positive element, whose *initial* intensity is *f*-8 *must become* *f*-32; but Mr. Hancock must certainly *not* "take it that definition is likely to be unsatisfactory if a larger aperture than *f*-32 be used," for any shorter extension of camera or back focus can be used, giving greater intensity but less magnification. Again, there is no reason at all that, in the case cited, the positive lens of six inches focus should not have an initial intensity of *f*-3 or *f*-12 for the combination!

The object of the construction of *moderate* amplification was to make the system applicable to lenses of weaker initial intensity (say, *f*-8) than portrait lenses, but portable at the same time, as Mr. Hancock readily perceives in the last paragraph of his letter. A lens, however, of high intensity and short focus may have great or weak amplifying negative lenses without unduly adding to their bulk or "necessarily looking like an astronomical telescope;" and, for this reason, a "battery" of negatives *might* be useful.

Quite outside the question of bulk, I have already given theoretical and practical reasons for not employing high magnification to positive lenses of a permanently fixed spherical correction. I think, however, that many will prefer, as Mr. Hancock agrees, to employ one negative with different extensions of camera, sacrificing magnification to rapidity when necessary, but making use of a greater degree of magnification when rapidity is not of such great moment.—I am, yours, &c., T. R. DALLMEYER.

25, *Newman-street, Oxford street, W.*

PHOTO-MICROGRAPHY.

To the EDITOR.

SIR,—In the article in the JOURNAL of July 28, commenting on Professor Piffard's paper, it is suggested that the obtaining of sharp negatives of microscopic objects with the objectives in use twenty-five years ago was difficult, in consequence of the want of coincidence of the visual and actinic foci.

It is nearly thirty years since I "took up" photography. My first negative was of a microscopic object, and having produced some hundreds of negatives of very varied subjects, including objects under polarised light, I found no difficulty arising from the above cause.

I worked "in the open," having my lantern at one end of a bench, and the carrier for the plates sliding along it according to the amplification required. The objectives used were cheap French triplets, no eyepiece, but sometimes double concave glasses in front, to increase the size. The light was "oxyhydrogen," and I got fairly sharp definition up to, say, 400 diameters.—I am, yours, &c., JOSEPH H. WOODWORTH.

Booterstown, Dublin.

A NEW PLATE.

To the EDITOR.

SIR,—I venture to hope that a short description of a plate which settles the much-vexed question of halation will be of interest to you and your numerous readers. I briefly describe the method which I have recently patented.

The plate is first coated with a gelatine substratum containing non-actinic colour, and upon this, when dry, is coated the ordinary emulsion. During exposure the colour absolutely prevents the passage of the actinic rays of light to and from the surfaces of the glass, hence there is no reflex action of light and *no halation*. The colouring matter (a harmless compound of carbon) readily disappears during the ordinary manipulations of development, fixation, and washing, so that the printing quality of the negative is as usual.

I think this simple discovery, besides opening a wide field for discussion, really places a new power in the hands of the photographer. Three things can with confidence be stated—first, halation is impossible; second, greater latitude of exposure is obtained; third, the scale of gradation is materially improved.

This, sir, is a short description without an attempt to deal with the scientific aspect of the question. I shall willingly supplement it with any further details you may wish to have. Enclosing for your inspection the first results from the new plate,—I am, yours, &c.,

46 *Fleet-street, Torquay, August* 7. CHARLES E. PETTITT.

PHOTOGRAPHY IN SOUTH AFRICA.

To the EDITOR.

SIR,—I think of going to one of the South African colonies as a professional photographer. As the climate of Cape Colony and Natal is not unbearably hot, it is very likely I shall select one of these as a starting point. Can any of your readers kindly favour me with their professional experience of these colonies, and say what prospects there are of success? Further, what stock of materials it would be advisable to take with me for working in the silver process? Pyro, I understand, is fifty per cent. dearer in the coastal towns than in England, and still dearer in the interior. I have been advised to take a tent as a studio. Some of your correspondents may be able to kindly inform me as to the best method of preserving the tent from the attack of flies, and also the most effective method of preserving the leather of the camera from their attack.—I am, yours &c.,

GEO. F. JESSETT.

7, *Batoum-gardens, West Kensington, W., August* 7.

THE CONVENTION GROUP.

To the EDITOR.

SIR,—Will you allow me to reply to Messrs. Heath & Co.'s letter in your last issue, in reference to the Convention group at Plymouth. I would be specially sorry to take any credit that is due to them for the grouping, &c., and I think, if they read again your commendations, they will find it was more for the promptitude displayed by my firm in getting proofs down to Plymouth with despatch. I will give the plain unvarnished facts as regards the taking of the negative, and leave your readers to judge what credit is due to me, and what is due to Messrs. Heath & Co.

I had prepared myself to take a group of the Convention members, by taking down a 12 × 10 camera with stripping films, with a view to stripping for collotype work, so that they could be done from the original negative. It was suggested by a member of your staff that I should expose on the official group, and I agreed with him that was the proper thing to do. I saw Messrs. Heath, and arranged that they should allow me to fix and focus my camera, and that they would get their assistant to take the cap off the lens (and this accounts for my being in the group). Three plates were exposed, and to my chagrin two out of the three were useless on

account of the camera being shaken in uncapping the lens; otherwise the whole three would have been perfect, and we should have had the advantage of being able to print from two or three negatives in the press at the same time instead of only one.

With regard to the development, this was strictly done under my supervision in Messrs. Heath & Co.'s dark room, their assistant mixing the developer because I could not grasp the formula they were using, no doubt due to my denseness and not to any complication of their formula. I rocked the dish and decided when the plate was developed sufficiently; at my request they dried the negative, packed and dispatched it to my firm at Richmond. I am extremely obliged for Messrs. Heath & Co.'s courteous help, but I do not agree that credit is due to them entirely for the JOURNAL group, but I leave your readers to judge.

Apologising for troubling you over such a stupid matter.

Yours faithfully, R. L. KIDD.

Exchange Column.

Will exchange new whole-plate extra special camera and three slides, whole-plate burnisher and canvas case, for half-plate Acme camera and slides and whole-plate rolling press. Address, S. BARTLETT, Colporteur, Stratford-on-Avon.

Wanted 12×10 and half-plate camera and slides, in exchange for 10×8 camera and three double slides, several wet-plate dipping baths, and cash adjustment.—Address, A. W. DURRELL, Photographer, 44, Birkbeck-place, West Dulwich, S.E.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

PHOTOGRAPHS REGISTERED:—

J. Whyte, Glasgow.—*Photographs of Sir Michael Corsnal.*

Debenham & Co., York.—*Photographs of His Grace the Archbishop of York.*

IVY.—The address is Messrs. Frith, Reigate, Surrey.

G. P. CARTLAND.—The letter in its original form was possibly libellous.

A. LEVY.—Thanks. Yes; English lawyers can, and do, sue for money owing to them.

R. SIMCOE.—There is no objection to the use of xylonite dishes for the fixing solution for P.O.P., neither is there for the toning bath.

H. L. M.—As the opinions offered are not to your satisfaction, you had better lay the case, with the lease, before a solicitor, get his advice, and act upon that.

W. M.—Sue the husband in the County Court if the wife has not a separate estate. You would not, we think, be justified in adopting the other course you propose to take.

ROBERT J. HILLIER.—As there are two gentlemen of the same name in the photographic world, the alteration was necessary. It in no way destroys the sense of your remarks.

R. H. THOMAS.—1. The firm named bears a high reputation. Possibly you were rather hasty; the delay may have arisen from legitimate causes. 2. The plate would be prepared from the negative.

W. P. WEARNE.—The delay at, possibly, a busy season is scarcely uncommon. We believe the firm named to be respectable. As you have threatened to place the matter in the hands of a solicitor, our advice would be useless.

GUS H.—The photographs of the interiors of the conservatories are very good but for the defects alluded to. They are caused by halation or reflection of light from the back of the plates. Had the plates been backed, it would have been avoided.

H. C. J.—What are termed "ordinary plates" are not, as a rule, sensitive enough for general work with a very rapid shutter and a lens with an aperture of *f*-11. They may, however, answer for some subjects when the light is exceptionally good.

D. LLOYD.—1. Use the largest stop that will secure sharpness all over the plate. 2. All will depend upon the size of the stop used and the quality of the light at the time. No useful information can be given on this point. Better expose a trial plate. 3. Starch paste.

W. T. PINE.—The fading of the print has been greatly accelerated by noxious vapours gaining access to it through the defective backboard of the frame. Such exceedingly common cardboard is very unsuitable for mounting photographs upon. This may as well have conduced to the fading.

GLASS.—Some of the wheel glass-cutters answer very well, but they quickly wear out with constant use. When they were first introduced they were of a much better quality than the majority that are now sold, but they were considerably higher in price. Nothing is so good as a diamond for cutting up dry plates.

B. O.—Send us particulars of your method of albumenising, and we may be able to assist you.

W. BLAKE.—It is so. The price of the specifications of some patents have been raised, while others are lowered. Those which used to be only fourpence are now eightpence, but those which were formerly several shillings, or pounds, are now the same price. The price of specifications is made uniform—eightpence each all round.

A PROFESSIONAL.—This correspondent complains that, when ordering his goods by "parcels post," the firm from whom he buys puts him to extra expense by sending the package by "rail." Such a case would, doubtless, only occur through an oversight. In these times competition is too keen to admit of photographic houses wilfully ignoring their customers' instructions.

J. W. BEATTIE (Hobart).—We have often experienced the same kind of fogging. It arises from the collodion not being sufficiently ripe. This may be cured by either adding an alcoholic solution of iodine, or dissolving in it a crystal of iodine until it assumes a port-wine colour. Try the experiment with only one or two ounces of the collodion at first, and note the results obtained.

Z. A. Y.—You are quite under a misapprehension as to collotype printing by machines being an impossibility. As a matter of fact, the larger proportion of the collotypes now produced, both here and abroad, are printed by power press. Some of the best work is now done by machine printing, but it must be confessed that much of it is inferior to what is possible with hand presses.

J. RINGROSE.—For permission to photograph on open spaces under the control of the Corporation, apply to Sir J. B. Monckton, Town Clerk, Guildhall, E.C.; for the County Council spaces and parks, to H. De la Hooke, Esq., London County Council, Spring-gardens; and for the royal parks, to H. W. Primrose, Esq., Office of Works, Whitehall, S.W., of course in each case enclosing a stamped envelope.

D. MCSKIMMING writes: "I am troubled with a flare spot when using my single achromatic view lens with a small stop. Can I remedy this by altering the position of the diaphragm; if so, must it go nearer or further away from the lens? Am I likely to introduce any other defect?"—This may be cured by altering the position of the diaphragm. Try the effect of withdrawing it about a quarter of an inch. No defect will be introduced.

E. PAINE.—There is no copyright now in many of the fine old engravings, such as those of Hogarth, Bartolozzi, and others; but there would be in all those recently issued, notwithstanding that they were produced by photogravure abroad, and from the works of foreign artists. They would have been made copyright under the new International Copyright Act. It is very unlikely that the owners of the copyright would permit of the copying for lantern slides.

J. J. WILSON asks: "Will you kindly inform me if chemically pure paper pulp is obtainable in small quantities; and, if not, by what means can the ordinary paper pulp be made chemically pure when used for photographic purposes?"—This is certainly not an article of commerce, but it is quite possible that some paper-maker will oblige with a small quantity for experimental purposes, though it would not be chemically pure. The nearest approach to chemical purity would probably be obtained by converting some Swedish filtering paper into pulp.

LONDON, E., says: "When I develop lantern slides with hydroquinone I get a perfectly clear and bright image without any veiling of the lights, but when I use ferrous oxalate, which I very much prefer, the lights are slightly fogged with a kind of white deposit, which seems to be more on the surface than in the film. I have used the developer with different proportions of iron and oxalate, and also more or less diluted with water. I know it must be the fault of the developer because the same plates are all right with the hydroquinone. Can you assist me?" The veiling is caused by a deposit of oxalate of lime from lime in the water. If the pictures be flooded with very dilute hydrochloric acid, it will be removed. One part of acid to twenty or thirty of water will suffice.

E. J. D. writes: "Will you please give me the necessary process to reduce eighteen carat gold in substance to chloride for photographic purposes. Also would the process be different for twenty-two carat gold. I remember reading some time since in one of your notes that photographers have been known to reduce sovereigns for the purpose, but mine is in small particles?"—Dissolve the metal, in a glass flask, in a mixture of one part of nitric acid, five of hydrochloric acid, and three of water with the aid of heat. When dissolved, precipitate the gold with a solution of protosulphate of iron. Wash the precipitate well and then redissolve it with the acid as at first, using no more than is necessary. Then dilute with water, so that one drachm of the solution contains half a grain of gold to the drachm. This will form a stock solution or a strength about equivalent to one grain of chloride to the drachm.

CONTENTS.

THE BRITISH
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No. 1737. Vol. XL.—AUGUST 18, 1893.

THE KEEPING PROPERTIES OF GELATINO-CHLORIDE POSITIVE PAPER.

How long will gelatino-chloride paper keep good, and what are the influences by which it becomes deteriorated?

It has not yet been sufficiently long before the public to warrant much to be brought to bear upon its keeping properties, but from our own observation, extending to a period considerably over a year, it keeps quite as well as the best ready-sensitised albumen paper, and much better than most of what is procurable. A sample sheet that has been sent to us from the Antipodes, as having gone yellow, has induced us to institute inquiries as to the conditions most likely to promote such discolouration.

First of all, we have opened and examined a packet of this paper which was placed in a flat envelope and sealed with ordinary paste, at the time mentioned. This packet has, since its receipt, been kept in a dry room free, in an average way, from gaseous or other deleterious emanations. When examined, every one of the cut sheets which it contained was found to be without spot or blemish, not the slightest discolouration being apparent. From this it is, we think, a fair inference that gelatino-chloride paper does not necessarily become discoloured for a considerable period when kept with reasonable precautions.

By what we must regard as a singular coincidence, a packet of ready-sensitised albumenised paper, "warranted to keep," was put away at the same time as the other, and with the same precautions as regards preservation. We also opened it, only to find that its contents, six 5×4 sheets, had become hopelessly bad, having passed considerably beyond "the colour of cheese" stage, and hence, quite useless.

Exposing gelatino-chloride paper to a damp atmosphere will, we should think, speedily ensure its discolouring, and this with the more certainty if continued for any length of time in a hot climate, or in such hot weather as prevails at the present time. This has long been known in connexion with albumenised and other paper, and led to the introduction of Marion's preservative case three decades since. This consisted of a cylindrical case with an air-tight cover in which was a small chamber containing dried calcium chloride, which absorbed the last traces of moisture left in the case, and thus ensured the dryness of the paper contained therein. We are aware of the discolouration from damp of at least one sheet of gelatine paper which was received in that state on being opened in New Zealand; but, as other sheets in the same packing-case were good, we conclude that the initial seeds of decay had been sown on the shelves of the merchant by whom it had been packed and shipped.

It may not be generally known that the oft-times offensive effluvium given off by albumenised paper conduces to the deterioration of both gelatine paper and plates. Some dealers, from motives of economy of space, or oven from orderliness, keep printing papers of various kinds stored in close cupboards, gelatine paper being in immediate contact with albumen paper of foul-smelling quality. Can it be wondered at if gelatino-chloride paper, redolent of such an atmosphere and taken out to be closely packed up for a voyage of considerable duration to the other side of the tropics, shows indications of discolouration when received by the consignees? The wonder would be if it were otherwise. We have been made aware of well-certified instances in which this has occurred. Each one can test this for himself by interposing a piece of non-sensitised albumen paper between two sheets of gelatino-chloride and keeping them pressed in a warm moist atmosphere for some time.

Although negative plates are liable to the same action from this cause, it happens that, in virtue of the perfect packing of each dozen, they are but little amenable to injurious consequences arising from vaporous emanations by which they may be surrounded. We know, however, that such plates, when they are removed from the packages in which they are sent out and are transferred to a grooved plate-box, have in a very brief period shown signs of having undergone deterioration, more especially so if the plate-box were a new one. Even the emanations from the flexible leather hinge, which some time ago used to be so commonly applied to the draw shutter of the dark slide, were well recognised as producing an insensitive strip across any plate which had been left standing in the slide for a length of time.

We might expand upon this, but enough has been said to prove that as between sensitive abumen paper and sensitive gelatine paper the latter has immensely the advantage as regards keeping when both are treated alike; and that, when reasonable precautions are taken for its protection from moisture, deleterious atmospheric influences, and injurious vapours, there is no reason why gelatino-chloride or gelatino-bromide paper should not remain quite good for a time infinitely longer than even its makers would care to assign to it.

Gelatino-chloride paper is of only comparatively recent introduction, but we possess valuable pictures on gelatino-bromide paper which were exposed and developed between six and seven years after we had received it from the manufacturer. But it had been well preserved from such destructive influences as those here hinted at.

MIXED DEVELOPERS AGAIN.

As the result of experiments in connexion with the functions of sulphite of soda and alkalies respectively, in conjunction with metol and amidol, some of which were recorded in a leading article a fortnight ago, we have been induced to revert once more to a subject that was treated, though from a somewhat different point of view, a few months back. In our issue of March of the present year (page 161) will be found an article on "Mixed Developers," that is to say, developers in which two or more of the various developing agents are employed in conjunction.

This is a practice which has found some favour both in this country and in America, and has for its object the combination of different characteristics not possessed by any one single substance. For instance, hydroquinone is known to act with great clearness and vigour, and to give images of considerable density under favourable circumstances, but it is extremely slow in action, and, with some plates, has an inclination to produce harsh gradations. Eikonogen, on the other hand, is rapid and searching in its action, and is remarkable for the delicacy and fine gradation of the images it gives, its fault being that this latter tendency is apt to degenerate into excessive thinness or want of printing strength. By using the two agents in combination, however, it has been found that a highly satisfactory compromise is made, and, while the cleanness of working of the two, when used singly, is not interfered with, the density-giving power of hydroquinone is combined with the energy and rapidity of action of eikonogen.

At the time our previous article was written we had not made any very extended trials of metol in any form, and with amidol had scarcely attained any marked success in any combination, but more recently have been led to take up the subject again, and, we may say, with a degree of success that we had never before experienced. There are, in fact, some special features in the character of the newer developers that seem more especially to fit them for use in conjunction with hydroquinone, and our previous failure to derive any apparent benefit from the mixture of that agent with amidol can only be set down to our not having gone the right way about it.

The general peculiarities of hydroquinone, as all who have used it are well aware, are its slowness of action and the extreme vigour of image it gives. These characteristics are greatly modified, if not altogether removed, if a caustic alkali be substituted for the fixed carbonates usually employed, while they are greatly intensified by the use of either sulphite of soda or restraining bromide. The extremely powerful modifying action of these two substances is, in fact, one of the peculiarities of hydroquinone, and, while it is impracticable to altogether dispense with them, hydroquinone has come to be regarded as too slow for ordinary purposes, and more especially useful in cases of over-exposure or for positive work.

Amidol and metol, on the other hand, are extremely rapid in their action, and, especially the former, will work without any alkali at all, the soluble alkaline sulphites, as we showed a fortnight ago, playing the same part in conjunction with them that alkali does with pyro and hydroquinone. Moreover, although it is possible to employ them without bromide, it is found, in practice, that the addition of some sort of restrainer is almost absolutely necessary if images of printing density and free from fog are to be obtained.

Arguing from these facts, it seemed to us more than likely that if properly used greater advantage would accrue from the mixture of metol and amidol with hydroquinone than those we mentioned in connexion with eikonogen, and on putting the matter to a practical test we were not disappointed. The way in which we looked at the question was this :—If, as appeared from our previous experiments, hydroquinone would act as the necessary restrainer, then bromide might be altogether dispensed with; and while the sulphite necessary to confer keeping qualities, as the stock solution, would also supply the necessary developing stimulus to the metol or amidol, as the case may be, any slowing action it might have upon the hydroquinone could be counteracted by the addition of a small proportion of alkali. In fact, it seemed possible to compound a developer without restraining bromide and with a minimumof alkali, which should be rapid in action even with quick exposures, and at the same time give vigorous images.

The merely physical advantages of such a developer, especially in hot weather, are too obvious to need mentioning here; but as we pointed out in our article on "Intensification" last week, it is preferable to get the needful density in one operation; if at all possible there is a palpable gain in that direction. Beyond that, if we consider that users of amidol and metol have hitherto, in order to get density, been using solution containing from sixteen grains of these comparatively expensive salts to each ounce, further heavily loaded down with sulphite, it must be obvious that a great pecuniary saving is effected when the proportions are reduced to about one-fourth, and a cheaper substance partly substituted. Such, however, is the not least important fact of the case.

As a first experiment, plates were submitted to the action of mixtures of amidol and metol with hydroquinone, without sulphite, but in the full anticipation of a negative result, as it turned out, the two former requiring the sulphite, and the latter alkali, before development could be set up. An addition was then made of sodium sulphite, and when dissolved this was again applied to the plates, which had been in the meanwhile covered up in a dish of clean water. After five minutes' action, neither mixture had produced a trace of an image, so we concluded that for practical purposes the alkali is a *sine-quâ-non*, the hydroquinone, as we had expected, acting as a restrainer. The quantity actually necessary to set up development is, however, extremely small, a single *drop* from a glass rod in two ounces of solution sufficing to set matters in motion, though naturally rather slowly. When the quantity was increased, in equivalent to two minims of strong ammonia to the ounce, the image at once began to acquire strength and detail, proceeding almost as rapidly as either metol or amidol alone, but without the slight veil that with most plates would then accompany the non-use of bromide. As the plates had received a full exposure, we accepted this as evidence of the restrainiog power of hydroquinone.

After fixing, the image produced by metol and hydroquinone possessed all the printing density that could be desired, and more might have been obtained by continuing the development further; but amidol left something to be desired in this respect. The plates used were specially chosen as being somewhat difficult to work up to printing density with either metol or amidol. After several trials with different proportions of amidol, hydroquinone, and alkali, it was found that, as in our earlier experiments, no advantage was gained by the addition of hydroquinone until the quantity of that, as well as of amidol, was increased to five or six grains to the ounce. If the former was increased without the latter, density was obtained, but at the expense of gradation, while amidol with a less proportion of the other substance failed to give any increase of vigour.

It has been said that a trace of acid acts with amidol or metol as a better restrainer than bromide, so the effect of an addition of half a grain of citric acid to the amidol solution was tried. The result was a very decided slowing of the action, scarcely, we think, from the slight decrease in the quantity of free alkali present, but evidently the well-known restraining action of the alkaline citrates accompanied by a very remarkable increase of density. With metol, neither the slowing action nor the increase of density was so noticeable, though they were present, not sufficiently, however, to be of any benefit or the reverse.

The question next arose as to the most convenient form in which to employ the mixed developer. Many persons favour the "one-solution" form, in which, however, it is obvious that the only control there is—and it is very limited—is in the greater or less degree of dilution. This may answer, perhaps, with one particular brand of plate, and with tolerably accurate exposure, but not otherwise. If the developing and accelerating solutions are kept separate, so that the proportions may be raised at will, there is, of course, much more scope for modifying the action; but the full power of the mixed developer is only attained when all three solutions are kept separate—that is to say, metol, hydroquinone, and alkali. In that case, it is possible at the moment of use to mix the two former in such proportions as will suit the particular kind of plate, or the class of subject under treatment, and degree of density desired, while the alkali is added to suit the exposure. The power, in fact, gained in thus varying the proportions of the developing agents is one of the most important points in this method.

After a large number of experiments, while we are personally inclined to give preference to the separate solutions, we are quite aware that under circumstances the other methods may be more convenient and equally efficient. For instance, in ordinary studio work, where a known plate is constantly used, the successive exposures are all practically uniform, a one-solution developer is perhaps the best, for at all times there can be kept at hand small quantities of alkali or restrainer for use in emergency. The trouble of constantly mixing up fresh solutions is thus avoided; but, for the run of amateur work, we think the practice of keeping the developer in at any rate two solutions is to be preferred—the developer proper and the alkali—and to use these as circumstances may dictate.

Space does not permit us here to do so, but we hope next week to give briefly formulæ of each kind that seem to answer best with different types of plates, naturally thin plates, of course, necessitating different treatment from those which readily run to density.

DR. EDER ON THE ACTION OF BROMIDE WITH VARIOUS DEVELOPERS.

Dr. Eder has lately been studying the action of bromide of potassium with various developers, and the results of his investigations are decidedly interesting. Bromide, the most commonly employed of the restrainers, he finds varies in the nature of its effects according to the developer with which it is used.

Some developers he points out, are particularly sensitive to the influence of bromide of potassium, iron oxalate, for instance, the bromide used as 1 : 10, and a few drops of that strength being added to every 100 c.c. of solution, having an energetic restraining action on normally exposed plates. For over-exposed plates it is only necessary to slightly exceed the proportion of restrainer mentioned.

Pyro-soda behaves in a similar manner to iron, the bromide acting as a simple retarder; if, however, pyro ammonia be used, the bromide acts as a preventive of fog, to the detriment of its powers as a restrainer of development, and it is necessary, therefore, to increase its proportion. For normally exposed plates, Dr. Eder finds, for each 100 c.c. of pyro-ammonia solution, thirty drops of bromide solution, 1 : 10, desirable, while for over-exposure it should be added in doses of from 5 to 10 c.c. for each 100 c.c. of developing solution.

Hydroquinone-soda (sold in the ready-made form) is less sensitive to the retarding action of bromide than pyro. Development may be restrained therewith by using comparatively large quantities, it is true, but the developer, even with prolonged use, does not yield such good negatives as pyro or iron. Hydroquinone itself, says Dr. Eder, acts as a species of restrainer, for it not only develops slowly, but gives vigorous results, not on account of the bromide that may be used with it, but in consequence of its own decomposition by oxidation, the oxidation retarding the growth of the image without tending to impair the vigour of the resulting negative.

With eikonogen and metol, notably the latter, bromide acts in the double capacity of preventing fog and restraining development, but the retarding effect is less noticeable than with the developers previously named. Very fully exposed plates can be held back by the use of bromide, but over-exposed pictures, says Dr. Eder, when developed with metol or amidol, are not so well controlled, even with large quantities of bromide, which is unable to check the energy of metol. An old solution of metol—one that has been used several times—retards development, but does not yield vigorous negatives.

Dr. Eder concludes his interesting notes by saying that to metol-soda or metol-potash a slight addition of bromide (1·1000) has such little restraining power that the manufacturers themselves often add bromide to the ready-made solutions, without the user noticing any retarding effect of these developers. The only effect produced is that negatives so developed have no fog.

Comet Number Two of 1893.—This comet has been photographed by M. F. Quénisset, and the result communicated to the Paris Academy. It was obtained by means of a Hermagis lens of sixteen cm. (about six and a half inches) aperture and an exposure of forty minutes. The comet shows two tails—one a degree, and the other half a degree long.

Eclipse Photographs.—In the *Observatory* Mr. Turner makes some remarks about the August, 1896, eclipse and reviews the photographic results of the late eclipse. He informs us of one point which appears to us the least satisfactory, namely, that the photographs taken of the corona are in the hands of an astronomer who will make drawings of them. Far better publish the photographs and let them illustrate their own story. Mr. Turner heartily congratulates the observers on their performances. Professor Pickering employed one of Dr. Common's twenty-inch reflectors of forty-five inch focus, and used slow plates, the result being that he has got more detail in the inner corona than is shown in the English photographs. Regarding the 1896 eclipse, Mr. Turner points out the importance of making preparations long beforehand. He says it is not a bit too early to begin at once, for, owing to the position of the central line of totality being so favourable, it is probable that a host of observers, both professional and amateur, will be able to co-operate in the observations.

Ultra-violet Photographs.—With regard to these investigations by Victor Schumann, before referred to by us, he states that he uses gelatine plates of his own manufacture, as commercial plates are less suitable. "When it is important to support as far as possible the optical power of photographic spectral apparatus, where the sharpness of the image is a main condition, also where a strong contrast in the intensity of the lines is needed, the commercial plate is inadequate. It does not work intensely enough to assist spectroscopy to the extent of the modern dry plate. The gelatine plate of my own preparation gives an intense and finely granular image on a ground clear as glass. The emulsion is relatively rich in silver iodide containing, with to 100 parts by weight of silver bromide, four to five parts of silver iodide. Its preparation is effected exclusively on Eder's method, silver-oxide ammonia (J. M. Eder, *Ausf. Hand. d. Photographie*, part iii., pp. 208–211, fourth edition, Halle, 1890), which I have used for more than ten years. For developing the plates I use the soda-pyrogallic developer, and for fixation sodium thiosulphate."

Central Photographic Club.—We gather that the principal reason why the Central Photographic Club has not ere this opened its doors to the several hundreds of members who have joined it is the difficulty which the Committee have experienced in engaging suitable premises. We understand that a considerable number of suites of rooms have been inspected, and in two cases the Committee had come to a decision, only to be disappointed over matters of detail, which rendered it necessary to seek elsewhere. The Committee have now resolved to seek accommodation at a first-class hotel in central London. Negotiations with that object are afoot, and we expect that in a few days the Committee will announce the opening of the Club at some suitable *rendezvous*, where arrangements can be made for use of meeting-room, dark-rooms, smoke-room, library, &c., as well as the supply of refreshments and hotel accommodation, with beds for country members. It appears to us that, with such advantages, the ultimate possibilities in the way of membership are very great indeed.

Extremely Rapid Exposures.—Some little while ago we described the marvellous photographs of flying bullets and other rapidly moving objects taken by Professor Boys; Messrs. E. & L. Mach have been working in the same direction, and have recently communicated a *résumé* of their results to the Vienna Academy. Some 1500 negatives were reviewed, and evidenced marvellous results. Images of the Mannlicher bullets, quite sharp and 3½ cm. (nearly an inch and a half) diameter, were obtained. Instead of electric contacts made by the flying projectiles which were liable to introduce a disturbing element, these experimenters were able to make the bullet itself close the electric circuit mechanically by means of the sound wave it produced. After a number of trials they obtained homogeneous plane parallel glass plates large enough to produce an interference field 8 cm. in diameter for use in Ludwig Mach's refractometer. When one portion of such a field is occupied by a flying bullet, an air jet or a sound wave passing an interfering pencil, the interference bands, usually rectilinear, appear bent in such a manner as to indicate a change of density of air at any point. For the purpose of instantaneous illumination the electric spark was usually employed, but sometimes, especially when longer exposures could be made, sunlight rendered monochromatic blue was used.

Proposed Photographic Astronomical Telescope for Cambridge University—The authorities of this University have made a public appeal for funds to enable them to construct a new telescope for celestial photography. They require about two thousand guineas in addition to what can be advanced from other available funds, the instrument itself and its fittings, dome, &c., being estimated would cost about £3200. They say, "It will be allowed that the Cambridge University ought to be completely equipped for carrying on the most advanced work in modern astronomy. As celestial photography is the branch of astronomy in which the most important advance is now being made, it has been decided that a photographic telescope shall be obtained if the necessary funds be forthcoming. It is the opinion of those most competent to form a judgment that a photographic refractor of about eighteen inches in diameter is necessary to render it possible to obtain results of the highest excellence. The new objective would be corrected for the photographic rays, and the present Northumberland telescope would serve as the guide when attached to the new tube." That such an instrument would be invaluable for the purpose we are quite certain, and the best hopes of all scientific photographers will go with the Senate of the University. For those who would desire to convert their wishes into current coin of the realm, we may note that subscriptions will be received by Sir Robert Ball, or by any of the following members of the observatory syndicate: — Jno. Peile (vice-chancellor), G. G. Stokes, G. D. Liveing, G. H. Darwin, H. M. Taylor, and W. W. Rouse Ball.

ON THE CONSTRUCTION OF INTERCHANGEABLE LENS SCREW FITTINGS.*

Common Method of Gauging Screws.

It is customary, in making screws, for opticians to provide themselves with certain gauges or standards with which to compare their work. Such gauges generally take the form of those shown (not illustrated). Let us suppose that a lens-maker, wishing to do the thing well, seeks the aid of some expert to construct for him a set of standard screw-gauges in pairs, male and female, for each size of screw.

He may keep a duplicate set if he likes, and can afford the luxury. Such gauges may be made of steel; but, as they would warp in hardening, they must be left soft, and are thus specially liable to become worn. They are put into the hands of the workman, who uses them to test his work. When, for example, a male screw has been formed, he screws upon it the ring gauge. If the gauge fit stiffly, he reduces the screw until the gauge passes on freely. In this way he tests one screw after another as he makes them, screwing the gauge upon each, and inevitably wearing it away. It is only a question of time, and generally of a very short time, for such a gauge to be worn large. Suppose it wear only one-thousandth of an inch large on its diameter at the root, or crests, or sides of the threads; it then becomes possible to pass freely through that gauge a male screw which may be one-thousandth of an inch too large. But such a screw does not fulfil our conditions of free interchangeability, and such a gauge, worn even so little, is not capable of ensuring such accuracy as is indispensable. "But," says the workman, "I always make my screws fit the gauge loosely." "How loose?" we ask. "Oh, so that they shake a bit!" he replies.

This is the common method of gauging screws; only it is rarely the gauges are themselves accurately formed at first. But, even if the gauges are correct, a method like this, which depends for its success upon the workman's fancy of the right amount of shake, and which makes things loose to secure their being interchangeable, cannot be considered an exact and satisfactory method, nor should it be tolerated when we know any better way.

Common Methods of Cutting Screws.

The common methods of cutting screws are very simple.

Let us take the case of a male screw. The piece to be screwed is held and made to revolve in a lathe, and its outer surface is turned truly to the form of a cylinder approaching the full outer diameter of the desired screw. Then what is called a comb or chaser is brought into use. This instrument, which may be bought at the shops, is a cutting tool roughly in the form a common chisel, the working end of which is serrated, the series of alternate indentations and projections presenting exact counterparts of the thread form and pitch of screw which it is desired to cut. This chaser is presented to the revolving piece of work, and, sometimes by hand, sometimes by machine, it is moved in a direction parallel to the axis of the lathe, so that it cuts a spiral groove along the cylinder and forms it into a screw. The form of the screw thread is determined by the form of the teeth on the chaser.

We know that it is of great importance in securing free interchangeability that the form of thread be correct, but it is a fact that screws cut by this common method seldom, or perhaps never, are correctly formed in this respect. A famous navy captain, being asked why, on a certain occasion, he had not fired a salute, gave thirty-nine distinct

* Concluded from page 510.

and substantial reasons for his neglect. The first reason was that he had no powder. In the same way, several reasons might be given why opticians fail to cut screws correctly with these common chasers; but the one sufficient reason is that there is not such a tool in the market correctly formed. At least I have never found one, though

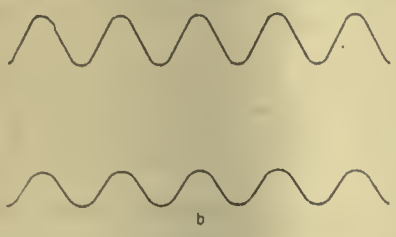

Fig. 5.

I tried hard to do so before giving it up and making my own. All the bought chasers I have seen form threads of wrong angle and insufficiently deep. Since the prominent points of the chaser teeth come into operation first in cutting a screw, and are thus most worn away, and since the chasers are themselves cut and formed by tools

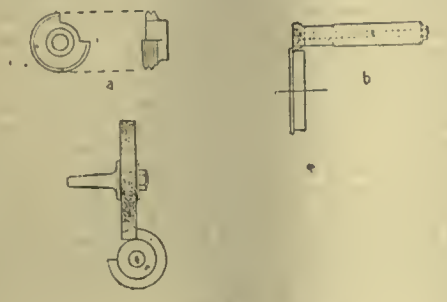

Fig. 6.

liable to similar wear of their prominent edges, we cannot expect very much of the ordinary shop tools, which cost only eighteenpence per pair. And, since everything the workman may do in grinding the tool to sharpen it, in altering the angle of the inclination of its upper face, either by grinding it or by the manner of applying it to its work, tends to alter the form of the screw thread and make it shallow, it comes to pass that the screw threads which are found on scientific instruments generally, and which are nominally of Whitworth form, vary from *a*, in fig. 5, which is correct, to *b*, and even worse than that, which is prepared from measurements of screws furnished to the recent Conference of Opticians by the opticians themselves.

An Improved Form of Chaser for Screw-cutting.

I have shown the two principal weaknesses of the common methods of screw-making—the possibility of error arising from the inevitable wear of the ordinary solid screw gauges, and the certainty of error arising from the use of chasers which in the ordinary way are faulty. It is now several years ago since I designed a chaser, shown in fig. 6, which possesses important advantages over the ordinary form. The chasing tool, *a*, is itself a portion of a screw, with only two turns of the thread, and is produced in a screw-cutting lathe, a quadrant being afterwards removed to form two cutting edges, one for male and the other for female screws. The figure at *b* shows also the chaser attached by a bolt to its holder, and in position for cutting a male screw. This chaser has the following important advantages:—The form of its thread is easily measured by means of the test-pieces which I have described. This is practically impossible with the ordinary form of tool. The circular chaser is easily made, and the tools used in making it are not subject to that incurable deterioration of form which is inevitable with the tools used in forming an ordinary chaser. The circular chaser is easily sharpened by threading it on a fixed pin or stud, S, as shown in the figure at C, so that the chaser may bear on the face of an emery wheel always in the same way to preserve the radial position of its cutting faces. It thus retains its original cutting angle until entirely worn away, and, with ordinary care, it is practically impossible to set it wrongly in relation to its work. It may be removed for sharpening by loosening the bolt, without displacing the holder, and in replacing it the only thing necessary is to set the cutting edge at the level of a fixed line upon the holder. With such a chaser, so easily removed and replaced, there is little temptation for the workman to neglect the sharpening of the tool, while with the ordinary form this temptation is very great.

For want of time I cannot now describe my methods of originating the thread form on these chasers. With suitable appliances the work is quite simple.

When properly constructed and arranged, such a chaser as I have described will form screw threads accurately, and for a considerable length of time before appreciable error arises from the wearing of the tool. For practical purposes it is possible so to rely upon the constancy of the thread form which it produces, that to measure the diameter of a screw on the tops of its threads sufficiently indicates to the workman the gauge of the entire screw.

The Chasing Lathe.

I show you a view of part of a chasing lathe as used for cutting screws with this chaser. The usual slide rest is removed to show the screw-cutting gear without confusion. The spindle which supports the work, and revolves with it, carries at its other end a guide screw of the same pitch as the one we wish to cut. Engaging with this guide screw is a nut attached rigidly to a bar capable of sliding along and behind the lathe bed, which bar serves to support and move the chasing tool. As the spindle revolves, its guide screw, acting on the nut, causes the bar to slide and so to move the chaser along at the necessary rate. For convenience the chaser commences its work at the shoulder of the screw, and moves away from it in performing its work. Then, by raising a handle, the guide nut and the chaser are lifted from their engagements, and the bar is moved back so as to repeat the movement of the chaser from the shoulder and along its work. At each turn, by means of a screw and hand wheel, the chaser is moved a little further into cut, until it has at last produced a full thread on a screw of right diameter, and further advance of the chaser is then prevented by a stop on the hand wheel.

By these means we have accomplished our screw-cutting at Leicester for some time with a remarkable degree of accuracy. We have been able not only to ensure that every male screw shall be at least as small as the normal, in order that it may be freely interchangeable with its fellows, but we limit its error in the other direction also, that it shall not be more than one-thousandth of an inch smaller than the normal—that is, that it shall not be loose nor shake in its fellow more than one-thousandth of an inch on its diameter.

Limit Gauges.

For practical purposes in gauging such male screws, and not for purposes of strict examination, though, indeed, with due care it is a practically complete test, we use a hardened steel gauge such as you see on the screen (not illustrated).

This is the two-inch standard male screw gauge. It is applied to the screw as a calliper to gauge its full outer diameter only. The gauge has two sides, the gap between its jaws on the side marked F being exactly two inches across. On the second side, marked S, the gap measures exactly one-thousandth of an inch less. In using the gauge, the screw is cut so that it passes through the two-inch gap without any jamming, but it is not allowed to pass through the gap, which is only one-thousandth of an inch smaller. Thus the screws are at least as small as the normal, and are freely interchangeable, yet they are not loose and shaky. For gauging female screws we employ a pair of disc gauges, one being of the correct core diameter of the screw, and the other one-thousandth of an inch larger. These are used in a similar way to that I have described for male screws—to limit the error in the size of female screws.

This is not a laboratory experiment. It is a process daily and hourly employed at Leicester, where such screws are made more cheaply than less accurate screws were ever made before. So reliable are the methods, that I could produce from stock at any time a sufficient number of screws of one size to form a million distinct combinations, every one of which would present a sweet, smooth fit without any need of forcing.

It should be understood that our brass work is prepared by special machine tools in order to form it accurately and uniformly as it never can be done by hand. It is in this process of preparing that the accuracy in the cutting of screws is observed. In the subsequent processes of finishing, slight errors are inevitably introduced through the wearing of the parts, but such errors are very small indeed, and do not lead to any sacrifice of free interchangeability, but rather in the other direction.

In order to cover every reasonable risk of our work not being freely interchangeable with that of any other maker who adopts accurate methods for his work of screw-cutting, it is our practice to make every female screw, such as those in flanges and adapters, one-

thousandth of an inch larger than the standard. Flange screws are thus made to fit loosely to this small extent.

It is also our practice, which, to save confusion, I have not previously mentioned, to make the prominent points of the threads upon our screw chasers abnormally prominent, so that the threads which are formed upon the lens fittings are abnormally deep, though they are correctly formed on their crests and on the sloping sides. This has the effect of making the threads bear only upon their sides when they are put together, as shown in Fig. 7, at *a*, an arrangement which has two principal advantages: one, that there is much less risk of the screws sticking fast together, a common defect with ordinary screws, which often fit only in the crests and hollows of their threads and not fully upon their sides. The other advantage is that the prominent edges or crests of the screw thread, which are the parts most liable to damage by bruising or by other accident, may even be bruised to a considerable extent before the damage will extend to the sloping sides of the threads and affect the fit or the free interchangeability of the screw. With the American form of screw, which has a flat and not a rounded crest, as shown at *b* and *c*, any slight bruising of the prominent edge of the thread is certain to affect also the sides, and thus to impair the fit of the screw. For this reason the Whitworth form of thread is better adapted than the Sellers thread for such screws as those on the fittings of our lenses, which we are frequently screwing and unscrewing, and sometimes leaving exposed and liable to damage.

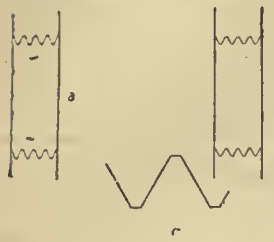

Fig. 7.

Finding the Zero of a Screw.

I should like now to refer to another matter of mechanical practice. Several years ago it occurred to me that it would be possible to provide a system by which all our lenses might be made to arrive home with their diaphragm indexes or other fittings in one position, convenient for use. The principle involved is that we should make the screw threads terminate at the shoulders of all the male screws at a point around the lenses having a fixed relation to the position of their diagram indexes or fittings. For example:—The screw thread of a lens with iris diaphragm might terminate at the shoulder of the screw at a point coinciding with the position around the lens of the iris index zero. If it did this in one lens, it might be made to do so with any number, and in this way all those lenses when screwed in turn into one flange would arrive home with their diaphragm indexes in one position. This system has been adopted as part of the Society's Standards, and it is a matter of considerable importance that opticians should be provided with some easy means of making their lens fittings uniform in this respect. When a male screw with a shoulder is screwed home in a female screw or ring so that the shoulder bears against the face of the ring and stays further advance of the screw, one side of the male screw thread is caused to bear hard against the corresponding side of the female screw thread. One side only of the thread is thus employed, and on the male screw it is the side which faces the shoulder of the screw. The position of rotation at which any lens screws home in its flange is determined by the relation of that active or working side of the thread to the screw shoulder. If we take a number of such male screws and try to discover just where the thread faces lead up to their shoulders, we shall have no easy task if it is to be accurately performed, and, unless we take into account the diameters of the screws as measured on the working sides of their threads, the lenses will not all screw home in the same flange to the positions our calculations would lead us to expect. But there is a simple way of accurately finding that point, which we may call the zero, of any such male screw with a shoulder. It is to have a corresponding female screw ring with the zero marked upon it, and after screwing home the male screw in this ring, to place the zero mark of the male in agreement with that of the female gauge.

The most convenient point to choose as the zero of a screw, is that point around the female screw where the tip of a tool cutting the screw would lie in the plane of the ring face. In other words, it is where the thread becomes complete at the face of the ring; but, if we were to locate the zero by watching where the cutting tool came into this position, or by looking for the commencement of the thread at the face of the ring, we might easily get into considerable error. If, however, we make the thickness of the ring-gauge an exact multiple of the pitch of the screw, and if we put zero marks upon both sides or faces of the gauge, the two zeros will be together at one point on the circumference of the gauge. It is easy to determine the true position of these zeros, for, if any wrong point be chosen for the mark, a male screw would not arrive home in either side of the gauge in the same relation to the zero marks. The true zero is at that point to which a male screw arrives home on both sides alike. This method is very simple and accurate, provided always that the screw of the gauge be of true size and form. Such a gauge should be made of steel, or it will not long withstand the wearing effect of forcing screws home in it.

Facilitating the Engagement of Screws.

This system of providing that all lenses may screw home in their flanges in one position depends, as I have said, upon the principle of making all the male screw threads terminate at the shoulders in one uniform position in relation to the diaphragm indexes or other fittings of the lenses.

This leads me to mention the improvement which I designed a year go for facilitating the engagement of screws.

When a pair of screws accurately formed are merely chamfered at their ends in the usual way, it is astonishing to any one who has not tried it how very difficult it is to get the screws to engage. They work together like a ball and socket joint, and, particularly with screws of large diameter, it is sometimes impossible to find at what part of their revolution the screws first engage. This difficulty is only lessened in common experience because such screws usually fit very loosely. The same kind of difficulty always occurs, if in less degree, with such screws, and we commonly experience the trouble of holding a lens to its flange in the right direction axially, and of finding at what part of their revolution the screws first engage.

The method I devised to overcome these difficulties by removing the usually incomplete portions of both male and female screw thread so that they commence abruptly of full section near the point which I have named the zero of the screw is perhaps familiar to you all.

There is one point only in this to which I wish to call attention in closing. It is that screws so formed cannot be damaged by crossing the threads; and, while this construction renders the engaging of such screws beautifully simple and certain, it removes a source of danger and helps to ensure the permanence of that accuracy of workmanship which is essential to the effective establishing everywhere of standard interchangeable lens fittings.

W. Taylor.

JOTTINGS.

I often met with the double tones in gelatine prints, to which Mr. S. Herbert Fry alludes, some months ago, but latterly I have got rid of them in a very simple way. The bath I used then, and still use, is a combined one, containing sulphocyanide. At first I was inclined to think that the double tone was wholly due to the presence and action of the latter salt, and although possibly it does predispose towards the defect, for defect it assuredly is, I am not persuaded that it is altogether to blame. When I first took up gelatine paper, I printed little, if any, deeper than I wished the finished prints to be, and I invariably met with the tone effect that Mr. Fry speaks of. Latterly, however, I have found that by printing more deeply than hitherto, so as to allow of a very considerable reduction in the combined bath, the tone scale of my prints is remarkably improved; so much so, that I seldom now meet with double tones. All the same, the character of the negative is not without influence on this point, I fancy.

I have an idea for the commercial preparation of thickly coated plates, which, if carried into execution, would entail no extra expense, and very little additional trouble in the method of manufacture. Thickly coated plates are said to reduce the effects of halation and to enable one to obtain richly deposited images, with possibly a better range of gradation than with other plates, so that it is worth the while of the makers to secure such advantages on the terms I am specifying. Good though it is, I shall not patent the idea. No, the only reward I ask is the gratitude of platemakers and plate-users alike; that will satisfy me. But to the formula. Any plate may be converted into a thickly coated one, by the simple expedient of adding to the coated side the quantity of emulsion which is usually to be found *on the backs of the plates*, in which position it takes no part in the formation of the image. During this season I have used gelatine plates of nearly every commercial brand, and I have been

astonished at the quantity of emulsion which is wasted on the backs of the plates. It is matter in the wrong place, but, unlike dirt, it has a right place in which it would be exceedingly welcome.

Once or twice lately the question of individual amateur photographers obtaining from the railway companies concessions in the matter of their fares, such as those enjoyed by anglers, has been mooted. Knowing something of the tricks and manners of railway magnates, I have little expectation that the movement will end in a favourable result. Obviously, the cases of the angler and the photographer are not parallel, and I fear that, if the companies did make a concession to the knights of the camera, the door would be opened pretty wide for the admission of abuses. By the way, amateur photographers on their outings should not forget the fact that to parties of ten and upwards the railway companies, or rather many of them, grant a reduction of fares. Some of the canny Midland and Northern secretaries are alive to the fact, as your pages testify whereas, judging from the silence of London secretaries on the point advantage does not appear to be taken of the fact in the Big Village. Or is it that you Londoners are less enthusiastic in the matter of outings than we dwellers up north?

Reading through a scientific journal the other day, I happened upon a short paragraph in which expression was given to the difficulty of coping with the now voluminous periodical literature of science with the view of collating that which would be worth preservation for future reference and information. It seems to me that the literature of photography must present just about the same difficulty. The number of publications is increasing to such an extent as to quite justify Mr. Mason's remarks, in his presidential address to the Convention, that "the journalism devoted to the profession seems to be out of all proportion to the extent of the trade it caters for." Side by side with this, moreover, has arisen such diffuseness and verbosity among individuals studying photography in its scientific aspects that it is next to impossible for any one person to keep pace with the appalling torrents of talk that are poured out as contributions to our knowledge of photographic science. Camera Club conferences and Photographic Conventions seem to be largely used as pegs upon which to hang long and weary screeds that probably few but their authors ever peruse, and now we have the parent Society cold-bloodedly proposing to inflict a two days' "Congress" of talk upon us. There is too much talkee-talkee in photography. Messrs. Guardia and Fry, the Photographic Club delegates to the Convention, bluntly say: "Except so far as the publicity of the press is concerned, the meeting" (*i.e.*, the Convention) "for the reading of the papers was a fiasco!" But fancy if all those terrible papers *had* been read! Why, they would have driven the Conventioners mad. I don't for a moment suppose that anybody outside a newspaper office has read them in their entirety. To do so would, in my humble opinion, entitle a man to receive the Albert Medal of the First Class from the hands of Her Gracious Majesty.

Talking of the north, it is singular to note that "diffused treatment" does not prevail so largely here as it does down south. Photographers, both amateur and professional, have no sympathy with the extraordinary abortions in the way of focussing that prevail in some quarters. They take their pictures as the human eye sees them, sharply, and as the optical analogue of the human eye, the photographic lens, also sees them, sharply. What's that? The human eye cannot see the different planes of a subject sharply at one and the same time? Granted; but the brain is conscious that when the eye is moved from plane to plane the subject will be seen sharply then; and while this consciousness remains sharp photographs will appeal to the perception of the multitude with greater force than the impressionistic blurs and smudges which are being run by slavish adulators of Whistler and his artistic toadies. With Captain Abney, I say I am a mappist. In my part of the world we are all mappists. And I venture to think mappism will prevail long after the confused dream of fuzzism simply lives in history as food for amused wonder.

The hot weather makes us all uncomfortable, "dem'd moist and unpleasant," as Mr. Mantalini would say, but it brings corresponding advantages in its train. The increased warmth of the solutions certainly hastens development, fixing and washing. The average temperature of the water with which I have been working lately has been nearer 70° than 60°, and, on the score of time saving, I have certainly found that no drawback. Fortunately, we live in days when frilling is comparatively unknown. *Apropos* of warm solutions, there is much wisdom in the remark of Mr. Haddon, made at the meeting of the London and Provincial Photographic Association, and reported on p. 517: He "had no doubt that, by the use of lukewarm water, five minutes' washing (of albumen prints) would suffice." I have long used water slightly warmed for the purpose, and can testify to the excellence of the idea. What a valuable paper that is of Messrs. Grundy and Haddon, by the way. Their experiments, I venture to say, are destined to become classical. Besides that, they will not improbably be instrumental in teaching photographers more than they hitherto knew as to the manipulation of albumen paper, and thus indefinitely stave off the extinction of a printing process the death of which, to say the least of it, has been prematurely prophesied. Than good silver prints nothing are finer, leaving surface effects to individual tastes, of course. As to their permanency, I have some in my possession nearly forty years old, perfect in preservation, and bad to beat from any modern point of view.

How is the Central Photographic Club getting on? I hope it has not fizzled out. Months ago, when the idea of it was mooted, I ventured to doubt the probability of its success, if the promoters in any way reckoned on the support of professional photographers. I fear they have been disappointed. The profession, in the main, is sadly deficient in *esprit-de-corps* and public-spiritedness. The National Society of Professional Photographers is doomed to perpetual impotence, by reason of its paucity of members; the Photographers' Benevolent Association is chiefly supported by amateurs and the trade. The Photographic Convention of the United Kingdom attracts less than a handful of professionals to its gatherings. A nice picture, certainly.

Cosmos.

THE ELECTRICAL ACTION OF LIGHT UPON SILVER.

At the meeting of the Asiatic Society of Bengal in May last, Colonel Waterhouse read a paper describing some observations of the electrical action of light upon silver and its haloid compounds he had lately been making. The subject is of interest in connexion with the formation of the invisible photographic image as well as with electro-actinometry, and an abstract of the paper will, no doubt, be acceptable to our readers.

The paper commences with a short summary of the previous observations of Becquerel, Hunt, Grove, Pacinotti, Hankel, Dewar, Egoroff, Moser, Minchin, and Griveaux on the electrical action of light on silver and its haloids, and on other metals in various solutions. The apparatus used is next described. This consists of two kinds of cells similar to those used by Becquerel—one being vertical, the other horizontal. The former consists of a glass cell in which the plates forming the electrodes can be coupled face to face or back to back, one being screened from light by the other and by one or two interposed screens of ruby or yellow glass, the cell being closed all round except at an opening on one side. This glass cell is enclosed in a wooden box, with a shutter on one side sliding in front of an opening corresponding to the one in the glass cell. In front of this shutter there are grooves in which coloured glasses can be placed in front of the opening. The upper part of the wooden case is open, but can be closed by a lid, through which, if necessary, a funnel may be passed to admit of solution being poured into the cell without letting in light. In this way sensitive plates can be put into the cells in the dark room and the solutions added at the time of observation. The silver plates used with this cell were 4 × 1¼ inches, other plates, such as photographic dry plates or celluloid films, being about the same size or smaller.

The horizontal cell consists of a wooden trough divided into two compartments by a double wooden screen, which allows the free circulation of the electrolytic fluid, while completely shutting off light from the unexposed compartment. This trough is covered with a lid, with two large openings fitted with hinged shutters, to the under sides of which mirrors are attached for the purpose of reflecting light at will on to one or other of the sensitive surfaces in the compartments below. By this arrangement the whole of the sensitive plate can be exposed to light,

while the unexposed plate is more perfectly protected from strong light than it is in the vertical cell. The horizontal trough is constructed to take two plates $3\frac{1}{4} \times 4\frac{1}{4}$ inches, or smaller.

In most cases, even under favourable conditions, the light currents observed are very weak, and, consequently, an exceedingly sensitive galvanometer is necessary. The one used in these experiments is the latest modification of the Rosenthal micro-galvanometer, made by Edelmann, in Munich. It is said to be sensitive to currents of a billionth of an ampère, with a resistance in the coils of only 1000 ohms. It can be set up in any position, is simple in construction, exceedingly sensitive, convenient in use, and easy to observe with fair precision, even in a town on a bad foundation like Calcutta. By using the directing magnet, the normal sensitiveness can be greatly increased; but in most of the experiments this magnet was not used, and when it was used the increase of sensitiveness was limited to about five times. The galvanometer is fitted with a small telescope, by which direct readings are made off the mirror from a millimetre scale placed at one metre from it.

As it was found that work with the spectrum required entirely special arrangements for obtaining a sufficiently large amount of light to make the action of the different rays of the spectrum distinctly visible in the telescope of the galvanometer, and as the weather was also unfavourable, the action of coloured light has only been observed through the ordinary coloured glasses as found in the bazaar. In all cases sunshine was reflected on to the sensitive surfaces by means of a mirror, as it was not convenient to use the direct rays of the sun.

Several difficulties are noticed as occurring in the course of the observations; among them, polarisation, or other currents generated in the cells independently of the action of light, but sometimes brought about by it; apparent reversals of current, due to decreases in the strength of the light. The unusually cloudy and changeable state of the weather during the course of the experiments, and the want of steady, clear sunshine made it difficult to compare the results of observations on different days.

The observations detailed in the paper are confined to pure silver plates in water, dilute acids, dilute alkaline solutions, and on pure silver plates in a dry state, the observations on the haloids being reserved for a future paper. The silver plates used were nearly pure, being about ·993 touch (not ·974, as stated in the paper). They were $4 \times 1\frac{1}{4}$ inches, and immersed in the various solutions from 2 to $2\frac{1}{2}$ inches, and about half an inch apart.

I.—Silver Plates in Water.

Distilled Water.—The current observed in distilled water between the exposed and unexposed silver plates was exceedingly small, and could only be clearly seen with strong sunshine. In nearly all cases the exposed plate was positive to the unexposed, as zinc to copper, and formed the anode or dissolving plate of the couple.

Tap Water.—The ordinary water from the town supply was used; and at the time of observation there would be a fair proportion of chlorine in it amounting to 1 to 1·2 parts per 100,000. In most of the cases observed the exposed plate was distinctly positive to the unexposed, as with distilled water. The plates were rather more sensitive than in distilled water, and were easily affected by changes in the strength of the light. In some cases, when fresh plates were exposed to daylight, the exposed plates were negative to the unexposed; but on subsequent expose to sunshine they were positive, and remained so on further exposures. Hankel found that, of two silver plates immersed in water, the plate exposed to white clouds, or to the setting sun, was negative.

II.—Silver Plates in Dilute Acids.

Becquerel found that with plates of gold or platinum, immersed in acid solutions, the plate exposed to the light was always positive. The same rule seems to apply to silver plates in most cases, but not in all.

Dilute Sulphuric Acid.—The action of dilute sulphuric acid upon silver plates under the influence of light seemed to be rather irregular, the exposed plate being sometimes negative on first exposure and positive in subsequent exposures, or *vice versâ*, but the general tendency seemed to be for the exposed plate to be positive.

In distilled water acidified with one drop of ordinary sulphuric acid in sixty c.c. of water, the exposed plate was generally positive when exposed to bright sunshine, but on two occasions it was observed to be negative.

In tap water similarly acidified, the plates appeared to be negative on first exposure, under white or coloured glasses, and on being exposed again later were also negative, but became positive and more sensitive both to white and coloured light. The plates were very sensitive to changes in the strength of the light.

With plates immersed in distilled water containing one per cent. of acid, it was found that, if the plates were exposed to sunshine a very short time after being immersed in the dilute acid, they were at first negative and fairly sensitive to light; but, in a case when the plates had been kept in the cell for twenty-four hours to reduce polarisation, they were positive and much less sensitive than the plates which were negative. After being exposed a few times they lost all sensitiveness.

In tap water containing the same proportion of acid, the exposed plates were generally positive on first exposure, but the current quickly decreased on subsequent exposures, and in some cases the exposed plate became negative.

With plates immersed in distilled water containing two per cent. of acid the deflections were usually positive, and the plates became less sensitive by repeated exposure and by keeping.

With plates immersed in freshly mixed dilute acid at five per cent., the exposed plates were positive on first and subsequent exposures, but with plates kept in the acid for twenty-four hours the first plate of the pair was negative when exposed; but, when the unexposed plate was also exposed, it remained positive. The increase of acid lowered the sensitiveness of the plates.

Dilute Nitric Acid.—With nitric acid the exposed plates are nearly always positive, and the action is more uniform than with sulphuric acid, especially when dilute solutions containing one per cent. or more of acid were used. Becquerel also found the exposed silver plate positive in dilute nitric acid.

Dilute Phosphoric Acid.—With dilute phosphoric acid the exposed plates were almost always positive. On first exposure they showed fair sensitiveness, but it rapidly decreased on further exposure.

Dilute Hydrochloric Acid.—With one per cent. of hydrochloric acid, s.g. 1·150, in distilled water, the exposed plates were uniformly positive, and, owing to the formation of a deposit of chloride, they were much more sensitive to light than plates immersed in acids which do not form a sensitive compound with the silver. The sensitiveness was greater according to the time the plates had been kept, but was reduced by increase in the strength of the acid. Coloured glasses all gave positive deflections, the red being the smallest, and then the green.

Dilute Hydrobromic Acid.—With dilute hydrobromic acid the exposed plates were uniformly *negative* and very sensitive to light. Coloured glasses gave fairly large negative deflections, the red being the smallest, and then the yellow. The plates were coated with a grey greenish-yellow deposit of bromide, which turned dark on exposure.

Dilute Hydriodic Acid.—A dilute solution of the acid was roughly made up by precipitating a solution of barium iodide with sulphuric acid. There was, however, a quantity of free iodine present, the solution being of a light sherry colour. The exposed plate was strongly negative in sunshine, but comparatively very insensitive to weak daylight. Coloured glasses gave negative deflections, the red and green being the weakest. The plates became less sensitive by keeping. They were covered with a strong loose deposit of iodide, under which the silver surface was darkened. A faint image of the exposed part of the plate was visible.

Dilute Glacial Acetic Acid.—In dilute glacial acetic acid at one per cent. the exposed plates were positive, but became less sensitive by keeping. In a five per cent. solution the exposed plate was also positive, but less sensitive than in the weaker acid.

Dilute Formic Acid.—In dilute formic acid at one per cent. the exposed plate was positive, but after being kept in the cell for twenty-four hours became much less sensitive.

III.—Silver Plates in Alkaline Solutions.

Becquerel found that, when platinum or gold plates were immersed in alkaline solutions, the plate exposed to light was negative. This rule does not appear to hold good with silver, the exposed plate being almost always positive.

Solution of Caustic Potash.—In a solution of caustic potash at one per cent. the exposed plate was positive and fairly sensitive. Coloured glasses gave position deflections, the red and yellow being the smallest.

Solution of Potassium Carbonate.—In a solution of anhydrous potassium carbonate at one per cent. the exposed plate was positive and fairly sensitive to diffused daylight as well as to sunshine, more so than in the solution of caustic potash.

In tap water with a few drops of 10 per cent. solution added to 60 c.c of water, the exposed plates were also positive and very sensitive on first exposure, but the sensitiveness decreased with the further action of light, and also by keeping the plates in the cell.

Solutions of Sodium Carbonate.—In a one per cent. solution of anhydrous sodium carbonate in distilled water the exposed plates were positive, but much less sensitive than with the potash salt, and further lost sensitiveness by subsequent exposures. With a stronger solution at five per cent. the results were similar, but the plate appeared somewhat more sensitive.

Solutions of Lithium Carbonate.—With plates exposed shortly after immersion in a one per cent. solution of lithium carbonate in distilled water, the plate exposed to sunshine was positive. The plates lost sensitiveness after the first exposure, as well as by keeping, but remained positive.

Dilute Solutions of Ammonia.—With a solution of four c.c. of strong liquid ammonia in 100 c.c. distilled water, the cell having been left standing fourteen or fifteen hours, the exposed plate was found to be positive, but exceedingly insensitive.

In a freshly mixed solution of half the above strength, the exposed plate was rather more sensitive, but the sensitiveness decreased on further exposure, and after a short time the plate became quite insensitive.

Potassium Cyanide.—With solutions of potassium cyanide at one per cent. there is a strong polarisation current which takes several hours to subside. When freshly immersed, the exposed plate was negative, but not very sensitive. On subsequent exposures the plates were first nega-

tive and then positive, and gradually lost sensitiveness. Some peculiar reversals and polarisation currents were observed, which require further examination. The plates were coated with a dark grey deposit, thicker at the upper part of the plate than at the lower. About the immersion line there was a yellowish white deposit, and the plates were deeply corroded, but no sign of an image of the exposed part was visible.

Plain Silver Plates Dry.—When a silver plate about 5×4 inches, not immersed in any solution, but with its ends connected by silver bands to the terminals of the galvanometer, the directing magnet being placed so as to increase the sensitiveness of the galvanometer about thirteen times, was exposed to light, so that one-half remained unexposed, it was found possible to detect a slight current between the exposed and unexposed halves of the plate, the exposed half being positive to the unexposed. With a plate that had been lying by for some time, and was not cleaned before exposure, the deflection in bright clear sunshine was fairly large, amounting to about ten divisions or rather more than the deflection caused by the contact of dry zinc and copper. When the plate had been cleaned with cyanide of potassium, followed by rubbing with emery cloth, the deflection on exposure was still positive, but much smaller, and became less by subsequent exposures.

Some other very pure silver plates, about 999·5 touch, also gave positive deflections on first exposure, but very small, but sometimes the deflections were negative, or became so by prolonged exposure. With silver deposited on glass the deflections were sometimes negative and sometimes positive, but always very small. These effects did not seem to be due to heat, because with the plate first observed, and with the purest silver plates, the action of heat applied at the exposed end of the plate was to cause a positive deflection, but with other silver plates not quite so pure, and with some largely alloyed with copper, the heated end of the plate was always negative to the cool end. The deflection invariably increased with the continuance of the heating and was always in the same direction on repetition of it. The light currents, on the other hand, showed a decrease of deflection from repeated exposures, and sometimes a change of sign contrary to the heat currents shown by the same plates. The observation is a very difficult one, and requires further repetition, under more favourable conditions of light and weather, in order to obtain definite results.

From the above experiments it would appear that, as a general rule, sunlight has an oxidising or dissolving effect on silver, whether in acid or alkaline solutions, the exposed plates being nearly always positive and consequently forming the anode of the voltaic couple. With solutions decomposed by silver and forming sensitive compounds with it the action is variable.

STEREOSCOPY.

[Fairfield Camera Club.]

One would think it hardly possible in these days to meet with anybody who does not know what a stereoscopic slide is, but I assure you it is not an infrequent occurrence to find good photographers who have not the slightest idea why a stereoscopic slide consists of two pictures, or in what way these two pictures differ; and, indeed, I might even go a step further.

Not very long ago a member of this Society called upon me, and, in the course of conversation, he said that he had never seen any use in stereoscopic slides; he had a stereoscope and some slides at home, but he could see the pictures best without the stereoscope. I gave him some of my slides to examine, and he very soon altered his ideas, and became deeply interested, and wanted to know more about them. In the course of a very agreeable chat, I asked him if it had ever occurred to him why he had two eyes? "Oh, every fool knows that!" he said; "it's so that, if I get one knocked out, I have another to fall back upon." But I think our friend would be able to give a better reason now for his having two eyes, for he has since become a most enthusiastic stereoscopist.

Binocular Vision.

Now, as the whole principles of the stereoscope are involved in binocular vision, we had best begin by a little consideration of the sense of sight.

The sense of sight has been called distant touch; it enables us to perceive light, and to distinguish bodies, not only as to their colour, form, and distance, but also as to their motion or repose.

The organ of vision is composed of a *receptive apparatus* and an *apparatus for transmission*. As a receptive apparatus we may compare it to a photographic camera and lens. We have a nearly globular chamber, composed of a thick, strong, white substance—the *sclerotic coat*—part of which is seen as the white of the eye. The inside of this chamber is interlaced with minute blood vessels, covered again by a thick black pigment, called the retina, and the whole is filled with a transparent jelly; in front is a transparent convex membrane (the *cornea*), fixed, like a watch glass, into the sclerotic coat, and behind this is the *crystalline lens*, covered in front by a curtain, which is perforated by a round hole in the centre, and is called the *iris*.

It is by means of the crystalline lens, which is bi-convex in form, that images are formed on the retina, and, as in the case of any other bi-convex lens, the image formed is inverted, just as the image formed by a photographic lens is inverted on the ground-glass screen of the camera; but, as we all know, the photographic lens, as it is generally used, has no fixed focus; the nearer an object be brought to such a lens, the further from the lens, on the other side, the sensitive plate must be placed, and *vice versâ*. For this reason we have a rack-and-pinion movement to our camera for focussing; but in the eye we have no rack-and-pinion movement, but we have an elastic lens which automatically flattens or bulges, to become longer or shorter in focus as we observe distant or near objects; thus the crystalline lens has the *power of accommodation*, as it is called.

The iris, too, is automatic in the adjustment necessary for more or less light admitted to the eye.

The receiving surface for the inverted image is, as has been said, the *retina*, which is an expansion of the optic nerve by which light impressions are transmitted to the brain. The eye thus receives impressions for the inspection of the mind.

But the *retina* is not equally sensitive over its entire surface; indeed, there is but one spot near the centre where distinct vision is possible. This is a yellowish depressed spot, sometimes called the "pit" (or *forea centralis*), so that, when observing natural objects, we only see distinctly a very small area at a time, all other parts are indistinct, or what a photographer would understand as out of focus, or very inferior definition; but the rapidity of the movement of the eye enables us to combine the successive images, and we know, from experience and the sense of touch, what they mean. To make this part of our subject still more clear, let us look at a landscape in nature. We concentrate our attention upon a tree. Now we see only the tree or a portion of it distinctly for the moment, all other parts of the landscape are more or less out of focus; but, as we desire to see other parts of the landscape, the movement of the eye and the accommodation of the crystalline lens instantly adjust themselves to produce sharp or distinct impressions of whatever part we turn our attention to; thus, "whatever we want to see we look at, and we see it distinctly; what we do not look at we do not as a rule care for at the moment, and so do not notice how imperfectly we see it.

Here I would suggest that a little study of the theory of vision might assist the followers of the school of out-of-focus photography—misnamed naturalistic photography—to a modification of their ideas.

Inversion of the Retinal Image.

Well, up to now we have only very briefly considered vision with one eye, and before we leave this part of the subject I must remind you again that the retinal picture is inverted both as regards top and bottom, and right and left, of the actual objects just as the image is inverted on the camera ground glass. Then the question follows, How do we get the impression of their true position? The theory of vision cannot be explained by anatomical facts, so that many hypotheses have been invented to explain it. The most reasonable of these is that of the late Professor Fick, by assuming that, as all retinal impressions are conveyed to the brain for the inspection of the mind, the nerves of sight and those of feeling are co-operative, or in correspondence.

If some of us forget our own first difficulties in composing a picture on the camera ground glass, we can care to mend the difficulties of photographic tyros. It is only by constant practice that we can adjust our instrument, and, when this is attained, there is no difficulty in arranging the composition of our picture; we may cut off the foreground, balance the sides of our picture with perfect ease—in fact, so accustomed are we to the inverted image on the ground glass, we do not even notice that it is so; but, when the negative is developed and printed, we can no longer tolerate its inversion, and to judge of its composition, or even to examine its detail, we turn it right side up.

As I stand now, I see the President in his chair, and, although the image of him on my own retina is inverted, I know that his head is up and his feet are down; and if I now turn my back upon the President, and assume the ungraceful position by bending my body with my head down between my legs, the retinal image of the President will be *reversed*, but I have still the impression that his head is up and his feet down.

Another instance of the correspondence in the sense of sight and that of touch is demonstrated by a man who shaves before a looking-glass. Those who are not accustomed to shave are in fear of cutting themselves, for the razor seems to go the wrong way. The same thing is experienced by young microscopists in attempting dissections under a microscope.

But it is time we began to consider vision with two eyes, or

binocular vision as it is called. When we look at an object with two eyes we receive two retinal images, one in each eye, and yet, under normal conditions, only one impression is produced in the mind. We direct the optic axis of both eyes to the one object, therefore they converge, and the images, falling upon corresponding parts, are transmitted by corresponding nerves, which may be described as bundles of fine fibres, the inside set of which cross like the reins of a pair of horses, and are brought together before entering the brain.

Convergence of the Optic Axis.

The power of convergence of the optic axis to one point is attained in infancy, and I have no doubt many present can call to mind a very young baby before it begins to "take notice" has a very vacant look about the eyes; it disregards the fond father as he approaches or recedes. The nurse draws her hand over the organs of vision as she notices the baby's eyes sometimes diverge, and this, she says, is to prevent it from having a permanent squint; soon the baby acquires the power of convergence, and then the nurse says baby is beginning to "take notice." But everything is to the baby upside down as yet; very often the bottle gets knocked over, and sundry other things go wrong, the baby begins to turn and twist its little hands about and examine them very carefully. Now is the time the direction of motion is beginning to be learned. Then toys are given, a soft ball, say, which baby throws away and cries for it to be brought back; no sooner is it restored than away it goes again, and father says it is getting tiresome. Then it hits its little nose, and cries again. Now, the facts are, the baby did not intend to throw away the ball or to hit its nose—things went the wrong way, like the razor to the man who is not accustomed to shave. Later on, other toys are given to the child, which are turned over and over; then the sense of touch and of sight are becoming associated, and soon we gain experience.

It is by this convergence of the optic axis that we are enabled to estimate the third dimension, distance; but it will be seen that when we view an object in nature with two eyes the retinal images are not alike, because they occupy different stations, just as if we take a photograph, then move the camera the distance our eyes are apart, viz., 2½ inches, and expose again, the two pictures will be dissimilar; and it is by the association in the mind of these two dissimilar retinal pictures that we know from experience we are looking at a solid object or a landscape in nature. If we place two similar objects, say, two billiard balls, in the centre of a billiard-table, and look at them with two eyes, we shall see two balls of a certain size and at a certain distance; but, if we direct the axis of the right eye to the right-hand ball, and the axis of the left eye to the left-hand ball—which may be done by two tubes—there will be the retinal image of only one ball in each eye, and the mind will unite these as one, and we see them as only one ball; but, in consequence of the optic axis having little or no convergence, the 'one ball' looks very much further away, and therefore very much smaller.

It is also quite easy to concentrate the attention on an image formed in one eye, and to disregard a different image formed in the other eye, as is the case when a microscopist applies one eye to his monocular instrument, at the same time keeping the other eye wide open; he sees only that which he concentrates his attention upon (through his microscope); this is called the *rivalry of the retina*.

Now, it will be understood that a man with a permanent squint, that is to say, having no power to converge the optic axis to one point, would most certainly see double, if it were not from the fact that he disregards the retinal image of one eye, and consequently he sees no better than a man with only one eye. This experiment may be tried by rolling two pieces of note paper into tubes, and applying one end of each to the two eyes, at the other end diverging objects may be observed through either tube, and seen distinctly, but it is impossible to see distinctly through both tubes at one time.

Now we are able to perceive that, although with two eyes we converge to the same spot and see that spot distinctly, the indistinct image or out-of-focus parts of the object or of surrounding objects are not alike in each eye, and by falling upon portions of the retina which are not in correspondence these images are doubled, but by being indistinct and our attention not upon them for the moment we do not notice that they are double. Here is an illustration: If I hold my finger, say, 8 inches in front of my nose, and now look at the wall opposite, first with one eye and then the other, there will be certain parts of the wall obliterated in each case because my finger blocks the way, but when I open both eyes there is no portion of the wall I cannot see, notwithstanding that the finger still remains, and the indistinct image of the finger gives me the impression that two fingers are there; indeed, I really see indistinctly *two* fingers, but, my attention being upon the wall, in the ordinary course of things I should not notice the finger at all.

If, now, we look at a box on the table with one eye, we get an impression such as a single photograph would produce; with the other eye we get another view of the box; when we open both eyes these different images are by experience from infancy associated with what we know to be a solid box of a certain size and depth and at a certain distance.

If the box be removed to a more remote position, we see it with less convergence, and we estimate its distance by the amount of convergence more or less; then, if we move two photographs of the box, such as would be seen by the right eye and the left eye separately, and present these to their respective eyes separately, the mind combines the retinal images, and we get the same impression of size, shape, and distance as in nature, colour, of course, being absent.

To do this is the science of stereoscopy. Stereoscopic photographs are, for various reasons, generally taken on one plate by a camera provided with twin lenses and a division inside the camera, so that we have practically two photographic apparatuses combined in one body. Now, the picture taken by the right-hand lens must be presented to the right eye, and the picture taken by the left-hand lens must be seen by the left eye. And now let us see how this is to be accomplished in practice.

Stereoscopy in Practice.

We hold a stereoscopic negative in the same position that the plate occupied at the time of exposure, viz., inverted, with the film side away from us the picture taken by the right-hand lens is on our right; if we turn the negative to get the image right side up, as we say, we find the right-hand picture is now on our left, and a print from the negative would have the same fault. This is caused by the fact that each photographic lens inverted its image independently of the other, and what we have just done with the negative is to reinvert the two together; and the only way to correct the inversion caused by the lenses is to reinvert the two separately, or, what amounts to the same thing, transpose the pictures. Sometimes this is done by cutting the negative, and then a single print may be taken from the transposed negative and mounted in the ordinary way as for a single print; but as there are some delicate points to observe, and as amateur photographers are not usually expert glass cutters, the transposing and trimming is oftener done in the prints.

In making transparencies on glass from uncut negatives a special printing frame is generally employed by which the right-hand side of the negative is printed on the left end of the transparency plate, then a second exposure is made on the other end of the plate from the left side of the negative, or the same camera and lens used to take the original negative may be employed as a copying camera, in which case the lenses reverse the negative image independently, and thus transpose at a single operation, or with one exposure.

Size of the Pictures.

The next thing to consider is the size of a stereoscopic picture, and to arrive at this we must not forget many things that have been said; we know that the pictures must be observed with no more and no less convergence than would be employed in viewing the natural object or we shall get wrong impressions of distance, and therefore of size, and, as our eyes are only 2½ inches, or 2⅝ inches, apart, it would seem that to be able to see corresponding points in pictures mounted at wider centres a divergence of the optic axis would be necessary; but by employing slightly prismatic glasses in the stereoscope it is quite possible to combine pictures up to 3 inches centres, but any increase on 3 inches is apt to produce a strain upon the eyes and become so painful as to condemn the stereoscope.

If 3 inches be considered the limit, it is clear that the pictures cannot be larger than 3 inches wide. The depth is not controlled by the same conditions, and may be anything up to 4 inches or more, consistent with the composition of the view or the taste of the photographer. Now, objection has been taken to the smallness of stereoscopic slides, but the objection has no foundation in fact, for it has been clearly demonstrated on many occasions that when a photograph is viewed at the angle at which it was taken, that is to say, at a distance from the eye of the observer equal to the length of focus of the lens employed to tone the negative, we get the apparent natural size of the object; thus a 3-inch square picture taken by a 5-inch focus lens, and viewed at 5 inches distance, would convey the same idea of size as another picture 6 inches square taken by a 10-inch focus lens, and viewed at 10 inches distance: it follows, then, that if a stereoscopic negative be taken by 5-inch focus lenses, the stereoscope should have lenses of the same focus, for in that case we have the apparent natural size, and therefore larger pictures would have no advantage. Of course, when a picture or a photograph is framed, or even mounted in an album, there are surrounding objects that are taken notice of, and these may interfere with the retina impressions;

but by a stereoscope all surrounding objects are excluded, we should see nothing but the picture, and for this reason the card mounts for paper slides should be black or very dark in colour (not to be seen), and when transparences on glass are printed they should be bound up with black paper marks showing nothing but the actual picture.

W. I. CHADWICK.

(To be continued.)

NOTES ON A MONTH'S TRIP TO CHICAGO.

In these days of ocean travel there is little of interest to record in the short journey across the "herring-pond." We embark in one of the floating palaces, and in a short week find ourselves on *terra firma* in the New World. If it were not for the general *bonhomie* of the passengers, short as is the passage across the Atlantic, the voyage would indeed be monotonous. Very few vessels are sighted, and, as one gazes around, nothing meets the eye but sea and sky, and sky and sea. There may be a remote possibility of sighting an iceberg, or, as the banks of Newfoundland are neared, where the warm Gulf Stream encounters the cold current from the Arctic regions, an impenetrable mist may envelop the vessel in its clammy shroud. Then the fog-horn intermittently belches forth its deep, harsh, guttural sound, to the annoyance of all on board, as the steamer ploughs on its way.

The excitement of the passengers grows intense as the land discovered by Columbus hoves into view. Even the yellow-faced occupants of various deck-chairs throw off their lethargy and pick up fresh courage at the prospect of ridding themselves of the nausea demon. Soon the vessel crosses the bar and enters the Bay, passing some massive battlements at the entrance. As it steams through the Narrows, between the villa-crowned shores of Staten and Long Islands, those who possess cameras are busy depicting each point of interest as they are unfolded to the view.

Bartholdi's colossal statue of Liberty is soon passed, and the city of New York lies before us, with that marvellous specimen of engineering skill, Brooklyn Bridge, in full view. The ship is soon berthed in one of the docks, which, by the bye, do no credit to an enterprising country like the United States, nor to a city of such pretensions as New York.

After the usual customs declarations have been made, we land, and, having collected our baggage, proceed to the Customs Office, where, on presenting our ticket, an officer is deputed to overhaul our trunks. (Note.—Don't wait until they come, but get your ticket without loss of time, for it is first come first served here.) The camera is duly investigated, but after due explanation it is admitted free of duty. Having consigned our baggage to an express agent, we proceed on foot to the hotel.

Two days are spent in visiting the lions of the city. An elaborate system of elevated railways and tramways facilitates locomotion. The paving of the roadways, however, leaves very much to be desired, and the elevated rails, although a convenience, are by no means elegant structures. Besides being obnoxious to the inhabitants of the houses in the streets which they traverse, they are a source of annoyance to the unwary foot passenger, who is liable to be bespattered with hot, rancid grease from the engines of passing trains. Central Park, of which the New Yorkers are justly proud, possesses many attractive features, engineering skill having remedied most of the defects of nature.

From New York the train is taken to Philadelphia, and a day spent there. The City Hall of Philadelphia is an immense solid and substantially constructed building, reputed to be the largest in the world used as business premises. From the top a splendid panorama of the city and the adjacent country can be obtained. Independence Hall, of historic interest, stands in the heart of the city, and there are some pretty spots worth photographing in Fairmount Park, the largest park in the world. An evening train lands us in the course of three hours at Washington, a city well worthy of its title, the "Queen of Lilies."

The site of Washington has been admirably chosen, and nothing could improve the positions of the many fine public buildings it possesses. The Capitol, a magnificent structure in white marble, one of the finest architectural designs in the world, is imposingly situated on a hill overlooking the city, and lends itself agreeably to the art of the photographer. A trip down the Potomac River to Mount Vernon, the home and burial place of George Washington, results in many pretty views being obtained. From the top of Washington's Monument, the highest in America, a splendid panorama of the city, the Potomac River and the distant hills is spread out before us. Two days spent in Washington are hardly sufficient to see and photograph everything of interest.

Leaving Washington in the evening, we take the train to Chicago, the objective point of our expedition. The railway traverses the renowned Alleghany Mountains, passing through beautiful mountainous scenery. As it travels on its upward course, valley after valley unfolds itself to view, with distant ranges of blue hills; now it crosses a mountain stream, then taking a sinuous course at high speed, on the brink of a wooded precipice, until it reaches the highest point 3000 feet above sea-level.

Then it gradually descends again, and morning finds us steaming along the banks of the Ohio. Another 300 miles or so over flat uninteresting prairie land, and we arrive at Chicago.

Everything in Chicago is on a colossal scale, hotels forming cities in themselves, theatres to seat thousands, public buildings and business premises towering many stories high that it becomes painful to look at their summits.

The main feature of Chicago is its magnificent boulevards, and the citizens may well be proud of them. They traverse miles and miles of the city, and are lined on either side with private dwellings of quite a particular style of architecture which has received the name of Chicagoesque. A bit of Norman, a bit of Grecian, a bit of the seventeenth century, and then some addition to suit the personal taste of the occupant, and we have it.

The Exposition fully indicates the desire of the Chicagoans to do things on a colossal scale. The immensity and grandeur of the various building are certainly marvellous. For the modest sum (?) of two dollars per diem, a camera may be taken within the precincts of the Exposition and the photographer will find much to interest and much to amuse him. The varied styles of architecture, the crowds of people of all nationalities, the villages and inhabitants of different countries, the gaily dressed Turk with a strong Hibernian accent, Greeks, Muscovites, Javanese, Esquimaux, and many others, are all seen under native conditions.

It is truly said that the Americans can build an Exhibition, but their management leaves much to be desired. Apart from the catalogue being misleading, the guides who are stationed to direct visitors seem ignorant of the position of the exhibits.

I was very desirous of seeing all that was new in the optical world and what improvements in lenses, cameras, and optical lanterns were being exhibited. A diligent search and numerous inquiries resulted in my arrival at length in the section devoted to same, which is sixty feet above the ground floor and in such an out-of-the-way place that no one would see it casually.

To say I was disappointed with the number of exhibits is only repeating what others interested in optical matters have said; and, although the majority of those who were showing photographic instruments are well-known firms whose apparatus enjoys a good reputation, the absence of anything decidedly novel was marked. Perhaps the annual exhibitions of the Photographic Society of Great Britain and the off-recurring exhibitions at the Crystal Palace and elsewhere has made as familiar with recent inventions, and so there was little left in the way of a surprise for visitors and our American cousins.

On leaving Chicago we take a night train to Niagara, as a visit to America would not be complete without seeing the Falls.

The first sight of the Falls is disappointing, but their immensity and grandeur gradually impresses one. Here there is plenty of field for the camera, as so many different views can be obtained of the Falls and the Rapids on all sides.

A night train conveys us to Albany, the capital of New York County, from whence we go aboard one of the magnificent river steamers that ply on the Hudson.

The Hudson is a grand river, in some places three miles wide, and the scenery on its banks is very grand. With a long-focus lens many fine views can be obtained, but the vibration of the steamer is not conducive to perfect negatives. New York is reached in the evening and the following morning we board the mail boat on our homeward journey.

No difficulty was found in changing plates, the photographers very obligingly allowing use to be made of their dark rooms without any charge whatever.

J. J. STEWARD.

WALTHAM CROSS.

WITH an intention of catching the 10.25 from Liverpool-street and arriving full early, brought a wee bit of good fortune by getting the one earlier at 10.5, a quicker and better train, reaching the destination with only about two stoppages. This train seems much patronized by the followers of the gentle craft. The Great Eastern Railway carry many to the banks of the Lea. Our compartment is very crowded with bundles of rods and fair-sized wood boxes, holding enough to outfit a family in clothing. Each have more or less length of rope as handles, and generally fitted through with every care to drawers and partitions, all to carry artful devices to deceive the bright, lively members of the finny species. While many are gentle in hobby, some are noisy in voice, and far from decent in language. When one reaches manhood's function it is to be regretted he wastes so much breath to so bad a purpose. In his own estimation he may feel taller much, but those not so closely and nearly related may consider him lower, if not very low indeed.

At first reaching Waltham Cross, nothing pretty is noticeable only for its noticeable absence. Taking a turn to the right from the station, innumerable narrow streams suddenly dart out in all directions, from under house windows, beside and under the road, and between rows of houses, all clear as crystal, and alive with small fry. The abbey now soon makes its appearance in the near distance—a noble, strong, firm-built-looking structure, standing as it does at the top of the main street. To this hangs a pile of age and history. It made its *début* about 1100, and suffered itself to be knocked and cut about from its original cross shape to its present with seeming indifference, to suffer so much as one would suppose. History of this and the brave Harold will a tale unfold to those who care to make its reference—and an interesting one, too. Hard by still stand the stocks, full of ancient carving and memories.

We were assured there is yet a man living near who remembers them in full active use. Beside the abbey stands an inn, and a very old one too. The present host is a genial man, a good assistant and pilot to the tramping amateur. Half a glance tells him to be a military man and a man of the world. If you play cricket, and cricket your hobby horse, with him you are at once at home and at your ease. If there is one thing he more glories in than the antiquity of his home and its surroundings, it's cricket. Feeling our knowledge to be dull on this particular spot, we spoke of photography and our requirements. You have only to leave the old-fashioned room, take three steps, and find the yard all that can be desired. It's been standing so 400 years. It's the old-fashioned coaching yard one sees often engraved, but not in reality; here you have the reality without the engraving. This old house is called the "Cock Inn."

You may get one or two views of the yard. Mr. Ward will willingly and pleasantly, if you wish, take you under his wing, and, within a distance of a couple of hundred yards, show you some fine bits and their best points. We saw the effective corners, and felt far from happy. To do them was next to making money for comparison of difficulties. The wind saw our desires and groaned and went on much, and that dreadful. When the camera became a standing figure, it raged and became perfectly wild with delight at such presumption. He snatched the focussing cloth and vibrated the camera. We waited, to wait him out. This could not be done; the more we tried the greater he laughed and became tearful, just remaining quiet long enough to consider removing the cap, when he would quickly and carefully place a dense cloud before the shining sun, then allow it to peep through in all its beautiful glory, and in the next turn start the trees waving their arms in wild pleasure. For one hour we waited, and ate sandwiches, and still he went along as only the wind can, till we confessed our defeat and accepted his least noisy turn and uncapped the lens, recording a little bit of English landscape showing the quaint Harold's Bridge (the oldest in England). The *Sporting and Dramatic Paper*, dated June 30, 1888, gives it as the second oldest, and at the same time a chatty, interesting article, made especially so with eleven sketches of spots round about. Anyway, whether the oldest or its next junior makes but little difference. It's an "old-un" anyway, built of stones, and jolly old stones they seem—ever watching and keeping guard over a tiny stream of clear, baby innocence, gliding on its ever-moving course, quite careless and regardless of the stern, time and weather-beaten, stone-hearted father bridge above it.

The old gateway is in good preservation considering its age, and good for a picture with ruined abbey viewed in the distance. Such bricks! many measuring 15 inches in length. Our forefathers did with the secret of brick-making, and carried it with them. So bright are they in colour and tough in texture, a lazy Socialist would rather do one class of strike than break such walls as these. By now you may receive slight notice the inner man would prefer some consideration. You once again hie for the "Cock" Inn and its master, where, and by whom, you may be suited to your wishes either in lunch, dinner, or tea.

After a comfortable meal and pleasant chat, you away to another direction, working on pictures of another character, consisting of a ruined wooden shanty standing on the edge of the narrow stream, with distant view of small ruined-looking bridges. Many are the different bits of this kind here obtained, that one's half-dozen plates are soon gone, to the sorrow of the photographer. Finding you have pleasantly and quickly passed a few hours, you, with a feeling of strong reluctance, put away your last slide, determined soon to return, possibly with another chum, who may have full play with a roller slide of unlimited exposures; in fact enough—time, tide, and weather permitting—to swallow up all Waltham Cross.

TOM COAN.

A DEVICE TO TAKE THE PLACE OF THE CAMERA LUCIDA IN MICROGRAPHY.

THE art of micrography, or the reproduction on paper of images of minute objects seen through the microscope, says Dr. H. G. Piffard in the *New York Medical Journal*, may be practised in various ways, of which the three following are the principal:—

1.—The observer studies the object on the slide, and when he thinks he has the outlines and details, or a portion of them sufficiently impressed on his mind, withdraws his eyes from the tube, and commits the mental picture to paper, using, of course, both eyes in direction of movements of his pencil. Success with this presupposes a retentive memory and considerable skill as a draughtsman.

2.—The observer, looking down the tube in the usual way with one eye—for convenience, the left—is, after a little practice, enabled, by a sort of auto-projection, to see an image of the object on a sheet of paper by the side of the microscope. The outlines of this image he traces with the pencil, using the right eye to direct its movements, the observation and the reproduction being simultaneous.

3.—By the aid of a camera lucida, of which there are many different sorts, a reflected or projected image is visible on the paper with the eye that is at the same time occupied in directly observing the magnified image of the object on the stage. In one of the latest forms of camera lucida—the Abbe—this use of half the eye for observing, and the other half for recording, is a reasonably convenient method, if the observer's eye is approximately normal; marked myopia or hypermetropia, and still more pronounced astigmatism, necessitating the use of spectacles, render the use of the camera lucida inconvenient, if not well-nigh impossible.

Some time since it occurred to the writer that the practice of micrography could be greatly simplified by adopting the principles employed in ordinary projection, as used in connexion with the optical lantern, the projection microscope, photography, &c. It was only a question of reflecting the projected image on to a piece of drawing-paper fixed in some convenient position. To this end I requested Messrs. Bausch & Lomb to mount a right-angled, reflecting prism with a short tube extending from one of its square faces, this tube to be of such calibre that it could be inserted into the microscope in the place of the eyepiece. From the other square face a similar short tube extends, capable of receiving the ocular and holding it firmly.

When preparing to use this device, the object is placed on the stage and focussed in the usual manner. The microscope is then brought to a horizontal position, the eyepiece is removed, and the prism case put in its place, the ocular being inserted in the short tube provided for its reception. The ocular should point downward. The lamp, or other source of light, should then be disposed in such a way that it properly illuminates the object to be examined, it being expressly understood that no light shall escape toward the observer except that which first reaches the object. A Beck lamp is conveniently adapted to this purpose. If a piece of drawing-paper is placed beneath the ocular, and the room darkened, a brilliant image will be projected on the paper, and its reproduction can be easily accomplished with a maximum of rapidity and a minimum of discomfort. In guiding the pencil the draughtsman uses both eyes, and his spectacles, if needed, and sits in whatever position he finds most comfortable.

With a proper lamp, and careful utilisation of its light, this device gives excellent results with amplifications up to four and five hundred diameters.

If a sensitive photographic plate be substituted for the drawing paper, an exposure of a few seconds will impress an image that may be developed in the usual way.

Our Editorial Table.

FALLOWFIELD'S PHOTOGRAPHIC ANNUAL, 1893-4.

THE *Annual* of Mr. Jonathan Fallowfield is, as our readers are probably aware, an illustrated catalogue of the goods manufactured or sold by the firm. When one looks over the 700 pages contained in this *Annual*, he is tempted to exclaim, 'Prodigious!' and wonder at the fertility of invention by which photographers could be enabled to usher into the world such a variety of articles in furtherance of their calling. When we say that there are twenty-four columns of index, it will be seen how unnecessary it is for us to even indicate the contents of such a compendium, which appears to include everything. The "Hints," which formed a useful feature in the previous *Annual*, are reproduced, with some additions, and form useful reading matter. In addition to the woodcuts, it contains six pages of snap-shot illustration (two on a page) taken by the "Facile" hand camera. Post free, 1*s*.

ADAMS & CO.'S PHOTOGRAPHIC ANNUAL, 1893-4.

WE are glad to see that Messrs. Adams & Co. have reprinted in this *Annual* the leading articles by various authors which enriched the previous edition. There are certain topics which, when well treated, are useful for all time. In other respects the *Annual* forms a well-arranged *répertoire* of the specialities of the firm, numerous pages being devoted to cameras for both studio and field work, while of those belonging to the hand-camera family there is a very large assortment, among which the well-known "Ideal" occupies a central position. The variety of apparatus described, illustrated, and priced in this *Annual* of 400 pages is very great. It is nicely printed on toned paper. Price 6*d*., post free 1*s*.

PHOTOGRAPHS FROM MR. F. A. JOYNER, ADELAIDE, AUSTRALIA.

WE are always glad to see specimens of the work of brethren at a distance. Mr. Joyner has sent us some charming examples, showing two children at play with a garden roller. The expression, posing, and execution are admirable.

From Archer & Sons, Liverpool, we have received their supplemental list of new cameras and apparatus, together with their list of second-hand and soiled apparatus in stock.

Wratten's "London" Plates.

Messrs. Wratten & Wainwright, of 38 Great Queen-street, W.C., have now been making their justly appreciated plates for something like sixteen years, and their good qualities seem to have assured them a perennial popularity. As an example of their remarkable keeping properties, as well as an indication of the length of time sensitive preparations can remain unimpaired in quality, we may mention that some few months back we had an opportunity of trying some plates of the "Instantaneous" brand that had been made ten years ago. These, with normal exposure and pyro-soda development, yielded clean, vigorous, harmonious negatives. The plates did not appear to have undergone the slightest deterioration, either in rapidity or good qualities. Samples of the "London" plates (Instantaneous), made recently, were also subjected to trial, demonstrating by their ease of development, and charming richness of image that Messrs. Wratten fully maintain their high reputation in the plate making art.

News and Notes.

Photographic Club.—August 23, *Printing on Rough Paper.*

Northern Photographic and Scientific Association.—August 19 St. Albans.

Hackney Photographic Society.—August 22, *Photographic Mirrors*, by Mr. J. Miller.

Gosport Photographic Society.—August 19, Carisbrooke. Leave Portsmouth Harbour at twenty minutes past one.

London and Provincial Photographic Association.—August 24, *Glycin and other New Developers*, by Mr. L. E. Morgan.

Manchester Amateur Photographic Society.—August 19, Bollin Valley. Leader, Mr. J. Ferguson. Train, Central, thirty-five minutes past one.

Croydon Camera Club.—August 23, Whole-day Excursion to Forest Row, conducted by Mr. H. Maclean. Train leaves East Croydon at thirteen minutes to ten.

Photographic Society of Great Britain.—Technical Meeting, Tuesday, August 22, at 50, Great Russell-street; subject, *Aluminium Flashlight*, a demonstration by Mr. Bolas.

Leytonstone Camera Club.—August 19, Along the Roding. Leader, Mr. E. A. Golledge. The Club will assemble at Ilford Station, G.E.R., at thirty minutes past three. Open Social Evening at Headquarters, eight o'clock. 23, Special General Meeting to receive and pass new set of rules, and elect Assistant Secretary and Curator in place of Mr. Montague Atkinson, resigned. Chair taken at eight o'clock.

The Queen has accepted a copy of the Rev. C. Cæsar Caine's *Martial Annals of the City of York*, which was forwarded to Her Majesty by permission. The last section of the work embraces a review of the life of H.R.H. the late Duke of Clarence and Avondale during his four years' residence in York Garrison. This book was noticed, with an illustration, in a recent issue of The British Journal of Photography.

Messrs. Morgan and Kidd's Employés.—For many years the *employés* of Messrs. Morgan & Kidd have enjoyed an annual holiday together, and on Saturday, August 5, their extensive premises in Kew Foot-road were closed for this year's outing. The members of the party assembled at Teddington Lock, and, embarking on the *Windsor Castle*, the largest steam launch on the river, they had a pleasant run up to Hampton. They were received at Hampton by Mr. and Mrs. Kidd, at their charming house, Castlemaln, where dinner was served in a large marquee erected in the grounds. The tables were beautifully decorated with flowers and palms, furnished from the gardens and conservatories of the house, and were filled with an extensive and varied array of appetising dishes. About 100 sat down to a very enjoyable and well-served dinner. The usual toasts followed, and Mr. Kidd, replying to the toast of "Success to the Firm," said that the present year was a very notable one in the history of Messrs. Morgan & Kidd. For some years past he had been solely responsible for the direction of the firm, but at the beginning of this year Mr. Ernest Morgan and Mr. H. M. Dennes had been admitted as partners. He hoped that the success of the firm would be fully maintained, and that with new blood it would receive a still further impetus. Mr. Dennes gave a hearty welcome to and proposed "The Health of the Visitors," and and Mr. Ernest Morgan "The Health of Mr. and Mrs. Kidd," a toast always very popular. Year after year the company find themselves deeply indebted to Mrs. Kidd for the active and invaluable share she invariably takes in the organization of the outing, and her spirited speech in reply to her part of the toast was received with great enthusiasm. After dinner a photograph was taken of the whole party, and the launch was again boarded, and continued its run up the river until Penton Hook was reached. Tea was served on the return journey, and the run back was enlived by the diversified musical talent of the members of the party. Most of the songs were rendered in considerably better style than the average of amateur ability, and were very heartily received. Teddington was reached about half-past nine, and a thoroughly enjoyable holiday brought to a close, the whole of the company pronouncing it one of the most successful outings ever given by the firm.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 14,677.—"Improvements in or relating to Photographic Cameras." J. R. Gotz.—*Dated July* 31, 1893.

No. 14,839.—"Improvements in or in connexion with Photographic Shutters, known as Blind Shutters." H. R. Cook.—*Dated August* 2, 1893.

No. 14,877.—"Improvements in and in connexion with Projecting Lanterns." Complete specification. W. C. Hughes and H. Woodruff.—*Dated August* 3, 1893.

No. 14,902.—"Actinometer and Method of Measuring the Chemical Effect of Light." Complete specification. J. Kremer.—*Dated August* 3, 1893.

No. 14,925.—"Improvements in Photographic Cameras and other Optical Instruments." J. W. Gordon.—*Dated August* 4, 1893.

No. 14,927.—"Improvements in Photographic Cameras." E. H. P. Humphreys.—*Dated August* 4, 1893.

No. 15,056.—"Improvements in the Construction of Photographic Cameras." A. T. Livie.—*Dated August* 5, 1893.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 21	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 21	Fillebrook Athenæum	Fillebrook Lecture Hall.
,, 21	Hastings and St. Leonards	
,, 21	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 21	Richmond	Greyhound Hotel, Richmond.
,, 21	South London	Hanover Hall, Hanover-park, S.E.
,, 22	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 22	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 22	Hackney	206, Mare-street, Hackney.
,, 22	Paisley	9, Ganze-street, Paisley.
,, 23	Leytonstone	The Assembly Rooms, High-road.
,, 23	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 23	Southport	The Studio, 15, Cambridge-arcade.
,, 24	Glossop Dale	
,, 24	Hull	71, Prospect-street, Hull.
,, 24	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 24	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 24	Oldham	The Lyceum, Union-street, Oldham.
,, 25	Cardiff	
,, 25	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 25	Holborn	
,, 25	Maidstone	"The Palace," Maidstone.
,, 25	Swansea	Tenby Hotel, Swansea.
,, 25	West London	Chiswick School of Art, Chiswick.
,, 26	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

August 10,—Mr. Thomas Bedding in the chair.

Mr. A. M. Levy was elected a member and Mr. J. J. Briginshaw an honorary member of the Association.

Mr. J. Cole showed a hand camera, constructed according to his own design, the principal features of which were that it could take lenses of from four to nine inches foci, the front of the camera being used as a sky shade, and the rising front being either raised or lowered by means of screw adjustment. The finder is placed beside the lens, and the camera was fitted with reversing back. Mr. Cole said he was in the habit of attaching the camera to his waistcoat by means of a small chain. This freed one hand and steadied the camera.

Exhibitions of Members' Work.

A question was asked as to whether it would not be desirable to occasionally have a Salon Evening, at which members would put their best pictures on the walls? and, further, might not such evenings alternate with the Lantern Evenings?

After some discussion, Mr. H. M. Smith proposed and Mr. W. E. Debenham seconded, "That it is desirable to occasionally have a Salon Evening, at which members might put their pictures on view."

An amendment, substituting the words "an Exhibition" for the words "a Salon," having been carried, the resolution, as amended, was also carried.

Nikko Paper.

Mr. H. M. Smith showed an untoned print on Nikko paper. He said the prints were toned with a hot solution of alum and hypo, which was a very curious toning compound. Such prints had been exposed for two or three months to strong sunlight, and have shown no traces of fading whatever. He asked whether members thought there was anything likely to be hurtful to the keeping qualities of the pictures in the toning solution?

Mr. H. Mackie asked: "What was the object of toning the prints?"

Mr. Smith replied: "To get a warm or sepia colour."

Mr. W. E. DEBENHAM had experimented with the action of silver on cotton, using silver tartrate, reducing by heat. This, on washing, left a reddish colour, which exposure to the vapour of sulphuretted hydrogen changed to a rich black. In a few months sulphur-toned deposits became faded and yellow, whereas those reduced by heat stood very much better.

Mr. SMITH pointed out that a developed image had stood when a printed-out image had faded immediately. Toning built up the developed image, and enabled it to stand exposure to sunlight.

Mr. P. EVENITT said that Captain Abney had characterised sulphide of silver as the most permanent of silver salts.

MYSTERIOUS MARKINGS ON A NEGATIVE.

Mr. Everitt exhibited a negative having diagonal wave-like markings of less intensity than the rest of the image. The plate was developed with pyro, to which sulphurous acid had been added. Three plates showed the markings, but a fourth, from the same box, developed with pyro, with the addition of sulphite of soda, was free from them.

Mr. A. HADDON did not think the markings could be due to the sulphurous acid, which never came into contact with the plate, it being converted by the alkali into soda sulphite. Therefore the same markings should have come when sulphite of soda was used.

After other discussion the meeting terminated.

North Middlesex Photographic Society.—August 14.—This was a technical night, and the attendance was affected by the holiday season and also the tropical weather. An interesting talk was held as to the use of amidol as a developer for bromide and Alpha papers. Mr. GREGORY had tried it, and got good black tones with much shorter exposure than when using ferrous oxalate. He used the formula mentioned in *Photographic Scraps* for July. Mr. BEEDLE had tried it, too, and had succeeded also in getting good blacks with very little trouble, but could not get greys, which he rather wanted. Several other members related their experience, but the general opinion seemed to be that, to keep amidol under control, fairly large quantities of bromide were necessary, and this so slowed the action that it became no faster in use than ferrous oxalate, and that, after all, the latter had not yet been ousted from premier position with regard to paper. One member had tried it with Alpha, but found he could on development only get a green-brown tone, which was no good for after-toning, a warm brown being necessary, but this he had not succeeded in getting. Mr. BEADLE showed a series of prints showing the result of partial reduction of his negatives, thus removing the effects of halation in interiors or through trees, bringing out distance which which was over-dense and did not print through, &c. The difference of before and after treatment was most marked. He described his method as follows:—A solution of hypo of ordinary strength had an addition to it of a little strong solution of ferridcyanide of potassium—just enough to give it a yellow colour; a small piece of sponge is dipped into this, and then squeezed fairly dry, and the part of the *dry* negative to be reduced gently touched or rubbed with the sponge until sufficiently reduced. The next meeting is on the 28th inst., when the Sandell plate will be dealt with by Mr. Herbert Fry. Visitors are welcome.

Hackney Photographic Society.—August 8, Mr. R. Beckett presiding. Report read of August 5 excursion to Radlett. Members' work was shown from Messrs. Guest, Hensler, Pollard, and Selfe. Question: "What is the best method of reduction of a negative overintensified with bichloride of mercury and ammonia." Reply: "After ammonia or soda sulphite, refix the plate with hypo, and it will come out little denser than it was before intensification. After cyanide of silver, reduce with ferricyanide of potash and hypo. Hypo alone makes little difference." Mr. Hensler succeeded in removing veil from lantern slides with Farmer's reducer. Mr. BECKETT said, if a single unexposed plate is left for any considerable time in its own box, on exposing and developing, often the paper mark becomes clearly visible. Mr. Blake showed negatives of a Lilium auratum on isochromatic plates, one with a light yellow screen and the other without; although two and a half times' exposure was given to the former, yet it had green fog. Three to four and a half times was recommended. Mr. PENNY showed a negative veiled over, and asked whether it were chemical or light fog? It was restrained with two or three drops of ten per cent. solution of bromide of potassium. Reply: "Quarter grain to four ounces is the correct quantity. Too much soda sulphite was probably used. It is safer to start development with half quantity and increase as necessary." Question: "Can Alpha paper be developed with amidol and be toned afterwards?" Reply: "Yes."

South London Photographic Society.—August 9, the President (Mr. F. W. Edwards) in the chair.—The Secretary announced the postponement of the President's lecture, *Reminiscences of a Few Eminent Men*, which was to take place on September 4, and stated a demonstration of the new developers, *Amidol*, *Metol*, *and Glycin*, would be substituted on that occasion. The names of two new members were proposed. Mr. MAURICE HOWELL (one of the Vice-Presidents of the Society) then gave a short lecture on *The Chemical Action of Intensification*. He stated that intensification was resorted to when the negative was not what it should be through errors of exposure, insufficient development, or several other causes. They, no doubt, all knew how to mercurially bleach the negative, but he proposed to enumerate several ways of turning the white preparation into a black one, and giving density to the picture. Ammonium sulphite was almost always used in the old days to intensify collodion pictures, but this process had the bad effect of darkening also the half-tones and entirely blocking up the shadows. A solution of ammonia or sulphite of soda might be used, but the best of all was ferrous oxalate, because it reduced both the silver and the mercury to a metallic state, and it possessed the best keeping qualities. Ferrous oxalate restored the image, and it had another advantage, as the negative might be bleached and intensified over and over again, so as to increase the opacity of the negative, and without apparently injuring it in any way. The mercury chloride could be used again and again until a very heavy deposit was obtained. He also referred to potassio-silver cyanide, ferridcyanide of uranium, and bromide of copper, the latter appearing to act as an admirable intensifier for lantern slides, but it did not act so well for negatives. They had their choice of all these processes, but he himself was in favour of ferrous oxalate, as he was of opinion that the deposit left on the surface was less likely to decompose when printing, especially when using albumenised paper. He used the ordinary formula for ferrous oxalate, taking one part each of Nos. 1 and 2, and adding one part water.

Leicester and Leicestershire Photographic Society.—The third excursion of the above Society took place on the 12th inst., under the guidance of Mr. J. Porritt (President), the rendezvous being the far famed Castle of Belvoir, the seat of the Duke of Rutland. The members and friends mustered in good numbers, and included several ladies, whose presence added greatly to the enjoyment of the party. The castle, built of freestone, chiefly in the Gothic style, is a magnificent building, standing on the wolds above the Vale of Belvoir, and occupies the site of an old fortress said to have been built soon after the Norman Conquest. After inspecting the exterior, the ladies and some of their friends paid a visit to the noble apartments, the picture gallery, containing an extensive collection of works by some of the most celebrated masters, and the Gobelin tapestry, while others rambled about the beautiful grounds and shady glades, taking views which it is hoped will prove happy reminders of a pleasant time and beautiful day. The light was about perfect for photography, but unfortunately the district is not a photographer's paradise.

FORTHCOMING EXHIBITIONS.

1893.	
September 5.....	*Royal Cornwall Polytechnic Society, Falmouth. W. Brooks, Laurel Villa, Wray-park, Reigate.
,, 20-21	*Hove Camera Club. Hon. Secretary, H. Emery, 142, Church-road, Hove, Brighton.
,, 25-Nov. 15...	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1-31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 9-Nov. ...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
November 7-11	*South London Photographic Society. Hon. Secretary C. H. Oakden, 53, Melbourne-grove, Dulwich, S.E.
,, 20-25.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.

* Signifies that there are open classes.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

PHOTO-MICROGRAPHY.

To the EDITOR

SIR,—I am afraid that the value of the evidence produced by Mr. H. Woodworth as to the possibility of producing sharp negatives by ordinary micro-objectives, is somewhat discounted by the fact of his using cheap French triplets only, my experience of such objectives being that it is impossible they can give a sharp picture of anything, and consequently, when the image in itself is worthless, a little more in or out of focus does not count. I happen to have been experimenting lately with a variety of the best object-glasses turned out at different periods, and am certain that with the far greater number—not apochromatic—there is difference enough between the visual and actinic foci to utterly spoil the picture photographically when ordinary plates are used.

I read with great interest your article on this subject in the number for July 28, and have nothing to say against the value of the methods there described for correcting the divergence of focus; but, having myself been teaching for some time past how the same thing can be produced without any addition to the objective whatever, will you allow me to give the readers of your valuable JOURNAL my experiences on the subject?

My method is a very simple one indeed, and consists in nothing but substituting isochromatic plates for those not colour correct, and as yet I have not found a lens which will not produce photographically as sharp a picture as can be produced visually, and that without any readjustment of the image thrown on the screen. I may say that I have worked at this subject somewhat exhaustively, Mr. E. M. Nelson having kindly placed at my disposal a selection from his unrivalled collection of object-glasses, and ranging in period from 1836 to 1887. In addition to this, I have experimented on several objectives made since the production of the Jena new optical glass and partly made with it, but without fluorite, and send you a selection of prints showing the difference of focus when isochromatic plates are used and when Ilford ordinary. In all the cases

the picture was perfectly true to focus when the former plate was used, but more or less out when the latter.

I do not profess to have been the first to discover the advantage of using isochromatic plates, but with others the question was always mixed up with the use of a coloured screen in conjunction with them, and, as they did not take the trouble to find out what the effect would be without the screen, confused cause and effect, and put down to the latter what was due to the former.

In conclusion, allow me to say that all my experiments were conducted without any screen whatever.—I am, yours, &c., T. F. SMITH.

185, *Brecknock-road, N.W.*

MESSRS. GRUNDY AND HADDON'S PAPER.

To the EDITOR.

SIR,—In your report of the discussion which took place on Messrs. Haddon and Grundy's very valuable paper (*vide* THE BRITISH JOURNAL OF PHOTOGRAPHY, August 11, page 518), the remarks I made have been so altered in transcription as to become quite meaningless. I will, with your permission, rectify the text so as to render the report accurate.

In the first paragraph is said:—

"Some alkalies were impossible to remove; *caustic potash* from cupric oxide, precipitated *by that agent* as hydroxide, for example." (Underlined words have been omitted.)

Second paragraph standing under my name:—

"Was the sulphur" (not silver, as printed) "really present as hyposulphite?"

Third paragraph under my name:—

"Why not metalloidic *sulphur*, formed in the pores of the paper itself? Hyposulphite of *soda*, in contact with a porous substance, and with air having every chance of access to it, would most likely decompose *in a very dilute solution*, and possibly metalloidic *sulphur* and some insoluble compound of silver be formed."

Fourth paragraph under my name:—

"Mr. Levy said there might be *sulphur*" (not silver, as printed) "in *that* allotropic form, when it would not be dissolved by *carbon disulphide*."

These corrections will restore to the passages quoted their real meaning.

With reference to the insoluble silver compound formed in the pores of the paper, M. Delafontoine (*Würtz, Dict. de Chimie*, vol. i. page 371) states that both the double hyposulphites of silver and sodium decompose "with the greatest ease" under the influence of heat *or water*, and yield silver sulphate, silver sulphide, and a sodium salt.

With reference to the decomposition of hyposulphite of sodium above alluded to, aqueous solutions of this salt decompose slowly in contact with air, and deposit sulphur. Even when air is excluded, sulphur precipitates in time, and the solution, under the conditions, contains a quantity of neutral sulphite (*op. cit.*, vol. ii., page 1535).

The above facts seem to point out that the theory I proposed at the London and Provincial Association, as to the nature of the compounds retaining both the silver and the sodium, and unremovable by washing, has, at least, some probability.—I am, yours, &c.,

ADOLPHE M. LEVY.

37, *Basset-road, Ladbroke-grove-road, London, W., August* 12, 1893.

TELE-PHOTOGRAPHIC SYSTEMS FOR MODERATE AMPLIFICATIONS.

To the EDITOR.

SIR,—Mr. Dallmeyer has been good enough to approve of the spirit of my letter, and to explain the question of rapidity in a manner that should satisfy every one. I did not, however, venture to suggest that definition would be unsatisfactory if a larger aperture than *f*-32 were used, but only asked for information on this point. My reasons for being a little doubtful about it were these—that, seeing that the operation of the instrument consists essentially of the formation of an image by a positive lens a certain distance behind a negative lens, but within the focal length of the latter, which image is then enlarged and projected on to a screen by the negative lens, and brought to a focus at a distance corresponding to the greater conjugate focus of the back lens as related to the lesser one, or distance from the lens to the primary image of which the enlargement is made, if the image produced by the front lens is unsatisfactory, the enlarged one must necessarily be so as well. I was thinking at the time of the appearance of images formed with a large aperture, say in bright light—the general brightness of the whole, but an indistinctness of detail, due to the superabundance of light transmitted. Enlargements of pictures such as these could not be satisfactory. Such pictures would be flat, weak, in fact, generally without sparkle. I cannot deny that a large aperture would be useful to some extent in dull weather, but I am afraid the evidence of which I speak would become very apparent if *f*-3 or *f*-2 were used, or, say, *f*-12 or *f*-8 with four times enlargement.

My idea is that most photographers would be satisfied with a more moderate equivalent focus, and gain the rapidity by this means. Seeing that the ability to regulate the amount of view included would be preserved, I do not think it would be necessary to do more than construct a lens that would give such a minimum equivalent focus as would ensure a picture of satisfactory minimum size, with powers to increase these to an extent that would not overtax the powers of the instrument by reducing to any important extent the available aperture. It was with this idea in view that I suggested the use of a negative lens of lower power than that referred to by Mr. Dallmeyer. Such a lens, say, of five inches instead of three inches focus, would require 7·33 back focus to give an equivalent focus of, say, fourteen inches, whereas the three-inch lens would give the same equivalent focus with only four inches back focus—insufficient to cover anything but a small plate. I do not offer my figures except as illustrations of the idea. There are perhaps obstacles which I have not yet encountered that would interfere with the practical solution of such a plan, but I must confess that I do not conceive what form they would take.

I should like to refer to the power of pictorial composition possessed by these lenses in connexion and comparison with their use for photographing objects at great distances. I would myself sacrifice the latter for the former. We have seen the print from a plate of imposing dimensions cut down for the sake of pictorial arrangement of subject, until the pity of working large apparatus for such reduced results has struck us forcibly. Now, the tele-photographic lens will do our print-trimming in the camera, and we can compose our picture in the field instead of with a pair of scissors. This is such a boon to those who would rather take one or two pictures that had demanded and received proper study than a dozen that depended upon more or less ungovernable conditions of apparatus, that comment is needless.

I must point out that I did not submit my diagram as a method to be followed in the field, its impracticability under these circumstances being evident, but rather to show quickly the actual working of my combination, and facilitate the choice of one that might answer special requirements.

For a method of ascertaining the back focus only, the following is a very simple plan: Multiply the focus of the negative lens by the number of times of enlargement minus one—thus, by three for four times enlargement, as in Mr. Dallmeyer's original illustration. A division of the result by the actual number of times of enlargement will, by the bye, give the distance of the primary image from the back lens. These calculations are only those common to the old style of enlargement-making, only that an alteration of minus for plus takes place as necessary to the use of the negative lens.

This is, however, only a reversal of the calculation in Mr. Dallmeyer's Rule III., for finding the extent of magnification, but it appears to me to be simpler than the process which is given in his Rule II.—I am, yours, &c., CHARLES E. HANCOCK.

15, *Oakfield-street, Cardiff.*

HALATION.

To the EDITOR.

SIR,—If Mr. Pettitt's new plate possesses all the qualities he claims for it, it is undoubtedly the plate of the future. For what is halation, but over-exposure and diffusion, caused by a semi-transparent film upon a perfectly transparent basis? By substituting a non-actinic medium all degradation of the high lights would be prevented, and the beautiful gradations of light and shade seen upon the surfaces in a well-lit studio would be retained; whereas they are now too generally lost, buried fathoms deep by a multitude of conflicting reflections.—Yours truly,

Nyassa, Bournemouth, Hants. HERBERT GLYN.

CELLULOID FILMS.

To the EDITOR.

SIR,—I have just been making some comparative trials with films and plates, and would like to know if any amateur who has gone over the same ground has arrived at the same results. I have tried a plate by Schleussner, of Frankfort, against films of four of the most renowned English and American makers, and they all failed, while the plate, with an exposure the minimum of the Thornton-Pickard focal plane shutter, supposed to be less than the $\frac{1}{1000}$ of a second, with *f*-12 of the Zeiss 111 screw, gave a fair negative, and what is more curious is that a Schleussner film was far worse than any of the others. May it not be that the celluloid has a deteriorating influence on the emulsion, or is it due to the pressure of the sensitive surfaces one against the other in the packing, causing rapid deterioration? These films all fogged with the same exposure and developer which was used on the plate.—Yours truly,

Venice, August 12. W. J. STILLMAN.

Exchange Column.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

G. W. T.—Lead toning is not to be recommended if permanence is a consideration.

JAMES CRAIG.—The address, "Holborn-viaduct, London, E.C.," will prove sufficient.

L. NIEVSKY.—We can hardly publish your letter; the opinions are expressed too forcibly to be enshrined in print. Thanks all the same.

ANXIOUS.—Fallowfield keeps collodion paper under the name of "Celloidin silver emulsion paper."—You had better not trouble to prepare it yourself.

T. BENWOOD.—Very thin guttapercha—guttapercha tissue—may be obtained at most of the indiarubber shops. We are unable to say its present price.

CARL NORMAN & CO. — So far as we are aware, there is no agency at present for the double anastigmat lens of Goerz in this country.

A. LASCELLES (New Zealand).—Thanks for enclosed print. The discoloration of the paper is believed to arise from damp. See also leading article in the present number.

T. MCPHERSON.—Be not disheartened by a few failures; they must be expected at first. The formulæ are all right. You must bear in mind that collotype, like most other processes, is not learnt in a day.

W. T. M. DAVIDSON.—Messrs. Hughes & Kimber, West Harding-street, or Messrs. Winstone & Sons, Shoe-lane, or, indeed, any other dealer in printers' materials, will supply all that is necessary in any of the photo-mechanical processes.

R. W.—If the indentures are not properly attested and duly stamped, they are not binding on either party—the master or the apprentice, or, as put, "articled pupil." With regard to the premium paid, better obtain the advice of a solicitor.

W. G.—1. The formula mentioned at the page you quote would probably answer as well as any. See also pages 780-81 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1893. 2. Should recommend fresh solution for each batch of plates.

NEMO.—The greater portion of the official photography is done by the Royal Engineers. If you desire to do that class of work, you had better enlist in that regiment. You can get full particulars of your prospects before joining by writing to the commander.

F. E. G.—The spots may be reduced or removed by very carefully painting them with a solution of ferridcyanide of potash, and immersion of the plates in hypo. On the few data given we cannot suggest the cause of them. Send us one of the plates for examination.

LAMP.—1. Have the sides and top of the lamps of metal, and try the effect of one, two, or three thicknesses of canary medium, and have the means of introducing a sheet of ruby medium. A little experiment with the effect of various thicknesses of the media on sensitive plates will indicate the safety or otherwise of the illumination.

M. BARRY.—There are no patents in connexion with orthochromatising collodiobromide plates with eosine or anything else, whether added to the emulsion or by bath. As a matter of fact, eosine was first used as an orthochromatising agent, and its properties in this direction fully established, with this process, long before gelatine plates were an article of commerce.

H. T. LAWSON.—Bearing in mind that all chemical action is assisted by heat, it follows that you will have to reduce the strength of your developer and, at the same time, increase the proportion of pyro and bromide, so as to ensure density before the whole of the details flash out. With this precaution there will not be need for cooling the developer with ice.

A. Z. B.—From what you describe, we imagine you are suffering from astigmatism somewhat badly in one eye. Our recommendation is, Go to a properly qualified oculist without delay; if you are, as you intimate, unable to pay a specialist's fee, go to one or other of the ophthalmic hospitals. Advice there is gratuitons, and eyesight is not a thing that should be tampered with.

YE PRINTER.—There are several causes for spots such as these, but it is obvious that, from simply looking at the prints, even if they were not stuck together as a conglomerate mass, as these were when received, and no other data, it is impossible to indicate from which they proceed. However, from the stains and dirt on the backs of one or two pieces we were able to detach, we should suspect that careless manipulation was the root of the trouble.

ROSE & CO.—If the articles cannot be obtained through the firms named, we cannot say where they can be had. We do not know them ourselves from your description. If you send the firms a sample, they can possibly supply them. Have you tried Marion & Co.?

T. HARVEY puts the following: "I put all my print washings (washing before toning, of course) into an old paraffin-oil cask, and add a little muriatic acid from time to time. The cask has no cover, and therefore is, part of the day, exposed to full sunshine, and a good deal of the chloride is dark instead of being white. Do I lose any silver by this? I have an idea I may."—No harm whatever is done. The light rather aids in the deposition of the silver than otherwise.

ATTENTION.—You appear to have under-exposed the negative, and to have used large quantities of sulphite as a remedy. You should have first increased your pyro to obtain density, and then increased the alkali. The spots on the intensified image may be due to the insufficient removal of the hypo. Try the effect of reducing the negative to a thin image by means of ferridcyanide of potassium and hypo, and then reintensify by means of mercuric chloride, and redevelopment with ferrous oxalate.

M. STEPHENS writes as follows: "Would you please inform me of a paste, for mounting photographs in an album, that does not cockle? I am under the impression I saw a recipe in the JOURNAL some time ago for same, but am not quite sure."—The best mountant for the purpose, which has been frequently described, is a solution of gelatine in which alcohol is made to take the place of a large proportion of the water. Make a fairly thick solution of the gelatine in water, and then thin it with the spirit, taking care not to add sufficient to precipitate the gelatine.

T. J. W., writing on his first attempts at working the Stannotype process, and proceeding exactly as directed in the articles on the subject in our columns a few years ago, says that the tissue cannot be developed even after it has soaked in water, as hot as the hand can bear, for more than an hour, and none of the gelatine will dissolve. His actual query is: "Did the long time it took to dry, nearly a week, have anything to do with the difficulty?"—It certainly did. Indeed the trouble, in all probability, is due entirely to that and nothing else, supposing the gelatine mentioned was employed and the details, as described, followed. With tissue, however good it may be, that takes so long to dry insolubility must be expected.

R. STEWART writes: "I am building a studio 36 feet long by 18 feet broad by 18 feet high at ridge, and a dark room at one end, and dressing and waiting rooms at other end—in all about 70 feet long. Can you tell me of a cheap, good, strong, effective, economical pipe-heating system? I think there was an Edinburgh photographer's described about the time of Convention there last year. Any information will be much appreciated."—On the whole, the best, and in the end the most economical, system we know of is hot-water pipes such as used in horticultural buildings, running through the length of the rooms, with a good-size "saddle boiler" and a well controllable furnace as the source of heat. Possibly some correspondent can suggest a better system for such a size structure.

PERPLEXED says: "I shall be very glad if you can inform me what is the cause of the spots on the enclosed photographs. I have had some dozens spoilt in this manner and cannot trace the cause of same. The spots do not show until prints are mounted and nearly dry, and mounts are therefore wasted too. I have tried fresh hypo, new dishes, and everything I can think of, but all to no purpose, and if you can tell me how to prevent same in future I shall be very grateful, as it is a great hindrance to business."—As all the spots have a pronounced nucleus, like a particle of metal or other reducing agent, and only show after the prints are mounted, we conclude that some pernicious matter comes in contact with them in the later stages of the operations. Floating particles of an injurious matter in the air settling on the prints while moist, will cause similar spots. So will particles of iron in the water. It will be well to test the mounts, as they do not appear to be of an extra good quality.

R. C. GARSIDE says: "Will you inform me what proceedings to take in case stated below? I was ordered to photograph the enclosed, for two dozen order, whole-plate price quoted, 2*s*. each first dozen, 1*s*. each after. Proofs were submitted (4); but, during the interval another contractor got a travelling photographer to take his works, and the charge was 5*s*. a dozen cabinet, 10*s*. a dozen whole-plate; therefore my customer sends back to say enclosed is not satisfactory, but will find no fault, but gets the other photographer (cheaper) to do the work. An assistant and myself were there from one o'clock till seven o'clock, had train fare to pay, and a two miles tramp to the works; so, on those conditions, can I claim damages?"—We should think our correspondent would have no difficulty in recovering by County Court summons. A solicitor should, however, be consulted in the matter, as it is a purely legal one.

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COUNTERACTING THE HEAT IN THE STUDIO AND OPERATING ROOM.

The unusually great heat experienced during the past fortnight has caused us to receive several letters expressive of the difficulties in photographic practice which have arisen in consequence of the increase of temperature.

In countries nearer to the equator photographers calculate upon being subjected to heat during the summer, and take precautionary measures to obviate the inconvenience arising therefrom; but in Great Britain the normal temperature is usually so mild and equable that when, as of late, it is high, beyond average, they are found unprepared to cope with such difficulties as are thereby engendered.

These difficulties find development in two directions. First, the heat in the studio or gallery, and the unpleasantness to the sitters arising therefrom; and, secondly, the increased temperature of the solutions employed in the production of the picture. The first of these may be mitigated by erecting, where the configuration of the roof permits it, a shade of any opaque material outside of the roof, so as to prevent, as far as possible, the sun from striking the glass. In a studio in one of the Southern States of America, we once saw a shade of the nature mentioned supported on strong uprights projecting above the roof, the management and unfurling of this being done from the inside. In another we have seen a water pipe running along and outside of the ridge of the roof perforated with small holes to permit a gentle stream of water to flow down the sloping sides of the glass roof, and thus keep it cool. This it does, on the principle that evaporation produces cold; the hotter the sun the more rapidly does evaporation proceed.

We have known it recommended to cool the interior of a studio by the suspension of sheets kept wet by being frequently sprinkled with water. This is not judicious, because, while such proceeding will ensure the cooling of the sheet itself, it has the undesirable effect of surcharging the surrounding atmosphere with moisture, and causing perspiration and a feeling of oppression to those present. To aid in keeping the studio cool, the sun's rays should be debarred all admission by blinds running along the roof, a feeling of greater coolness being induced by having them of a blue colour. It is almost unnecessary to recommend that the fullest ventilation should be had recourse to.

In hot countries ice is a necessity, and in all cities is usually delivered every morning at residences. A lump of this placed in a covered box or chest well lined with thick felt and of capacity sufficient to contain bottles of developing, fixing, and other solutions—which, if allowed to get too hot, might endanger the safety of gelatine on plates or paper—will be found a prophylactic for the ills that may arise from heat. The trays employed in development should also be kept in this ice safe when not in actual use. An evil that has been complained of when employing a developer that has attained a temperature many degrees higher than the average one is that the image flashes out with unusual rapidity, and that this affords no time for density to be obtained. This trouble will cease if the hint here given be taken. A bottle of a solution of chrome alum should always be at hand to apply to the plate, and thus prevent solubility of the film of the negative when exposed to the air for the purpose of being dried. It may be borne in mind that a developer composed of pyrogallic acid conduces more to hardening the film and rendering it insoluble in warm fluids than one of ferrous oxalate. Before dismissing the subject of ice as a refrigerant, we may observe that its powers of producing cold are greatly increased by crushing it and mixing therewith some common salt, a fact well known to and taken advantage of by every vendor of ice cream.

Where ice cannot be procurable, by far the best and most economical substitute is one with which we have had much experience, and which we have more than once recommended in these pages. We refer to nitrate of ammonia. As we have formerly said, this salt is cheap (its present quotation is 42*s.* per hundredweight); when dissolved in water, it strikes a very low temperature, and it is practically inexhaustible, for it can be used over and over again. By way of experiment, we have just tried some which was in actual use in 1882, and it does not appear to have had its virtues diminished. Equal parts of the crystals and water, when mixed, will ensure a fall of 46° Fahr. in the temperature of the solution, whatever that of the water may have been at the time of mixing. When the solution is effected in a wooden or other trough, any desired number of inches in depth, bottles containing solutions, or anything that it is desirous should be cooled, may be placed in it, with the certainty of a fall in the temperature resulting.

There are other mixtures which will produce cold in even a greater degree; for example, a mixture of snow (two parts) and chloride of calcium (three parts) will produce a degree of cold equalling 50° Fahr. below the freezing point. But where the economy of the nitrate of ammonia comes in is here: as soon as the solution has done its work, and has again become of a temperature at which it ceases to act as a refrigerant, it is only necessary that it be poured out into a shallow tray, and allow the water to evaporate, leaving the crystals in the bottom.

These, when dried and put away in a bottle, are again ready, at any moment, to be used in the same way, and with similar results. Ice-making machines based upon this property of the salt are in use in some parts of the world.

By adopting the hints above given one may greatly ameliorate the effects produced by such great heat as we have been experiencing of late, and may prepare for its recurrence.

PURE OXYGEN.

That a review of this subject need not by any means be a purely theoretical disquisition any one who has taken an interest in lantern matters will readily understand, and prove by reference to our columns. On the one hand, we have had complaints of the poor quality of, at any rate, some samples of compressed gas; on the other, we have heard for years past how gas from chlorate of potash is so contaminated with chlorine as effectually to destroy eventually the indiarubber fabric of which they are made. With regard to compressed oxygen, the feeling that it is unequal in illuminating capacity to the older kind is felt very strongly by some large users; but its unparalleled convenience suffices to cause such objections to be over-ruled, unless the particular sample employed were of especial impurity. Nevertheless, it should not be forgotten that an admixture of even one per cent. of nitrogen must have a perceptible effect in reducing the heat of the flame, and in a proportion far greater than that indicated by a mean of ninety-nine per cent. and 100 per cent.; for, in the first case, there is in ordinary air about twenty-one per cent., and such proportion is useless for the purpose of the lime-light; and, secondly, as it is perhaps only about the last half of the excess of temperature in the "oxyhydro" over an "air-hydro" flame that can be said to count for illuminating purposes, the heat absorbed in raising the temperature of only one per cent. of useless nitrogen reducing the total available temperature to an extent equal to several times one per cent. The manufacturers, however, are strenuous in their endeavours to continually improve the quality of the gas they compress, and eventually, no doubt, the useless nitrogen will be still more diminished. Were it a commercially paying process to use oxygen from chlorate of potash for compressing into cylinders, we think it quite possible that it would be preferred by those who wish for the utmost attainable value from the gas employed in the production of the oxyhydrogen light.

A very singular light has recently been thrown upon this aspect of the subject during some investigations upon ozone lately made by Professor Brunck, of Freiburg. One of the most commonly held beliefs upon the peculiarities of oxygen as usually prepared is that the strong smell it possesses is owing to the presence of free chlorine. Marignac, it is true, when attempting to ascertain the actual amount of this impurity present, was only able to obtain three milligrammes of silver chloride from the gas from fifty grammes of chlorate—an infinitesimal proportion; and this fact might have caused suspicion in the mind of investigators. Dr. Brunck now proves that, when the saline residue left in the flask after driving out the oxygen is examined, it has a neutral reaction, while, if free chlorine had been evolved, the residue ought to be alkaline. Again, let the gas be washed frequently with strong solution of caustic potash, it will be impossible to remove the odour; yet, if chlorine were there, it ought to be all absorbed. Further, the gas so washed bleaches moistened litmus paper, and turns starch and potassium iodide paper blue instantly. Finally, the gas, passed through alcohol, causes the production of aldehyde, an effect of oxidation which free oxygen cannot bring about. From these results Professor Brunck draws the conclusion that the odorous gas present in oxygen made from chlorate of potash and oxide of manganese cannot be chlorine, and must be ozone. One proof of this is that the odour is entirely destroyed if the gas be passed over a layer of manganese dioxide at the ordinary temperature of the atmosphere.

The great objection to this theory is that it is generally held that ozone is decomposed by a high temperature; long ago, Andrews gave 300° as the temperature of decomposition. However, Professor Brunck shows that ozone, passed slowly through a tube heated to 350°, still retained twenty-five per cent. of the original quantity of ozone. He further instances several high-temperature readings in which ozone is liberated, and he points out Schönheim's statement that the oxygen obtained by heating several metallic oxides appeared to contain ozone, as it liberated iodine from potassium iodide.

From all these observations the inference is to be drawn that gas made in the old-fashioned way in all probability contains more than one hundred per cent. in volume of oxygen, which accounts in another way for the alleged superiority of that kind of oxygen. Finally, when gas is made and stored in bags, means must be adopted for decomposing ozone instead of removing chlorine where the lasting conditions of the bags is of prime importance.

MIXED DEVELOPING FORMULÆ.

In giving the following formulæ, we may remark that they have been so arranged as to represent as nearly as possible similar proportions and strengths of the different ingredients, the combination being such as has been found, after careful trial, to suit the average plate under what may be considered normal conditions. It is, of course, absolutely impossible to form a combination that will give the very best results with plates of widely different character, which is the reason why we prefer to recommend the separate solutions; but, at the same time, it is possible to so vary the composition of the single solution as to render it suitable for any class of plate.

The formulæ given are calculated to suit plates of the "ordinary" or moderately rapid type, which, with the usual pyro development, give printing density without much trouble. With such plates, and ordinary exposures, the development takes place with about the same rapidity as with pyro, and full printing density will be obtained simultaneously with the production of detail, without the necessity for any restrainer beyond that contained in the developer itself. In case of over-exposure the use of an additional restrainer may be resorted to as under ordinary circumstances, and it may consist of a sixty per cent. solution of bromide of potassium, or a plain solution of citric acid of half that strength. The latter solution is, we think, preferable, as it seems to exercise a more decided check, both on development and fog, than the bromide, and, especially with amidol, aids greatly in the acquisition of density.

With plates of a more delicate type—notably some of the more rapid ones—we have tried, it may be requisite to slightly modify the formulæ, either by varying the proportions of hydroquinone or of the alkali, or by directly adding a restrainer

to the solution. The first method seems to us the preferable one, and the variation is easily carried into effect for any given plate, but in a one-solution developer the range of power is not very great.

The advantages claimed for the system of mixed development may be briefly recapitulated here. In the first place, density is obtained with far more dilute solutions, one grain or one grain and a half of amidol or metol, in conjunction with a similar quantity of hydroquinone, serving the same purpose as plain solutions of four times that strength or more. Secondly, the addition of a restrainer may, under ordinary circumstances, be dispensed with, the hydroquinone acting to some extent in that capacity, with the result that there is a complete prevention of fog, with a minimum of action upon the feebly illuminated portions of the picture, a matter of the utmost importance in cases of very short exposure. In fact, it may be claimed that the mixed developer will "get more out of an exposure" than, under ordinary circumstances, metol or amidol alone.

The first formula we give is a single-solution one, which, as has been already remarked, may be found useful or convenient for studio work where one kind of plate is constantly used. The solution keeps fairly well, at any rate for a week or ten days, in the concentrated form in which we give it, but when diluted for use it very quickly discolours, and a few hours suffice to practically deprive it of its developing powers. The solution is made as follows, the substances being dissolved in the order named :—

Single-solution Developer.

Metol	40 grains.
Sulphite of soda	120 ,,
Hydroquinone	48 ,,
Carbonate of potash	240 ,,
Water	8 ounces.

Apply heat if necessary to dissolve the metol, and afterwards add the sulphite, and allow that to dissolve before adding the other ingredients.

For use under normal conditions, one part of the above is to be diluted with three parts of water. To some extent greater or less vigour may be obtained by using it in a state of greater or less concentration ; but the difference in action is not great, and, should greater density be required, it is better to increase the proportion of hydroquinone, or to add to the formula a few grains of citric acid.

The next formula is one in which the developer and alkali are kept in separate solutions, which will retain their properties for a much longer period than when mixed together. The proportions of the ingredients are practically the same when mixed for use as in the foregoing.

Two-solution Developer.

A.

Metol	40 grains.
Hydroquinone	48 ,,
Sulphite of soda	120 ,,
Water	8 ounces.

B.

Carbonate of potash	1 ounce.
Water	1 quart.

For use, mix one part of A with three parts of B for ordinary exposures ; for over-exposures use less of B, or else add a few drops of a ten per cent. solution of bromide of potassium, or of a five per cent. solution of citric acid ; for slight under-exposure, increase B.

But the best form of developer for general purposes is one in which the hydroquinone is kept in separate solution from the other ingredients, as it can then be used in any required proportions to suit each particular kind of plate or any length of exposure. It may, in fact, be added as required, in the same manner as the ordinary restrainers, during the progress of development. As citric acid is a better preservative for hydroquinone than sulphite of soda, advantage is taken of the fact by combining the hydroquinone with the acid, and the additional benefit of the latter is secured proportionately with that of the hydroquinone. The formula is as follows :—

Three-solution Formula.

A.

Metol	40 grains.
Sulphite of soda	120 ,,
Water	8 ounces.

B.

Hydroquinone	40 grains.
Citric acid	10 ,,
Water	8 ounces.

C.

Carbonate of potash	1 ounce.
Water	20 ,,

For use under similar conditions to those already mentioned, take one part each of A and B and two parts of C. It will be noticed that in this formula the proportion of hydroquinone is slightly less, and that of alkali greater, than in the others—an alteration rendered necessary by the presence of the citric acid, which, in addition to neutralising a portion of the alkali, very considerably modifies the general behaviour of the developer.

If required for use with plates of the more rapid type, or such as are difficult to work up to density, the proportion of B to A may be increased, as, for instance, making the mixture one part of A to two each of B and C. In some instances a better result is obtained by increasing the proportions of A and B equally, keeping C the same, say one and a half part to each of A and B to two parts of C. These, however, are details which each operator will do better to work out for himself.

In conclusion, we may say that, while considerable variations may be made in the formulæ, both as regards the proportion of the ingredients and the introduction of restrainers, the fundamental principle of the innovation is the utilisation of the restraining power that hydroquinone undoubtedly possesses in addition to its developing action. We should warn our readers who make a practice of using the same developer repeatedly that with the addition of hydroquinone the solution discolours very rapidly after use, and this very materially curtails the power in that direction. In any of the above formulæ sixty grains of amidol may be used in place of the metol.

The Poisons Act and Photography.—Last week a Madame Ruppert was proceeded against in Dublin by the Pharmaceutical Society of Ireland for selling a bottle of "skin tonic" containing eight grains of bichloride of mercury in solution, she not being licensed under the Pharmacy Act. The defendant was mulcted in a penalty of five pounds and costs. Bichloride of mercury is somewhat largely used in intensifying negatives, and we know it is vended by some dealers in photographic materials who are not licensed under the Pharmacy Act without knowing that they are doing wrong or rendering themselves liable to a penalty. They should take warning.

A Neglected Field for Photographers.—Mention of promising prints reminds us that a little while back, during a short photographic tour in west Sussex, a district remote from large towns, we were, on no less than three occasions, offered money for the photographs we happened to be taking. The offers emanated from the inhabitants of small villages, into which it is likely the professional photographer seldom, if ever, penetrates. The larger villages and townlets are doubtless, well looked after by photographers; but it has occurred to us, from our own and others' experience, that no inconsiderable harvest awaits those enterprising photographers who devote themselves to portraiture, cottage views, &c., in out-of-the-way places, such as those we have in our minds.

Promising Prints.—Some friends of ours who went the other day on a photographic expedition to an Essex village were chilled by a cold stream of rustic sarcasm on applying for permission to photograph one of the "show" subjects. They would not mind sending the custodian a print, would they? Not at all, he should certainly have a print. He hoped he would, but—several gentlemen had recently made him a similar promise and had not kept it. He supposed all their photographs had turned out badly, as they were "only amateurs." Our friends winced, knowing that in all probability, though it was possible the photographs had turned out badly, this was not the real cause why the proffered promises had not been fulfilled. Assuredly, where prints are promised, they should be sent, if at all practicable, otherwise a great deal of ridicule, and not a little obloquy, is cast on amateur photographers generally, who thereby stand in some danger of becoming just about as unpopular with large sections of the general public as are those self-constituted kings of the highway, cyclists.

A New Paper.—A new kind of paper from which, it is asserted ink writing can be removed with a wet sponge has excited some attention in Germany. Not only has a patent for it been refused, but its manufacture and sale are declared unlawful. The paper is said to resemble ordinary paper in appearance, and is made of similar materials, with the addition of asbestos and a parchment size. The pulp, however, it is stated, is treated with sulphuric acid, and, after washing, then with a solution of ammonia and further washing. So far as one can judge from the meagre description before us, it differs only from the well-known parchment paper by its containing asbestos, and the pulp being parchmentised instead of the finished article. When parchment paper was first introduced it was proposed to parchmentise photographs to enhance their permanency. We treated some salted prints at the time—now over thirty years ago, but we did not find that it added to their stability. Halves of the same prints, darchmentised and unparchmentised, mounted side by side, showed no difference at the end of twenty years.

Art Awards at the Chicago Exhibition.—The official list of awards in the Art Section of the World's Fair has just been issued. From this it appears that over a hundred come to Great Britain—the largest number taken by any country—namely, seventy-two for oil paintings, twenty-one for water colours, and nine for black and white. Germany takes about eighty, and other countries less. It is noteworthy that Japan is awarded thirty-eight, while Italy takes only fifteen, and Switzerland but two. America is next to this country in the number of awards. Since France and some other countries withdrew their exhibits from competition, that can scarcely be considered of such an international character as would otherwise have been the case. By the way, when the medal question at the Photographic Society of Great Britain has been discussed, it has often been suggested that the Society should follow the dignified example of the Royal Academy and not give medals at all. It is, however, worthy of note, on looking through the list of prize-winners, to find the names of so many of our most celebrated R.A.'s, including that of the President of the Royal Academy, Sir Frederick Leighton himself. If our most famous painters do not consider it too undignified to compete for medals, why, then, should photographers?

Duplicate Fixing Baths.—The paper recently published by Messrs. Haddon and Grundy goes far towards clearing up some of the causes of fading in albumenised paper prints, though, unfortunately, it does not provide a remedy. Therefore, so long as albumen paper continues to be employed, it seems that permanent pictures cannot be ensured. Against this it may be urged that, as some albumen prints have withstood the test of time for three or four decades, and are still as good as ever they were, fugitiveness is not a necessary accompaniment of the process. In the paper just referred to, the point, so well understood by experienced workers, is again strongly emphasised, namely, that perfect fixation is of even greater importance than the washing, and that two baths are again recommended. Of late years the perfect fixation of albumen prints has been a secondary consideration to the appearance of the pictures afterwards. Prints from very thin negatives, on some of the weakly salted and sensitised papers, will not stand the necessary action of the "hypo" solution without serious deterioration in their vigour. If prints of this character suffer so much in one solution, they will suffer more by treatment in a second one. The prints of old were often in the fixing and toning bath for several hours; but they were printed from vigorous negatives on very strongly sensitised paper, hence their stability.

Beach Photographers.—One class of photographers probably does not join in the chorus of lamentation over the alleged depression in photography that has recently lifted its melancholy note in our correspondence columns. We allude to beach photographers. This year the fine weather has rained a golden harvest on seaside resorts, the number of visitors being unusually large. At three or four of these popular places we made a point of observing to what extent the beach photographers were profiting by the visitors' patronage, and were agreeably surprised to find that business looked decidedly brisk. Our observations were confirmed by one or two photographers to whom we put a question on the subject. By the way, a good spirit of *camaraderie* prevails among these humble professors of the popular art. Competition is keen, but never unfair, nothing like an advantage being taken one of the other. We saw instances where a helping hand was freely given in the way of the loan of chemicals, operating one for another, and so on. Quite a number of these photographers belong to the fair sex, who sometimes operate themselves, and, where necessary, assist their husbands by subduing the sunlight on a group of sitters by means of a translucent screen. We were amused, one day, at the adroitness with which one of the photographers quieted a squalling baby whose vocal performances disturbed the equanimity of a group of nine people he was taking. Whistling for his dog, who was gambolling on the sands, he whipped the animal up in his arms, flourished it before the eyes of the recalcitrant infant, who instantly became interested in doggy and quiet enough to permit of the cap being removed. The "friend of man" is a useful accessory.

OPTICAL TRUTH AND VISUAL TRUTH.

No intelligent photographer can fail to be deeply interested in Mr. Van der Weyde's bold attempts to counteract what he supposes to be shortcomings in the optical delineation of the portrait lens. Without entering into the actual application of Mr. Van der Weyde's correcting lenses (about which he has not yet published full information), further than to remark that their successful application will always demand the very highest artistic judgment, or gross failure will be the inevitable result, I will pass on to deal with the vexed and yet unsettled question which was reopened in the discussion on Mr. Van der Weyde's paper on the *Pictorial Modification of Photographic Perspective* read recently before the Society of Arts. Here we have two most eminent authorities in practical and theoretical photography expressing diametrically opposite views concerning the optical delineation of the photographic lens: Mr. Van der Weyde, on the one hand, emphatically asserting that, even under favourable conditions, the perspective drawing of the lens does not truly represent or preserve the same proportions in parts of the subject as those which are present to the visual sense of the observer when looking at the same subject from the same point of view as the lens; and Mr. W. E. Debenham, on the other hand, asserting that the lens is in no sense to blame; that if some artists find fault with the optical drawing

of the lens, it is because they have been trained to conventionally idealise and flatter their subject, which, of course, the lens will not do: in short, that the properly taken photograph is perfectly true in its proportions and its perspective, and therefore should yield to the eye precisely the same visual impression as a direct eye-view of the subject from the same point of view.

Is there no way of reconciling these seemingly opposite views? When artists of the highest repute, who have gone through the most tediously painstaking training in the accurate delineation of the human figure, for instance, and whose eyes have consequently grown exquisitely sensitive to little differences in curves and proportions of parts, deliberately assert that a certain full-length photograph of a beautiful lady-sitter, taken by some eminent photographer, does not do her figure, on the whole, justice, that her foremost hand and her feet appear *larger than they actually do in life*, are we at once to shirk discussion by attributing his verdict to professional bias, or to the supposed fact that artists are *invariably* guilty of conventional flattery of their subjects, and therefore will not have a good word to say for an unbiassed mechanical process which will not do the like? On the other hand, if men of the highest scientific and optical training assert, equally emphatically, that the optical projection or perspective of a photographic lens yields precisely the same image (except for colour, &c.) on the retina, when a print is viewed by the eye squarely and at proper distance, as that thrown on the retina when directly viewing the same subject with the eye from the same point of view as the lens, are artists justified in simply poohpoohing such a verdict, on the false ground that a mathematical mind cannot, with any profit, deal with artistic matters?

I hope to be able to show that both sides are right in this controversy, and that both sides are wrong, *by omission*. I am not one of those who believe that photography cannot err, for I have elsewhere pointed out one very serious cause of the limited powers of photography (see "Nature's Light Scales as Rendered by Photography," *Photographic Quarterly*, vol. iii., Nos. 9 and 11); but what I here contend for in regard to this question of photographic delineation is, that the "mechanical" lens does not err, but that the human photographer does very materially err, inasmuch as he seriously expects to get the same visual impression by regarding a picture on the flat as projected by the *monocular* photographic lens as he gets when viewing the same subject from the same point of view by the binocular vision afforded by his *two* eyes. The whole controversy has been conducted, so far as I know, without making anything like adequate allowance for the apparent discrepancies which must arise in comparing together an effect of monocular vision with the more realistic effect of binocular vision of the same subject.

In order to explain my meaning fully, I must first set out with illustrations of a very well-known fact in connexion with the theory of vision; the fact that our instinctive estimate of the real sizes of objects is generally a product of *two* factors.

1. The visual angle subtended by an object; or, what comes to the same thing, the size of the retinal image of that object.

2. The distance from the observer at which the object is instinctively judged to be situated.

For instance, in fig. 1, E represents the eye. Suppose that *a b* is a plain wooden rod, two feet long, and *c d* is another such rod, four feet

Fig. 1.

long, but just twice as far from the eye, E, as *a b* is. Then the images of these two rods on the retina of the eye will be of the same size exactly, and, in the absence of any means of judging that the rod *c d* is further away than *a b*, the conclusion would inevitably be that these two rods are of the *same* size. The eye cannot differentiate their sizes without, in the first place, having some means of judging their relative distances.

At the risk of triteness, I will enumerate the principal means whereby the observer is enabled to judge the distances of objects.

1. In the case of near objects, the focal adjustment of each eye required for distant vision constitutes roughly a sense of distance, but it can be shown that this cannot be operative beyond the distance of about fifteen feet.

2. The knowledge of the absolute size of familiar objects, as derived from experience. A man knows well the usual size of a cow or sheep, and consequently he instinctively guesses, without other aid, the distance of such an object corresponding to the visual angle subtended by it at his eye.

3. In the case of very distant, but more or less unknown, objects the eye derives much help in judging their distance, and therefore their size, from the apparent thickness of atmosphere which seems to lie between—often a rather deceptive clue.

4. The effects of geometric perspective, especially in the case of buildings and other objects bordered or varied by straight lines.

5—and most important of all in relation to the main point which I hope to establish—the effect of what I may call *duplex perspective*, due to binocular vision. The view of any object within 100 yards' distance, presented to one eye, is essentially more or less different in its perspective and proportions to the view of the same object presented to the other eye, the left eye seeing more round the left-hand margin of the nearer objects, and the right eye seeing more round their right-hand margins. Examples of the accurate sense of distance derived from binocular vision, and the very vague and shadowy sense of distance derived when binocular vision is either absent or rendered ineffective, are well known to all of us. As an example of the first case, let anybody try to thread a needle with one eye shut. As an example of the second case, how notoriously difficult it is to judge the distance of a horizontally stretched rope without putting the head on one side, and, consequently, how vague is the idea derived as to the real thickness of the rope.

One or two further examples of the fact that our estimate of the size of objects depends upon both visual angle and imagined distance may be given. There is the well-known case of the full moon or the sun generally appearing considerably larger when rising or setting on the horizon than when high up in the sky. Yet it has been conclusively proved, over and over again, that the visual angle subtended by their horizontal diameters is exactly the same in both cases, while their vertical diameters subtend a visual angle actually smaller than when at greater altitude.

The only possible explanation of this phenomenon lies in the fact that nearly every one almost unanimously attributes a flattened dome shape to the sky, the parts overhead being thought much nearer than the parts near the horizon, doubtless because there are so many objects between us and the horizon, helped out by the effect of atmospheric perspective, all conspiring to throw back the lowest parts of the sky into an apparently very remote distance. Therefore the moon, when setting, although of the same visual angular diameter as when at higher altitude, is instinctively judged to be much further off, and therefore proportionately *larger*.

In the same way a distant hill is judged to be loftier and more imposing when an atmospheric haze gives the impression of its great distance than when extreme clearness leads to the impression of its near proximity, when it looks comparatively dwarfed in size. Yet the visual angle is the same in both cases.

Now, when we come to represent a natural object or scene upon a flat surface, according to the well-established laws of geometrical perspective, which can be done either by the tedious process of careful drawing and plotting out, or, far more expeditiously and accurately, by a rectilinear lens, it must be carefully borne in mind that the resulting view or picture is essentially a *monocular* one; it is projected with reference to one particular point of view—the nodal centre of the lens in the case of a photograph, and the *point of sight* in the case of plotted-out perspective. Therefore, in viewing such a picture on the flat, it is obvious that binocular vision is no longer operative; the picture is the same to both eyes, and the effect of looking at it with both eyes is, in the average of cases, rather to make the observer all the more conscious that he is looking at a flat picture—a fact borne out by the habit, common among artists, of viewing pictures with only one eye, whereby relief is *gained*, and not lost.

And, since binocular vision is no longer operative, the observer is deprived of one of the most important means of estimating the relative distances of the various objects represented in the view. However skilfully drawn or painted the picture may be, if it represents objects comparatively near to the observer and within the range of binocular vision (in which case the great relief imparted by atmospheric perspective would generally be out of place), still the principal natural means of instinctively estimating the relative distances of the objects represented is denied to the observer. And the obvious deduction from this is that those parts of the subject represented which are nearest to the observer will appear somewhat exaggerated in

size, while those parts furthest from him will appear somewhat too small.

For I have already dwelt upon the fact that the mental estimate of the size of objects depend upon *two* factors, visual angle and estimated distance. Here, then, in the picture visual angles are relatively all right, but, owing to binocular vision being inoperative, there is necessarily inability to mentally project the various parts of the subject to their proper relative distances. If it is a full-length portrait of a man seated in a chair, with his hands and feet projecting toward the lens, then, in the absence of binocular vision enabling him to see at a glance how much the feet are nearer than the body; they will, therefore, not appear small enough; in other words, they will tend to appear disproportionately large. And the same thing will happen with the hands and the forward projecting arms or legs of the chair. On the other hand, if one of the sitter's hands is extended away from the camera, then, since the observer of the portrait cannot properly project that hand to its proper relative distance further back than the sitter, he will inevitably tend to think the hand relatively too small.

A very instructive experiment will further illustrate this. Take a low seat a few feet in front of a substantial arm-chair, in such a position that the back legs are visible between the front ones, and the whole chair seen in somewhat violent perspective. Shut one eye, and with the other steadily regard the *tout-ensemble* of the chair. It will be noticed that the foremost parts of the chair bear certain apparent proportions to the more distant parts. On quickly opening the other eye and bringing binocular vision into play, a sudden apparent shrinking of the front parts of the chair at once takes place, thus showing that one-eyed vision is apt to over-estimate the relative sizes of objects near to the eye at the expense of objects more remote. Similar experiments may be made in the case of other near subjects presenting parts relatively very much nearer to the observer than other parts. But the most decisive experiment of all would be to take a full-length portrait of a sitter placed in such a position in an arm-chair as to bring out this apparent distortion to the utmost—the body reclining, one leg stretched out towards the camera, the other foot put back under the chair; one hand stretched forward, the other put far back. Let a portrait be taken with a *stereoscopic* camera, furnishing two simultaneous views of the subject, and taking care that the distance between the centres of the two lenses does not materially exceed the distance between a pair of eyes. Moreover, let the distance between the camera and the sitter be such as is usually found best for artistic results, a wide-angle picture being thus precluded. Yet each picture in itself would be found to give a disagreeable effect of distortion, the foremost foot and hand looking far too large. Let a stereoscopic transparency of the two pictures be made and viewed together in the stereoscope, thus virtually calling binocular vision into play again, and then it should be found that the apparent exaggerations of the advanced parts of the sitter and chair, &c., at once disappear, everything assuming its proper proportions true to fact; this taking place not by any modification of the relative visual action (or perspective) subtended by the various parts, but simply because the parts are projected to their proper relative distances, and therefore the twin factor in instinctively estimating real size is supplied. This experiment would supply a crucial test, on which the soundness of the theory herein advanced should rest or fall, and as soon as I can find time I shall carry it out and report upon the result, which I feel positive will turn out as anticipated.

This apparent distortion may exist in very various degrees, in some cases being far too slight to strike an untrained eye, but yet glaring enough to an artist, whose eye has been carefully educated to estimate subtle proportions as he sees them, and transfer his impressions to canvas. After all, then, is there anything to be surprised at if artists accuse photography of distortion of proportions? Where they are wrong is in blaming the lens, whose only error, if it is one at all, consists in being rigidly faithful to monocular perspective. The hand artist has fallen into the way of drawing in the nearer parts of his subject smaller than the laws of monocular perspective would demand, and thus, if he does not overdo it, he compensates in a perfectly legitimate manner for the absence of binocular vision and its consequent duplex perspective when viewing the portrait. We habitually use two miniature cameras situated about two and a half inches apart for forming pictures of objects about us, and gauging their relative situations and distances, and therefore relative sizes, and transmitting the information to the brain. The photographic lens justly demands that it should be put on an equal footing with the eye, that its own faithful picture should be supplemented by another picture taken by another lens like itself, but placed two and a half inches to one side, and that the right-hand picture shall be viewed by the right eye only, and the left-hand picture by the left eye only, and then no suspicion of distortion can be urged against the combined visual impression. Under these circumstances, nothing further can be urged against photography for portraiture and the like than its scrupulous fidelity to the proportions of the subject as we see them with our eyes. Hence, then, Mr. Van der Weyde's plan of modifying the proportions of his subject by a system of very shallow lenses is but the optical counterpart of the hand-artist's power of compensating in drawing for the apparent distortion following upon the absence of binocular vision, and seems to furnish the only solution of the difficulty of making a flat monocular picture truly represent a two-eyed impression. The only danger lies in the fact that so many sitters are satisfied with nothing short of the most flagrant flattery on the part of the photographic artist as well as the portrait painter, and that the method may, in some hands, be prostituted accordingly.

H. Dennis Taylor.

AMERICAN NOTES AND NEWS.

A New American Journal.—The palatial city of Washington, D.C., has not had, so far as we know, a journal to represent photography there until now that the *Photographic Adversaria* has been published. It is to appear fortnightly, and we give hearty welcome to our young contemporary. The most noteworthy article in the issue for the 5th inst. is one by Dr. Theodore Hansmann, in which he discusses the possibility of obtaining spirit photographs, and states that in course of his investigations he has obtained several that have been recognised. One of these is printed as an illustration to the article, and represents the author himself, together with a sharply defined portrait of Gen. U. S. Grant on the same plate. Dr. Hansmann is not quite correct in stating that a certain London photo-journalist, whom he names, lived in Washington ten or twelve years ago. The most that can be said is that he twice visited it for one day, *en route* for the south, about the time mentioned.

The Convention of the American Photographers' Association.—If the reports in American journals are to be credited, and we see no reason for not doing so, the recent Convention, which was held at Chicago, has proved a deplorable failure. Not a single paper was read, nor was there any discussion on a technical or scientific subject. In brief, says the *Photographic Times*, "the Convention amounted to this only: The members met, selected a location for the Convention next year, elected officers, and adjourned." By the way, the *Times* issued its July 14 number as a special "Convention Number," but quite omitted to say anything about the Convention in it, preferring to give the report a fortnight afterwards.

Coincidence or——?—Is it not due to the readers of the "Convention Number" of the *Times* afore mentioned, that some explanation be given how it happens that an article, by Mr. William Taylor, of Leicester, entitled "The Principles of a Lens' Action," should have appeared in its pages with the signature of Walter E. Woodbury attached thereto? True, the original title of the article has been altered to "The Action of a Lens Simply Explained," and a few verbal alterations, not corrections, have been made; but, in other respects, the article, together with its illustration, is essentially that of the clever Leicester optician, and forms an addendum to his firm's catalogue. Some explanation seems desirable.

On the War Path.—We understand, from the *Photo-American*, that the Duke of Newcastle, who is stated to have almost a craze for photographing wild beasts, especially those of a rarer class, has visited California along with Mr. Gambier Bolton, intent on his favourite pastime. One project these distinguished photographers have in hand is to photograph the big sea lions at the cliffs. It is not their intention to photograph those creatures from the shore, but to steal up to the seal rocks on a tug and get perfect negatives. After leaving California, they go to Honolulu. We trust that both will return safe to England, heavily laden with the spoils of the chase.

Their Loss is Our Gain.—The editors of the *American Amateur Photographer* announce that, although they lose the active personal aid of Miss Catharine Weed Barnes by her marriage with

Mr. H. Snowden Ward, and her consequent removal to London, where she will in future reside, yet is she to keep herself in touch with her former journal by still acting as an associate editor and English correspondent. This esteemed lady, during her visit to Britain last year, made many friends, who will gladly welcome her back again, and among these we include ourselves.

Half-tones in Colours.—Mr. F. Kurtz, of New York, has patented a process of printing half-tones in colours by carrying out the idea of the three primary colours, and using blocks in which the grain runs in lines of different directions. He prints two colours over a third, and thus obtains a combination print in which several different colours appear. The negatives have to be taken through special coloured screens.

Friction at the World's Fair.—Photographers appear to be resenting the restrictions put on them in connexion with making use of their cameras at the World's Fair, and are leaving them at their lodgings rather than be subjected to the exclusive and restrictive policy adopted towards them. Hence, says the *American Amateur*, the number who try the privilege is at least ten times smaller than it would be if some reasonable fee was asked, and, as a consequence, the income from fees is disappointing. The annoyances everybody has to put up with at the hands of the Photographic Department are patent and notorious.

Extemporising a Camera Stand.—There is an absurd rule prohibiting the use of a tripod; but this seems, in one case at any rate, to have been cleverly evaded by the photographer fixing his camera on the back of a chair by a bicycle clamp. It is said that the official photographer employs a force of fifteen men to look after camera permits and watch for camera users.

Soap-bubble Photographs.—In view of the desire that now prevails among some photographers to take children in the act of blowing soap bubbles, Mr. E. L. Wilson gives (in *Wilson's Magazine*) a formula, presented to the Academy of Sciences by M. Izard. He uses a resinous soap, made of ten parts of finely powdered resin intimately mixed with ten parts of carbonate of potash, and adding a hundred parts of water, these being boiled till fully dissolved. This keeps well. For use, it must be reduced with four or five times its bulk of water. The bubbles made with this liquid continue much longer than those made of common soap.

THE PHOTOGRAPHIC CONVENTION, 1893.

Delegate's Report to the London and Provincial Photographic Association.

In accordance with my duty as an elected delegate to the Photographic Convention of the United Kingdom, I have the honour to submit to your notice the following report, comments, and opinions.

By dint of a little personal exertion, I managed to get a small party together on Monday morning, July 3, for the 10.30 train from Paddington. Taking ten tickets, the reduced fares of a party were obtained. The party consisted of nine only, so the amount saved amounted to 7*s.* 11*d.* instead of 10*s.* 8*d.* each. But, as the remaining ticket was sold at Plymouth, I declared a dividend 1*s.* 3*d.* each, making the total amount saved 9*s.* 2*d.* I mention this to show what can be done, and to urge the importance in future of some combined effort beforehand—first, to secure a comfortable saloon carriage; and, second, to reduce the fare of the journey. My work was but a scratch affair at the last moment, but it is certainly an item that should be taken in hand in future, as there will probably always be a goodly London contingent at all Conventions.

The Excursions.

Whilst finding no fault with the local Committee, there can be but little doubt of the folly of arranging too many excursions for one day. At Plymouth, as at Edinburgh, the great majority went to one particular fixture, leaving a bare handful for the others. This must be particularly unpleasant for the leaders of both, or, as was the case at Plymouth, all three. Two or three of those arranged this year practically fell through altogether, and it should be a lesson for next year that the alternative excursions should not exceed two upon any one day. I will mention one instance only. The excursion to Looe and the Cheesewring on the Thursday was allowed to drop, with the result that the one to Totnes and down the Dart was patronised by nearly seventy instead of about twenty-five as expected. The consequence was that the flotilla down the Dart had to be augmented, and finally consisted of the steamer, a barge and two small boats. To me the pleasure of an excursion is the party, and therefore all arrangements for cutting up a good size gathering into fragmentary segments of five or six do not commend themselves.

The weather, with the exception of the first day, was particularly bright and pleasant, though hardly the best for photographic work. It was most unfortunate that the first day was so wet, because the special invitation steamer trip organized by the local committee was quite a new thing, and deserved greater success. By means of local subscription, a handsome steamer was chartered for the whole day free of cost to those attending the Convention. Had the day been fine, the chances of the hand cameras were simply magnificent. However, Mr. Handsford Worth, the local Hon. Sec., and Colonel Barrington Baker exerted themselves to the utmost, and their endeavours, together with the two excellent repasts served on board, the music, and collection for the Photographers' Benevolent Association fund, served to keep the large company in what, under such depressing circumstances, might fairly be termed good humour. The trip which was probably more enjoyed than any other was that down the beautiful river Dart from Totnes to Dartmouth, although there was but little photographic work feasible.

The Papers Read.

I fear in this instance that I must find serious fault. There were too many papers to commence with, some of them were not conducive to discussion at all, and there was no time in any case for it. It was rather surprising to me that, beyond the officials, who would feel compelled to attend the reading of the papers, even a small number of ordinary members put in an appearance. The papers are usually in print and handed round beforehand to the meeting, so that there is not even the charm of listening to something new, and the discussion, being so limited, is of no value. Consequently there is but small inducement for members to attend when varied enjoyments await them elsewhere.

The highly scientific nature of some of the papers is distinctly against any sort of discussion. Even the ablest scientist would fight shy of dealing with a mass of diagrams and tables without first digesting them.

The Social Side

Was, as usual, distinctly a success. Old friends met old friends, and newer members met those they had so often heard of or read about, but never seen in the flesh. With the slight exception of a little snarling by one or two members of the trade, everything passed off well. The post-convention meetings, where over a glass of stone ginger beer, old battles are refought, and song and story enliven the evening, have become quite a recognised institution. One of our members, Mr. Cowan, rendered yeoman services at these with his recitations.

To sum up, the Convention, in spite of the few matters which might be improved, was enjoyed by every one, and I hope Mr. Cowan or Mr. Hadden will bear me out in this. And I should like to recognise the valuable services of Mr. Handsford Worth, the local Hon. Secretary, who was most indefatigable in his efforts to please and assist; also those of Mr. Cembrano. They are both model Hon. Secretaries.

One more grumble and I have done. The receptions by the Mayors of Plymouth and Devonport were all right in their way, but I must certainly deprecate the increased use of evening dress. This year the number of times required was increased to three. Personally I should like it to be forbidden altogether. We don't go out photographing and for enjoyment in dress suits; and, when the local committee specially stated on the programme that they should make a point of attending the receptions in morning dress, it was nothing less than affectation for the visitors to disregard the hint. Of course it's just as well to show the natives that some of us possess such articles of clothing, and that we know how to walk about the streets to show them to best advantage.

A journalistic friend of mine, hearing of the new venture, the magazine I edit, said, "Oh, it's easy as easy; when you haven't much to say, shove in more pictures." This is my case now, and in the album in which this report is written you will find a few of my hand-camera shots, to make the report a pictorial souvenir as well.

Walter D. Welford

CAMERA SUPPORTS.

For years a light, portable, withal rigid, stand has been a *desideratum*. I have longed for such ever since my first essays, when I was wont to carry some five feet or so of ash and brass, yclept a tripod—nothing was better in its was, stronger or more rigid; the stand bearing the name of the the late Mr. Kennett was, and is, admirable, but weighty; the "Maudsley" is a model of beauty, and is light, neat and rigid, the perfection, in fact, of a tripod for general use. The large variety of stands may be somewhat confusing, they may be all that could be wished as regards *ingenuity*, but, when we come to consider their portability, opinions will vary; what one man looks on as *portable*, another would consider impracticable.

I once owned a "fishing rod and gas-pipe arrangement" of metal with a horn attachment, this was supposed to represent an umbrella. It required a strong arm to wield it, was only some three feet six inches high when extended, and was then practically of no use, being a veritable reed "shaken with the wind."

However, the ordinary photographer has little now to complain of with regard to tripods, he can get them one, two, three, or four fold—but none of these are suitable for those who, like myself, combine the art science with *cycling*. I believe the want of a good stand deprives many cyclists of the pleasures derived from the practice of photography. To such I commend the perusal of this short note and description of what I have so far found to be a really *light*, *portable*, and *rigid* contrivance for supporting a camera during exposure. My own idea was, to have made a hinged rod to attach to the handle bar of safety, the rod to have at the end a metal plate pierced for the camera screw and fitted with a universal joint. However, I saw just in time a really good attachment by Lancaster, which, though not, I think, perfect, is still so near the mark as to make it, considering the reasonable price, a good thing to have.

Now, what we want on the cycle is an arrangement which will enable us to dismount, and, without any unpacking, transform our machine into a steady tripod, the time expended being merely that required to unpack and erect the *camera*, entirely doing away with any bulky bundle of sticks strapped to the frame of the bicycle. With the camera attachment referred to (Lancaster), and a simple contrivance which any one could manage for himself, we have all we require. The cycle, of course, will be of no use without a third "leg" or support. This I get by attaching to the safety frame, just above the front fork, by means of a collar and nut, a light bamboo stick. This, when not in use, is held up under the saddle with a small strap, though a spring "clip" would be simpler. Drop this "leg" down, and we have at once a strong, steady stand, the safety leaning over somewhat. The camera attachment, being already fixed to the top bar of frame just behind the handles (the Beeston frame being understood), is at once ready for the camera. We get three movements—lateral, vertical, and horizontal. Each movement is controlled by a simple but powerful screw, and the whole arrangement *in situ* is barely noticeable. The total weight of attachment is well under one and a half pounds. The height may be reckoned at from three to four feet six, the rapidity being wonderful.

It is well, however, to remember that to secure the best results, and to ensure one's own comfort, the camera and its fittings must be perfect. Each part should move freely and easily, the dark slide inserted and the shutters drawn without undue exertion. This is on the face of it a simple matter, but is most important in practice. Above all, the exposure should invariably be made by means of a mechanical arrangement fitted with ball and tube; the focussing cloth, slightly weighted at the corners, is left hanging, and leaves no necessity for touching the camera or machine during exposure. It is by no means requisite to remove the camera every time between exposures, as where several views are to be had in one neighbourhood the machine may be wheeled or ridden, the camera being in place ready for work; at the same time all *unnecessary vibration* is to be avoided.

Many cyclists may prefer to add (with very slightly increased weight) a second leg or strut, *i.e.*, one *each side* of bicycle. This gives greater steadiness, takes no more time to work, and is undoubtedly an additional security against vibration. Another point worth mentioning is to line or pad the *clip* with *leather*; the latter is better than rubber. It may be securely fastened on with Prout's glue, making the metal hot, running in the glue, adjusting the leather and screwing up tight till secure and set.

J. Pike.

PLATINOTYPE.

[North London Photographic Society.]

There are, to my mind, but two other processes able to approach platinotype, viz., photogravure and carbon printing. As to the exact salts with which the papers are coated, I believe the chloro-platinite of potassium, in combination with ferric oxalate, are chiefly used. Ferric oxalate is sensitive to light, and by the action of light becomes ferrous oxalate. One of the properties of ferrous oxalate is, that in solution it has the power of reducing chloro-platinite of potassium to metallic platinum. Oxalate of potash, or kindred alkalies, which compose the developer of these papers will dissolve ferrous oxalate, and this in turn reduces the chloro-platinite of potassium to metallic platinum, forming the image of a platinum print, the unused portion of the iron salt being dissolved out by the acid bath. The foregoing brief outline of the process shows the extreme simplicity of this method of printing. Platinum is undoubtedly one of the most stable and unalterable metals known to chemists, and in the very fine state of division in which we find it in a platinum print is of a rich, pure black, unaffected by light and insoluble in hydrochloric or other acids, thus ensuring permanency. This quality is undoubtedly of high value, though its simplicity of working, its artistic colour, and the soft effects producible by it, quite overshadow, in my estimation, all other good qualities. To obtain an artistic print by any process, it is necessary to devote considerable study to the production of the negative most suitable to it, and the samples which I have here will, to some extent, explain the quality of negatives most suitable to the process under consideration. True artists admire a perfect platinum print as a thing of beauty in monochrome, while it is the envy of the mediocre painter who daubs on the canvas his abominable greenery-yellowy colours in sections like a child's puzzle, which colours externally refuse to blend together and can only be softened down by prolonged contact with the fuliginous atmosphere of the kitchen chimney. Some of the older generation of photographers were somewhat incensed at Mr. Guardia's remarks at the Plymouth Convention, *re* art productions with the hand camera, and claimed that equally good work was done by some of the early and earnest workers as by those of the present day, and that is undoubtedly true; but, however technically perfect their collodion negatives with their false shadows of absolutely clear glass may have been, and probably were, the photographers of old were almost confined to printing in silver, and lacked such splendid processes of reproduction as present workers may revel in, first and foremost among which I place the platinotype.

Having said thus much to express my admiration for the process, I will give a few details as to the working of the paper, &c. Firstly, the paper *must* be kept perfectly dry before, during, and after printing. Secondly, the negatives should be, in my opinion, fairly dense, but soft, with details to suit the subject, and free from stain, especially yellow, to which colour the paper is but slightly sensitive, in consequence of which the development may be carried on by gaslight, and so simple and cleanly is the process that you may with the cold bath perform the necessary operations in your own dining-rooms (if you can get the requisite permission) without the slightest detriment to the furniture. Thirdly, in printing it is necessary to back the paper with a thin sheet of vulcanised India rubber and by all means varnish the negative. Print till a faint grey image appears as if imbedded in the lemon-coloured sheet with a thin veil or film over it—a softness characteristic of the process without hard or decided lines obtruding themselves. In working the process it is not necessary to tie yourself down by inexorable rules (except with regard to the exclusion of damp) but every worker with intelligence may vary the composition of the bath or the extent of the printing to obtain different effects of tone ranging from silver grey to exquisite black full of transparency. I would advise beginners to print till the shadows and half-tones are faintly discernible, and to have two developing baths, one much diluted and the other of normal strength. Draw the face of the print over the surface of your first very dilute bath, and if the effect desired is obtained plunge the print into the acid bath to prevent further action; but, if through insufficient printing or weakening of No. I the desired end is not obtained, then resort to the stronger bath and complete development on that.

J. V. Brewer.

ART IN PHOTOGRAPHY: AN INTERVIEW WITH MR. FREDERICK HOLLYER.

[*The Studio.*]

A commonplace-looking room on the ground floor of a commonplace house in a quiet Kensington square, the demure plainness of its furniture relieved only by the soft grey tones of the countless platinotype reproductions of the pictures of that apostle of romanticism, Mr. Burne-Jones, which lined the walls. This is where I found Mr. Frederick Hollyer, a sturdy, broad-shouldered, good-humoured, and good-looking man of middle age, who comes nearer to the definition of artist-photographer than any other man in England. To the art-loving public in general, and to the section of the American community which deserves that title in especial, Mr. Hollyer is chiefly known and appreciated as the translator into a more popular medium of the poetic fancies of Rossetti and Burne-Jones. To a smaller circle, however, that appreciation is widened into recognition of what may be called, without prejudice, his creative work, as distinct from his reproductive work with the camera. It seemed to me, therefore, eminently fitting that I should come to this modest oracle for a word on the vexed question of art and photography. As luck would have it, I had made my pilgrimage at an opportune moment, for, taking advantage of the leisure afforded him by a rare holiday, Mr. Hollyer had, the day before, acquitted himself of a piece of work

which I think represents the high-water mark of photographic portraiture. He had deliberately set himself a task, the technical and artistic difficulties of which would, to the ordinary man, have seemed insuperable. The result, in the shape of a platinum print from the untouched negative, was hanging in his studio to dry, and I was gratified with the first outsider's glance at it. It was simplicity itself; a charmingly pretty girl, dressed in a simple summer costume of pure white, standing at an open door, with her fingers resting on the handle as though she were on the point of going out into the little suburban garden, a glimpse of which was caught beyond. The upper part of the figure was seen against a background of absolute sunlight, and yet face, arms, white dress, hair, and dazzling sunlight were all given with a fidelity to values which would not have been unbecoming to a Whistler. In face of this result it seemed to me almost impertinent to ask Mr. Hollyer whether, in his opinion, there could be such a thing as "Art" in photography, for was there not lying before me, as I hesitatingly put my query, a clear answer in the affirmative? He met me, however, with no expression of lofty scorn, but with a somewhat quizzical smile, replied, "I really don't know; but, to tell the honest truth, I have got rather tired of the very words 'art and artistic,' and at times am inclined to say rude things about those who insist so strenuously that they are artists, with a big A, and seem to forget that they ought first and foremost to be photographers. The fact is that my association with the eminent artists whose works I have been permitted to render into black and white by means of my camera has rendered me exceedingly diffident in making any claims at all. I am content to do the very best work I can with love as well as care, and to let the rest shift for itself. If there be art in the result, I am quite sure that those who have a right to be dogmatic on such questions will find it out; if there be no art, I am sure it is my fault and not the fault of my medium. I think that the fact is that, as regards photography as well as other things, we are inclined nowadays to talk too much and do too little."

"Very truly and modestly put, Mr. Hollyer," said I, "but I am afraid you have something more than an inclination to evade the real point at issue."

"Well," was the reply, "to speak frankly, I am quite convinced that something, call it art or what you will, but something apart from mere mechanical and scientific excellence, not only can, but should, find its way into every print from every negative that leaves the photographer's studio. In landscape photography, for instance, that something may be of the nature of selection, and selection is, as I understand it, an important part of the equipment of every painter. Observation, too, I think, must be fostered by the photographer as carefully as by the figure-painter, for, if his work show not the presence of this quality in itself, it will be a mere piece of mechanism. I have some prints here from negatives taken by me many years ago to which I may, I hope, without egotism, refer as showing the importance of proper selection. This view of Waterloo Bridge, for instance, might have been taken from half a hundred other points of view, and yet from a topographical and mechanical standpoint have been as correct as I here show it. To make it pleasing to my own eye, however, I found there was only one spot from which I could properly view it. Having found this spot, I had again to patiently wait until the cloud and mist effects, with the London sun just peeping through the murky veil, were as I thought they should be. Not only this, but selection came into play to tell me when the black barge was in the right relative position to the rest of the picture, and when other boats and floating objects, which might have formed discordant notes, were well out of the way. The result, whether good or bad, is practically what I had intended it to be from the very first, and is no hap-hazard accident, but the expression of a deliberate intention, gained by careful selection on my part. At that point, of course, I stop, and the rest of the work is done for me by the camera, but I might almost as well declare that the etcher was a mere mechanical workman because the biting of his line is done by the acid and not by himself, as hold that because some portion, granted even that it be the major portion, of my work is done by an agent which I only imperfectly control, I cannot introduce into my work that personal note which I take it is but a synonym for the 'Art' of which you speak. Of course I am aware that at one moment, and that perhaps the supreme moment, the actual recording of the observed facts is taken out of the photographer's hands.

"This is the moment of exposure. Consider, on the other hand though, at how many other points the personal equation enters into our problem. First, there is the focussing (and though some writers on photography have disagreed with me here, I maintain that I am absolutely correct in saying so); then there is the development; thirdly, there is the manipulation of the print from the developed negative. Don't for one moment understand me to mean that that fatal crime of touching and retouching negative or print is or has been laid to my charge. On the contrary, no one can have a greater abhorrence of such acts than I. I consider it almost as criminal to form a picture by the superposition of one negative upon another. I am convinced that two photographers, equally skilled in the mere mechanical processes of their profession, can photograph the same object from the same point of view with the same camera, and under exactly similar conditions, and that the finished print of one man may be a mere soulless transcript of what lay in his field of view, while that of the other may be something to which, for want of a better word, I must apply the term 'artistic.' How much or how little of art may belong to photography is another question, and one which I must refrain from entering upon. When, not so very many years ago, photography came into being, the marvellous results which were produced by the very earliest photographers caused an exaggerated opinion to prevail as to its purely artistic future. When, later on, its well-defined limitations became apparent, there was the usual reaction in the other direction, and those who claimed that art might in any form enter into photographer's work were sneered at as presumptuous Philistines. Surely there is safety in the middle course. If you do not deny artistic faculty to the man who reproduces in black and white a picture by means of his patient 'rockings' and 'scrapings' of a copper plate, relying in a large measure upon reproductive processes which are entirely mechanical, why should you not, then, attribute some degree of artistic personality to him who reaches the same end partially by means of the camera? Compare the work of different men in my own branch, and tell me whether there is not the greatest difference in the result, as regards not only the technical excellence but the artistic value of the translation as well.

"Perhaps I have talked too much, for I hold, as I said when I began, that my mission is to do and not to talk. But I am as irritated, on the one hand, when I hear the flat-footed declaration that photography can never be more than a mere mechanical trade as I am restive on the other when I hear a photographer aver that, by combining a set of views taken at various times and hours of the day, he has effected what he fondly calls 'a picture,' as distinct from a 'mere photograph.' In other arts, and especially the subsidiary, it is their very limitations which the craftsmen turn with instinctive recognition to their own advantage. If this principle were only to be recognised and honestly lived up to by photographers in general, we should have results which would be better art, because they would be better photographs." HORACE TOWNSEND.

THE PHOTOGRAPHIC CONGRESS AUXILIARY OF THE WORLD'S COLUMBIAN EXPOSITION.

SEVERAL papers have been contributed to this Congress, which was held on August 1, under the presidency of Mr. James B. Bradwell, Chairman of the Committee. We print the following at present:—

WINTER PHOTOGRAPHY IN THE ALPS.

ALTHOUGH it is now twenty years or more since winter visitors first came to the Alps, few photographs have been preserved which render faithfully an Alpine valley in winter. The subjects ready to hand are varied and beautiful, yet somehow one seldom sees first-rate photographs of these high-lying districts under snow.

Those who have so kindly asked me to prepare this paper have greatly over-estimated my capacity for telling you some new thing. Still, bearing in mind the fact just referred to, it is evident that few persons have made a study of landscape photography at that season in the Alps, and thus, perhaps, the experience of one who has worked in that direction may be of some interest.

Those taking up this branch of their art are usually handicapped at the start by their belief in an article of faith—and of little else—laid down by the majority of English photographers, who declare that snow should never be photographed in a bright light. I dare say that in your sunnier climate, which must offer many more opportunities for experimenting in winter photography than does that of Great Britain, you have already discovered that brilliant sunshine is essential to the best results. But, in case any among you still hold to the unsound maxim, I would ask him to bear in mind exactly what snow is; that it is unform in colour, almost smooth of surface, and on dull days without distinct outline against a grey sky. It must, therefore, be built up, so to speak, and modelled into that miracle of fairy delicacy and lightness which, under favourable conditions, it may become. We can have it at its best by working with suitable light at suitable hours, and now and then calling to our aid one or two artificial but inoffensive contrivances. At midday in winter the light falls too directly on the subject; the lace-like tracery with its system of innumerable tiny snow crystals, obtains no relief against the white robe, standing hard and stiff around rock and *châlet*. But go early in the morning or late in the afternoon, and note the change. You will find in the long, soft shadows a thousand exquisite half-tones. See how the highest and nearer lights are broken, and broken again, by the thin veil of surface crystals, each with its perfect modelling, its tiny shade throwing up its star-like form. Look at the rounded billowy flow of the snow where, half in sunshine, half in shadow, it sweeps around and over the inequalities of the ground. If there has been a mist, however slight, during the night, a fretwork of hoar-frost will cover all, and will complete the materials for as fine a subject as you can wish for.

You may find it desirable to use, in addition, the artificial contrivance to which I referred, and by shovelling some of the snow, or trampling out a track, break up any portion of the picture where the uniformity is too great.

And now, having placed your subject under the most favourable conditions, what is the best way of photographing it? My own experience leads me to think that slow plates are far the best, so that when used with a small stop the exposure can be as prolonged as possible. I have always used Wratton & Wainwright's "ordinary" plates for this purpose, with one of Ross's portable symmetrical lenses, and with the smallest stop. I give under the conditions of light just described an exposure of two seconds. In developing, I am careful to work up the plate very slowly and to carry the development very far, and when I have finished I expect to find a range of density from excessive blackness to clear glass; but, though there must be no mistake about the quality of these two extremes, there must be very little of either. It is on the variety of the half-tones that the success of the picture depends, and it is for this reason that, in photographing snow, correctness of exposure is of such prior importance; and therefore a slow plate, allowing of more laxity in exposure than a rapid one, is far easier to work with. A plate under or over-exposed can never, however skilful the development, give a perfect result if the picture is of a snow-covered landscape, as the half-tones must suffer from the error. I have used the iron developer, eikonogen, and pyro, and ammonia, and, for snow, have obtained the best results with the latter. I may add that, when developing photographs of large moving figures, taken in winter in the Engadine, on our skating rink, I get the most successful pictures by allowing the plate to flash up at once under eikonogen, and continuing the development until the principal object is hardly visible when viewed by transmitted light. For studies of this kind I have had the best results with Lumière plates.

But I have digressed from my subject—because, probably, I had so very little to say. I have now all but done; but, before concluding, I should like to draw your attention to the fact that very beautiful effects can be obtained in Alpine photography by facing the camera to the sun, which, of course, should be just *out* of the plate. For most subjects (water and clouds excepted) such lighting is rarely suitable—at any rate, in so extreme a form; but with snow I have obtained most charming studies in this manner.

In response to so great a compliment as has been paid me in requesting me to write this paper, it would have been ungracious on my part to have refused; but I must ask you to forgive the very inadequate manner in which I have responded, for I know but little of the technical side of photography, and of the practical side am but self-taught, by my love of an art the beauty of which has always warmly attracted me.

ELIZABETH MAIN.

PRESENT AND FUTURE POSSIBILITIES OF PHOTOGRAPHY.

To render an account of the present state of photography presents no difficulties whatever, the facts to its credit being recorded everywhere, so that we need only draw from recent sources, the very ancient facts being, so to speak, contemporaneous, in order to trace a complete history of photography up to the present hour, passing in review all its methods, all its countless applications.

And, while we are desirous of justifying the very title of this paper, the circumstances allow to foot on the past, admitting it to be well known to all of us, in order to arrive at a conclusion as to future possibilities which we are able to foresee, combining the progress of photography itself with the science of to-day.

We are witnesses of a scientific progress so continuous and wonderful that it would be rash indeed, even if aided by the most exalted imagination, to indicate the more and more extraordinary facts reserved to us even by the nearest future. New discoveries in the domain of general science will, without fail, result in unexpected photographic inventions, or in applications of photography to uses of which at the present time not the slightest idea can be formed. This is why we cannot approach the difficult subject which has been referred to us without a strong sentiment of our complete inability; in other words, this is a new world, inaccessible, which we set out to explore; we would have to give proof of the fervour of our imagination, of a kind of foresight, more than of true science. We would be well inspired if we could embark on a journey to the beautiful land of dreams to talk with the fairest fairies, and would return to describe our visions and to explain the most fantastic and most wonderful facts, while now we are obliged to appeal to reason—to the reason of to-day—it may be well understood, for our reason changes its basis at every moment according to the conclusions it has to draw from evidences and facts which yesterday it denied and thought wholly impossible.

But enough of philosophical contemplations, to which, however, we were prompted by a prudence which every one will appreciate.

Being thus under the protection of the unforeseen, we may now venture suppositions as fantastic as possible, and become prophets without much merit of our own, since the past serves as guide in discovering future possibilities, which, hypothetical as they are, may be admissible, because it has been shown that we need not doubt anything in the course of scientific facts.

The past belongs nearly exclusively to monochromy, designating thus any method which, by the aid of light, produces an image with more than one colour, whatever colour this may be, and even images of more than one colour, obtained by the aid of monochromy, each having its own colour.

The progress in this line has been very remarkable, especially since the production of single images took the place of a multiplicity of copies.

First, the paper prints obtained by a chemical process from one and the same plate; then the commercial prints, obtained in a mechanical way with plates prepared with the aid of light, have made photography one of the most ingenious and faithful auxiliaries of the art of illustrating all kinds of publications; in one word, the automatical means of copying the most wonderful and most instructive objects which have ever been imagined. On the other hand, the considerable increase of sensitiveness of the products exposed in the camera to the action of light, together with the invention of the dry film and the consequent portability and easy management, have caused an immense expansion of this art, which now in every respect is in the reach of all.

Science has, not less than arts profited by the progress of photography, which made it an indispensable aid for its most delicate researches. To prove this we only need observe the excellent and unsurpassed services rendered by it to astronomy, to physics, to the study of the infinitely small, to the rapid and complete registration of all phenomena of light and motion, even of the wonderful rapidity of the minutest organisms. Indeed, it is at the same time an eye and a draughtsman. Like the eye, it is gifted with the highest rapidity of vision, so much so that it sees objects as if they were stationary though they are alive with miraculous swiftness. Ah, it even sees what is invisible to the human eye! The stars bear witness—which, though unknown till now, have been discovered by the photographic eye in the depths of space, inaccessible to our most powerful telescopes. The reproduction of ultra-violet rays bears witness—which, for our power of vision, belong to the invisible.

As a draughtsman it is unrivalled, for nothing equals the definition of the lines it traces, the accuracy of the endless details it reproduces, the truth of which is such that it has the force of the evidence of a witness. We may add that it is also an artist. Indeed, thanks to entirely successful researches, we are able to obtain impressions on the sensitive medium by the aid of light of all colours, in proportion to the degree of luminosity of the different colours. This progress was achieved but slowly, and, now that it has become an accomplished fact and practically within the reach of all, it gains ground slowly; but this can be only a question of time. Since we are able to sensitise our products so as to render them susceptible to impressions of all colours, giving them a perfect orthochromatism, it must also be possible to render them more sensitive to one colour than to another.

This possibility of selection must lead to the production of monochromes corresponding to every one of the principal colours, and consequently to the representation of the colour effect of an object or of nature, by superposition of the different monochromes, each having its own colour.

Therefore, photography, being the most skilful draughtsman and lithographer, and the most admirable engraver, is also a wonderful expert of colour. But it is even more than this, it is already the artist of entire pieces of art, producing by one single action the colours of objects, much as it impresses the sensitive monochromatic plate.

And, what a really wonderful idea, we begin to trace on the sensitive film the true image thrown into the camera, with its reality of detail and of colours. And this is our present position.

The development during more than fifty years has been nearly completed, because we have succeeded in passing through all possible phases of the art of designing and of its applications, attaining even to the art of painting. We say "attain," by which is not meant that we have advanced in the subject of colour photography to a point which we did not gain in monochromatic reproductions.

The most characteristic name which might be given to the present epoch is that of a new era. We are on the threshold of the art of polychromy. Indeed, in scientific applications, the first step counts most, as perhaps it does in every other field. We have only to direct our attention to what is going on in the electric world, and then to proceed by analogy. There we have arrived at a point at which even the most fertile imagination could not pass beyond the scientific wonders of the future, even if its flight would lead us into the most fantastic dreams. No doubt electricity, with its power, its invisibility, its enormous rapidity of propagation, will become an ally of photography to aid in the creation of unexpected wonders. Already they speak of plates exposed and developed by the aid of an electric current. Edison is at work to construct an instrument intermediate between the phonograph and his kinetograph, which will enable us simultaneously to see the motions of a person, to hear his voice, his words, put in immediate harmony with his gesture, his attitude, the play of his lips and eyes, &c.

This has not only been taken into consideration, but can be realised—probably it is realised—at this hour. But this is not all. By electricity similar effects may be and are (why not speak affirmatively, since such is our opinion?) transmitted over a distance.

Thus, using the electric telegraph at the same time as telephone and as kinetograph, we will be able to communicate the complete effect of form, motion, and sound to points far distant from the scene of action.

So far we have spoken of the form, which involves the idea of outline and detail of objects. Will a transmission of colours become possible? Will we be able to complete the characteristics of an object by communicating through the electric wire not only its outline, but also its colours?

Why should we not admit this possibility, extraordinary as it may seem? How to get there? This is the point which no one yet knows; but, considering the present state of our scientific resources, based on the divisibility of matter, it does not seem impossible that we may arrive at results of this kind.

Passing in review the history of development of electricity, are we not convinced that about fifty years ago no one would have believed a prophet of the future foretelling all the present wonders of the spark?

We do not burn the wizard any more, at least in civilised countries, but they are still treated as fools.

Well, we can no longer denounce folly in view of scientific predictions of the most revolutionary character. All we are allowed to say is this: "*Who can tell? This may be very well possible.*" Thus we do not risk to engage in a dispute which sooner or later will be decided against us by the facts.

Speaking of the progress of photography which may be realised, we think at once of a higher sensitiveness, which would allow of instantaneous impressions even with the feeble light of interiors. The sensitive product, or at least its vehicle, shall have the fineness of the collodion or albumen film. The apparatus, perfect as it is, still shows an incessant tendency to improvement.

From the standpoint of expanding the field of photography until it reaches every home, the ideal will always be an apparatus essentially portable, of small weight and volume, permitting us to photograph without being observed, and containing a number of plates or flexible films, sufficient for a large number of successive exposures.

The favourite of the future is evidently the flexible film or the very small plate, so that, after a sufficient perfection of the rolling apparatus, an endless ribbon may be advantageously substituted for a certain number of single plates.

The rolling device lends itself better to a rapid succession of new sensitive surfaces, but its operation must be made more reliable and easier. This evidently is a field for the future.

The future will find enough work in the development of photography, and persons who believe that very little is left to extend its field are badly mistaken.

Well, what is it? they ask. There is the question of colours, and, saving some perfection in details, that is all, isn't it?

First, in regard to colours, it is by no means a small step forward to bring this branch of reproduction to that degree of perfection which we have attained in monochromes. If such a great step *has* been taken, inducing us to believe in a possibility of reproducing colours, and proving that the means of direct reproduction of colours exist, it is not less true that all is done with a view of applying it to industrial uses, either to obtain simply and easily direct prototypes from nature, or to multiply polychromes with the aid of these prototypes. The very day this possibility is recognised and justified by facts, nobody will do anything but take polychromes.

But the perfect realisation of this hope will not come without extensive further researches. It will be necessary to conquer step by step, with the aid of successive progress, and no one is able to foresee how many years it will take us to arrive at the perfection of this process. Occupied with this most attractive study, we may ask, what other applications remain to solicit our earnest endeavours?

Is it not surprising that so little has been done until now toward employing photography in industrial decoration of ceramic and tissue? And, besides, we have everything necessary to pursue this line with success. To the future, therefore, is left an application as important as useful, and we hope that this work will be accomplished in an excellent manner.

How long before the constables, policemen, and detectives will be provided with detective cameras, permitting them to add to their words as witnesses the proof of the crime and of the identity of the criminals? Though we have now all that is necessary for this application of photography, so simple and useful, yet it remains still to be realised.

How long before we think of introducing into our schools and colleges the study of photography practical enough to enable each scholar of either sex to constantly use the pencil of photography, according to the lessons of the course pursued, for gathering all the souvenirs on their excursions and voyages?

If this could be done, the application of the photographic lens to certain functions would cease to present difficulties.

We have already sounded far, very far, into the depths of infinite celestial space by photographic investigations, but they are less applied to terrestrial or submarine uses. Geology would find it advantageous to verify the symptoms of life in the depth of the abyss, aided by a photographic apparatus, combined with a magnesium flashlight, which may be lighted at a distance by electricity. The same might be done below the surface of the water, in depths which no eye has yet beheld, and thus an investigation of submarine landscapes, so to speak, would prove to be of priceless value to science.

We have not yet encountered any impossibility, and the well-known facts suffice to give immediate results of the highest value.

How much remains to be done in regard to the methods and nature of registration? We cannot form an idea thereof. Why, for instance, is not the portrait obligatory on the passport? What better proof that this *is* Mr. X. who speaks to you than the presentation of his duly executed passport bearing his picture?

On the train, at the hotel, at the public places visited by travellers, at the windows of the telegraph and post-offices, and of the banks, &c., every one appearing should leave, without his knowledge, the proof of his presence, in the shape of an automatic, direct, and permanent reproduction. What an aid would this be for the researches of the department of police, for the proof of *alibis*, &c.

We would find no end, would we venture an excursion, be it ever so summary, into the realm of future application of photography. We would only have to turn to every art, to every science, and say that the drawing of the light is called upon to render them much more valuable services than they can be rendered by any other means.

Until now we are concerned with flat monochromes or polychromes, but it is possible that images in relief may have to rely on the aid of photography.

Already it is used in engraving, either in relief or in impression. We have made, by photographic process as well, mouldings in relief, still somewhat imperfect, yet it is certain that we will learn the act of producing better reliefs, and, on the other hand, that we will obtain true copies of round ornaments.

The various trials in this line, known as photo-sculpture, did not give very satisfactory results; yet we have results at least, and to the future belongs the task of more and more perfecting works of this kind. In short, the question is only how to transform the plane into a relief, and we shall certainly find a solution in a more practical way.

It remains to consider what influence the art of drawing and painting with light exerts on the arts proper.

It is evident that photography teaches to see nature better, to give a better account for the rules of perspective. Notwithstanding, there are always fantastics. They will have difficulty in freeing themselves of the true representation of their objects, as well in composition as in colour; yet, at the same time, they try to use originality and impress the stamp of their personality on their pictures; and, besides, even the colour shows a tendency to approach more and more to reality, if we behold true pictures, painted directly by the aid of photography. Perhaps they wish to turn away from truth prompted by a desire for contrast, and imagine to find colour effects absolutely anti-natural.

This applies to some of them, but the larger number, though led by confirmatory proof to represent truth, are tempted to observe an exactness of colours much as if this question was one of perspective.

Will the art gain thereby? It will in correctness, perhaps it will not in originality. For it is probable that every artist will always have many means of proving his worth by impressing on his canvas the stamp of his personality, which will distinguish it from all the rest. Notwithstanding photography, Roybet would not cease to be Roybet, and Bouguereau or Meissonnier would not be less than what they are.

All we can say is, that as perfect an art of copying as the art of photography must naturally exert a favourable influence on theory and practice of the beautiful arts.

We do not understand how it may be detrimental to ideal art, which at all times will be able to assert its rights. If photography compels it to become more accurate, where is the disadvantage? Is it for fear of invasion of a certain monotony due to this very excess of accuracy? It would be the same to say that we might ever become weary of the beautiful works of nature because they are always correct in outline and in effect of light and colours.

In our humble opinion, the ideal, the beautiful art, the art of creation will gain, not lose, thereby, because the artist, not embarrassed by difficulties of composition, will be more at liberty to dart forth into the realm of dreams and pure vision of his imagination. As basis, he will have the infallible guide of true effects rendered by the photographic printing, and nothing will prevent him from embellishing this reality with all the children of his brain.

As a result of the foregoing, we may predict the most brilliant future for the art of drawing, painting, and sculpture with the aid of light. It will ever be useful to all, and for every purpose. Nothing seems to exist capable of taking its place, and we cannot foresee how it might ever become hurtful to the beautiful arts, whose most powerful ally it is already at the present time. LÉON VIDAL.

THE DESIRABILITY OF AN INTERNATIONAL BUREAU: ESTABLISHED (1) TO RECORD; (2) TO EXCHANGE PHOTOGRAPHIC NEGATIVES AND PRINTS.

THE international photographic survey of the heavens has now been in progress for six years; some thousands of negatives of the stars have been obtained, and when this survey is completed the present face of the sky will be known with an accuracy which the astronomers of a pre-photographic age never dreamt of, and which will possibly enable the structure of the universe to be worked out, or, at all events, will afford a means of detecting the changes which we now know so frequently occur in the heavenly bodies.

But is not a photographic survey of the *face of the earth* at least as important as that of the celestial sphere?

Even such physical features as hills and coast lines change slowly but surely: the influence of man upon nature brings about far more rapid changes in the face of every country, while the successive generations of mankind pass away and leave but little more record of their physical peculiarities than the waves which beat in turn upon the seashore.

I have advocated a systematic photographic survey of the British Isles for many years, and the details of my scheme will be found especially in two papers:—

(*a*) "Notes upon a Proposed Photographic Survey of Warwickshire," read before the Birmingham Photographic Society in December, 1889. This was printed in the journals, and a thousand copies in pamphlet form were sent to all the photographic societies in the British Isles and in America.

(*b*) "Proposal for a National Photographic Record and Survey," read before the Photographic Society of Great Britain in May, 1892, and also printed as above.

In these papers the idea advanced was that in the British Isles the photographic societies of each *county* should band themselves together to secure, by the aid of photography, a more or less complete record of the physical features of each county, its fauna and its flora, of its architecture and archæology, and its ethnology, &c. The aid of the leading men in science, literature, and art in each county was to be invited, who should be requested to furnish lists of places, persons, and things worthy of being grouped together to form this "True Pictorial History of the Present Day." As a unit of work the sheets of the excellent ordinance survey map were taken. These sheets are on the scale of six inches to a mile; each sheet or map includes six square miles; upon them is marked every house, field, and tree.

One or more sheets of this map may be allotted annually to each photographer who expresses his willingness to take part in the task.

This photographic survey work is now being actively prosecuted in about eight English counties. In most cases the local free libraries and museums have been selected as the best places in which to deposit complete sets of prints. In the case of each of the two counties (Warwickshire and Glamorganshire) the number of mounted prints of local places, &c., handed over to municipal authorities during last year (1892), exceeded one thousand in number.

It is greatly to be desired that this systematic survey work should be extended largely, both in England and America.

It supplies a definite and useful object both to each photographic society and to each and every member of such societies. In the British Isles we have now nearly three hundred photographic societies, and in the United States about two hundred.

There is no reason, however, why the "unattached" workers—men who belong to no society—should not also lend active aid in the work.

That such survey work will be continued and will prosper is obvious; but it seems a great pity that the results secured should be confined to the locality in which they are produced. And the main object of this paper is to point out how the usefulness of the scheme might be largely extended.

In each country there should be some central place—the British Museum, for example, for the British Isles, and the Smithsonian Institution for the United States—where a *record* of all the negatives should be kept. This record should be limited to negatives (*a*) of good technical quality; (*b*) of local interest. A complete set of the prints from these negatives would also be stored at each of these centres. Such prints might either be furnished as gifts by the producers of the negatives or they might be printed by the special staff of the central institution. They should be in either carbon or platinum.

As the workers in the majority of cases would be amateurs, it is probable that they would not object to handing over the negatives themselves to such central institutions; the negatives could then be stored in fire-proof and damp-proof rooms, and could be printed from by a special staff as desired.

Printed lists of negatives added annually should be published, and should be widely circulated among free libraries, museums, &c. A complete set of the prints should also be exchanged annually between the two great centres one on each side of the Atlantic. It is certainly lamentable to consider how many thousands of valuable negatives are wasted annually for want of any method for their preservation and publication. Moreover, the establishment of some such scheme as is here advocated would lend an incentive to steady work by supplying an object, and this is just what nine out of ten of the great and growing army of amateur photographers stand in need of.

And, as each earnest worker "joins the majority," it would certainly be satisfactory to think that his store of fine negatives—accumulated at so much expense and with such pains—would be preserved and used, instead of being wasted and lost, as is at present almost invariably the case.

EXCHANGE OF PRINTS.

Every donor of negatives or of prints might be credited with a certain sum (according to the number and size of his contributions), and he should be allowed to select prints to this value from the published lists.

The working expenses of the scheme may be derived from such sources as (*a*) grant from government; (*b*) subscriptions, the subscribers being allowed to select a certain number of prints in return; (*c*) sale of prints to the general public.

How many thousands there must be in the United States who would welcome the opportunity of examining the lists of British photographs which would be furnished to their local institution (library, or museum, or municipal offices), and of selecting therefrom pictures of the village, town, or county from which they or their forefathers came; or of the places of which they read in history or in their daily paper. And we in England would many of us gladly hail similar opportunities of obtaining pictures of that wide land where our relations dwell, and of its wonderful physical phenomena.

Although such a scheme ought ultimately to be conducted at the national expense and by national institutions, yet it would probably be necessary to inaugurate the work on a smaller scale so as to show its desirability and its possibilities. In England the Photographic Society of Great Britain is now endeavouring to affiliate to itself all the local societies; and, if there is (or could be established) a similar union of societies on the American side, the matter could be negotiated between these two central institutions. Or direct relations might be opened up between societies of equal numbers (of members) and importance on either side of the Atlantic.

In conclusion, the points to which I wish to draw attention are :—

1. In every county it is desirable that a photographic survey should be initiated. By the term "survey" I here mean a pictorial record of the state of things, physical and general, as now existing.

2. In each country there should be (*a*) local dépôts containing complete sets of permanent photographic prints of the district; and (*b*) a central bureau containing negatives and prints.

3. Facilities for the exchange (or purchase) of prints, &c., should be provided.

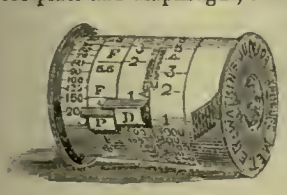
It has been well said that "all photographers are brothers," for it is certain that the study of this light science, though black art, tends to bring its fellow-workers together in no ordinary degree. Moreover, photography is more and more employed every day as a means of record in every branch of science and of art. It is of the utmost importance then, that the students of this subject, both in England and in the United States, should become acquainted with each other's work, and should be able to avail themselves of it. If this principle be once recognised and approved of, then the details by which it can best be carried out might safely be left to a committee appointed by the conference, should they see fit to do so.

W. Jerome Harrison, F.G.S.

Our Editorial Table.

The Watkins' "Junior" Exposure Meter.

A new and simple form of the Watkins' Exposure Meter has been issued under the above name by Messrs. R. Field & Co., 142, Suffolk-street, Birmingham. In this, when the adjustments are once made for plate and diaphragm, the different exposures due to variations of light during the day can be read off without further adjustment of the instrument. By comparing the cut with that which has previously appeared in connexion with descriptions of the Watkins' Meter, it will be seen how much it has been simplified. This will conduce to further popularising an instrument which is one of great reliability. An improvement in the "Junior" consists in transmitting the light to the sensitive paper through an end piece of blue glass. The price of the "Junior" is *7s. 6d.*



News and Notes.

Northern Photographic and Scientific Association.—August 26, Hatfield.

Hackney Photographic Society.—August 26, Excursion to St. Margaret's. Take excursion ticket for Rye House. Leave Liverpool-street by quarter past two train. Tea at Pied Bull, Stanstead. 29, *Daylight Enlarging.*

Leytonstone Camera Club.—August 26, Buckhurst Hill. Leader, Mr. A. Frost. The Club will proceed by the train leaving Liverpool-street, Great Eastern Railway, at thirty-five minutes past two p.m., calling at Leytonstone at eight minutes to three, arriving at Buckhurst Hill at seven minutes past three. Open Social Evening at Headquarters, eight o'clock.

Midland Camera Club.—The First Annual Exhibition of the Club will be held at the Botanical Gardens and College Grounds, Moseley, Birmingham, to open on Monday, October 2, and close on Saturday, October 14, 1893. Particulars and forms may be obtained on application to the Secretary, Mr. C. Jevons Fowler, 4, Woodstock-road, Mosely, Birmingham.

Accident to Mr. Birt Acres.—We are sorry to learn that an accident of a serious nature has happened to Mr. Birt Acres. He was experimenting with sodium for the production of hydrogen for a particular purpose, and was making use of about sixty grains of it wrapped in fine gauze to prevent the gas from becoming ignited. But as soon as the sodium touched the water a terrific explosion ensued which tore a large hole in a thin sheet iron drum he had in his hands; he was also holding the sodium with a pair of ordinary pliers. How he escaped without still more serious injury than he has sustained is a mystery, but it is probable that the water having been dashed in his face by the force of the explosion saved him. From Tuesday (last week) until Saturday he was totally blind, but on the latter day he recovered the use of one eye, and the doctor holds out the hope of a similar recovery of that of the other one shortly. We know that sodium ignites when it is brought into contact with water, but were not aware that such ignition was accompanied by an explosion, and we shall await with much interest such details as, on his recovery, Mr. Acres may be enabled to give us. Meantime we accord him our sympathy, and rejoice that the consequences, serious though they be, are not still worse.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 15,383.—"An Improved Process and Combination of Ingredients for the Formation and Transfer of Photographic Images." O. Hellstern.—*Dated August* 12, 1893.

No. 15,400.—"Improvements in Coin-freed Photographic Apparatus." P. E. Mallet.—*Dated August* 12, 1893.

No. 15,473.—"Improvements in Photographic Positives, and in Sensitive Emulsions therefor." J. B. Brooks and J. H. P. Gillard.—*Dated August* 15, 1893.

No. 15,621.—"An Improvement in Photography." C. F. Cross and W. Nelson.—*Dated August* 17, 1893.

No. 15,666.—"Improvements in and in connexion with Photographic Shutters of the Character known as 'Blind Shutters.'" H. Cook.—*Dated August* 18, 1893.

SPECIFICATIONS PUBLISHED.

1892.

No. 13,241.—"Photography." Hemery.
No. 18,899.—"Photographic Cameras." Krügener.
No. 22,576.—"Photography." Hauff.
No. 13,632.—"Photographic Apparatus." Ponton.
No. 14,753.—"Photographic Cameras." Griffiths.
No. 16,074.—"Racks for Photographic Plates." Pumphrey.

1893.

No. 12,304.—"Photographic Plates." Edwards & Ransom.
No. 12,655.—"Trimming Photographs." Rettie.

Improvements in Photographic Apparatus on the Pinhole Air Lens Principle.

No. 13,632. Archibald Campbell Ponton, Viewfield, Parkstone, Dorsetshire.—*July* 26, 1893.

The invention relates mainly to the construction of cameras for taking pictures rapidly through very small pinhole lenses, the focal lengths of the air lens or, what is the same, the depth of the camera being apportioned to the rapidity of exposure. I find that I may use pinholes as small even as $\frac{1}{250}$ of an inch in diameter. These may be formed in metal foil, such, for instance, as of platinum or brass, and are inserted in the lid of a box-shaped camera. The latter may be made of cardboard or sheet metal, and may be pressed up. The interior size of the camera should be that of sensitised plate to be used, and of the depth of the focus of the air lens. I prefer to make the camera in two parts, one fitting into the other like the ordinary cardboard box in which sensitised plates are sold. The box lid may, by partition or partitions, be divided into two or four compartments for the production of several photographs on one sensitised plate, thus, for instance, adapting it for stereoscopic pictures. On the outside or inside of the lid I provide a movable lever-shaped or other shutter, which, for two pinholes for stereos may be T shaped and working on a pivot.

This apparatus may be made so light as to only slightly exceed the weight of the plates themselves, at the same time it can also be made at a very low price indeed, so as to bring it within the reach of the million.

From the small negatives produced by this apparatus the positives can be printed in an enlarging camera of the size most suited for trade purposes. Negatives taken with an air lens of $\frac{1}{100}$ of an inch in diameter for stereoscopic pictures are found to give a sufficient field to be printed from direct by contact.

Improvements in and relating to Photographic Cameras.

No. 14,753. Walter Griffiths, Highgate-square, Birmingham, Warwickshire.—*July* 29, 1893.

My invention has for its object improvements in and relating to photographic cameras, by which I obtain a much more durable article, which is particularly suitable for export by reason of its freedom from liability to be affected by the intense heat or cold of other climates, while it is much stronger in construction, without losing the delicacy of movement and adjustment of the various parts, which is so essential to a first-class camera. At the same time it is simple in construction, and my improvements are embodied without in any way increasing the cost of the camera. By my improvements in relation to the dark slides for use in cameras, I also obtain a much more durable article, which, at the same time, is more compact, and also does not increase the cost of manufacture, such dark slides being cheaper than the ordinary ones of equal quality.

In carrying my invention into effect, I form the bottom, or under frame, of my camera of metal tubes, with, say, two longitudinal tubes, and two cross tubes attached, as to form a square base, and with the longitudinal tubes mounted upon the cross tubes within each longitudinal tube, a second tube is telescoped, and upon the front ends of these two inner tubes another cross tube is mounted, to the centre of which one end of another longitudinal tube is attached; this latter longitudinal tube passes through a socket formed upon the front lower cross tube, and is tapped at the back end to receive a screw, which has its shoulder socketed upon the rear lower cross tube, being provided with a thumb-screw end, which enables the screw to be turned, and thus adjust the distance between the lens and the back frame.

The front for receiving the lens is mounted upon the front upper cross tube, and thus travels with it, while the back frame is mounted at its bottom to two outside longitudinal tubes by means of two metal sockets, which slide on the

said tubes. The ends of the metal of these two sockets may be bent up to form a flange, and to these flanges the back frame is pivoted so as to be pitched to an angle or shut down on to the bottom, and it is secured in the required position by a metal strut, having a slot working on a thumb-screw on the back in the usual way. The front frame for lens may be kept up in a vertical position by a snug formed upon its bottom side, having a screw which engages with the boss, which forms a finish to the end of the central longitudinal tube. The back and front frame are cased on their outer edge with thin metal, having an inner lining of wood, upon which the grooves for receiving the dark slides are fixed. The bosses forming the connexion between the longitudinal and cross tubes at the two front corners and the centre boss on the back cross tube have their under sides shaped, or are provided with studs to receive the top of the tripod, which is fixed in the usual way.

The ends of the bellows are clamped between the metal casing and wood lining of the back and front frame, which thus forms a very strong connexion, and throughout there are no joints dependent upon wood.

In place of forming the bottom of tubes, I may form them of metal rods of other section, such as hollow V-shape or any equivalent of the tubes.

In the case of the dark slide, I form the centre partition of two thin sheets of metal, which are bent over at the sides to form grooves to receive the plates, and these two sheets are bound together at the top by velvet, which is padded out to the thickness of the grooves. A square metal frame of channel section on two sides and the bottom is provided to receive this partition containing the plates, and the top ends of the two sides of the frame are connected together by a sheet-metal band, which is turned out to form a flange at the top, thus strengthening the band, and preventing it from being sprung open. The insides of these bands are lined with velvet, the top edge of which is secured by the flange being turned back with the edge of the velvet between. The shutters are of sheet metal, and slide in between the velvet on the inside of the frame and the velvet on the outside of the partition, and, as there is a spring within between the two sheets of the partition to expand them at the top, all possibility of any light entering is thus prevented. By these means an exceedingly simple, substantial, and portable camera is obtained, in which all the latest requirements are embodied, and which will stand the varying climates of other countries, while it is not liable to be destroyed by those insects or worms which, in the case of wood, are so destructive in warmer climes, and the dark slide, while being much more substantial, is much more portable and compact, without any increase in the cost of production.

Improvements in Racks used for Soaking or Drying Photographic Plates.

No. 16,074. Josiah Pumphrey, 160, Angelina-street, Birmingham. *July* 29, 1893.

I construct a frame and hinge on it, in a suitable position, two corrugated plates, furnished with feet, each having a fence on one side. Handles are attached to the upper edges of the corrugated plates. The measurements are so calculated that in one position the corrugated plates are at such a distance as to take plates of a required size between them, and, by reversing the apparatus, the same number of a dissimilar size are equally well accommodated without any readjustment of loose or fixed parts.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 28.....	Dundee Amateur	Asso. Studio, Nethergate, Dundee
,, 28.....	North Middlesex	Jubilee House, Hornsey-road, N.
,, 28.....	Richmond	Greyhound Hotel.
,, 29.....	Birmingham Photo. Society ...	Club Room, Colonnade Hotel.
,, 29.....	Hackney	206, Mare-street, Hackney.
,, 29	Halifax Camera Club.....	
,, 29.....	Lancaster	Springfield Barracks, Lancaster.
,, 29.....	Leith	165, Constitution-street, Leith.
,, 29.....	Paisley	9, Gauze-street, Paisley.
,, 29.....	Rochester	Mathematical School, Rochester.
,, 29.....	Warrington	Museum, Bold-street, Warrington.
,, 30.....	Bath.....	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 30	Burnley	Bank Chambers, Hargreaves-street.
,, 30.....	Leytonstone	The Assembly Rooms, High-road.
,, 30.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 30.....	Southport	The Studio, 15, Cambridge-arcade.
,, 31.....	Glossop Dale	
,, 31	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 31.....	Hull.....	71, Prospect-street, Hull.
,, 31.....	Liverpool Amateur.....	Percy-buildings, Eberle-street.
,, 31.....	London and Provincial.....	Champion Hotel, 15, Aldersgate-st.
,, 31..... ...	Oldham	The Lyceum, Union-st., Oldham.
September 1.....	Cardiff.....	
,, 1.....	Croydon Microscopical	Public Hall, George-street, Croydon
,, 1.....	Holborn	
,, 1... ..	Leamington	Trinity Church Room, Morton-st.
,, 1.....	Maidstone	"The Palace," Maidstone.
,, 2.....	Hull.....	71 Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At a meeting held on Tuesday last, the 22nd inst., Mr. G. Scamell occupied the chair.

Mr. T. Bolas, in giving a demonstration of *Flashlight with the metal Aluminium as a Combustible*, mentioned that an assertion had been made that aluminium could not be usefully burned in such a flash lamp as is used for magnesium, but this statement had arisen out of the somewhat dangerous practice of positively asserting a negative proposition, merely because the speaker had not seen the positive side demonstrated. It was then pointed out that a very fine state of division is essential in the case of a flashlight with aluminium powder, as otherwise the metal passes through the flame without being heated to the somewhat high ignition point of the metal. When the aluminium does burn, it produces a more intensely actinic light than magnesium, as the temperature of combustion is higher.

The commercial aluminium bronze powder, as manufactured at Fürth and Nürnberg, but sold in London by Mr. W. C. Horne, of White Horse-alley, Cowcross-street, was then shown in three degrees of fineness, costing about seventeen shillings per pound, and was recommended, the minute scales composing this being about one-five-thousandth of an inch thick. This powder, as sold, is covered with a very minute trace of the oily matter used in its manufacture and this causes it to hold together in clots when blown through a flame, and so, as was demonstrated, if used just as sold the greater part escapes ignition.

In order to fit it for use in such an ordinary flash lamp as that of Mr. England, this oily matter must be removed, and Mr. Bolas showed how this may be done. The powder was merely heated to about the temperature of melting zinc, in a test tube, and after this treatment it had no tendency to clot, and it is blown about, with each grain separate, by the slightest breath.

About a grain and a half of the powder was now burned in an England's flash lamp, and by the light Mr. W. E. Debenham took a fully exposed portrait of the Chairman.

Other ways of using aluminium (leaf in oxygen, and the powder mixed with potassium chlorate) were now shown, but Mr. Bolas said the object of his demonstration was principally to show that aluminium can be used in the flash lamp, and that it can be much more completely burned than is usually the case with magnesium powder. If magnesium is so finely powdered as to burn completely, it oxidises or rusts very quickly, and so becomes useless. The aluminium dust may be kept without fear of deterioration by slow oxidation or rusting.

Mr. Andrew Pringle and Mr. Clifton both spoke of the inconvenience of the magnesia smoke, which is peculiarly irritating to their lungs, and they remarked that the alumina smoke did not appear to have irritating qualities to the same extent.

Mr. Bolas said this was easy to understand, as magnesia is a caustic earth almost as irritating as lime, while alumina is bland or neutral.

Mr. Pringle now made a communication on photo-micrography with lenses not specially corrected for photographic work, and his results fully confirmed Dr. Piffard's observations that such lenses will work to focus if a yellow screen and orthochromatic plate is used. Such microscopic lenses as those of Powell, a Lealand, or a Ross will give excellent and sharp results if the screen and the orthochromatic plate are used.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

The usual weekly meeting was held on August 17, Mr. R. Beckett in the chair.

Notice of a special general meeting was read, the object of which was to discuss a recent alteration of rule 7, respecting the election of members. August 31, was fixed as a suitable evening for the purpose.

Mr. P. Everitt showed a lens mount made by Mr. Haddon, and remarked upon its being a good piece of amateur workmanship.

The Chairman passed round a negative having markings upon it. A general opinion was formed that they had been caused by mechanical abrasion whilst moist.

Mr. Fry had had similar experiences during hot weather, the defects appearing after development, and during the period of drying; he considered them as being caused by decomposition of the gelatine in the presence of heat and moisture.

Some results of the recent meeting at the "Zoo" were shown by Messrs. Boyston and Steinmetz. It was suggested that the members who were present on that occasion should show their pictures at the meeting on August 31.

Mr. Welford read his report upon the Convention meeting as a delegate of the Association [see page 543].

After reading the report, he handed round the small album which contained it, as well as prints from negatives taken on the occasion.

After a few remarks from Mr. Fry, the other delegate,

Mr. Haddon proposed a vote of thanks to the delegates, agreeing that the excursions were too numerous, and saying how much non-members of the Convention lost by holding aloof.

Mr. Everitt supported the vote of thanks, and moved the adoption of the report.

The Chairman and Mr. Debenham agreed that great benefit was derived from these meetings.

The Hon. Secretary seconded the adoption of the report, which was then carried.

Mr. Welford acknowledged the thanks.

Mr. Debenham quoted a letter which appeared in the current number of a photographic paper, stating that some lenses would not work to focus with a yellow screen. He pointed out that this occurred through the operator focussing before introducing the screen, instead of with the screen in position, inasmuch as the screen has the effect of lengthening the focus about a third of its own thickness.

After a discussion involving a slight modification of the delegates' report, the meeting closed.

Hackney Photographic Society.—August 15, Mr. T. H. Smith in the chair.—Work of the members was shown. Mr. Vining asked what was the particular advantage with tabloids? The Hon. Secretary said they saved measuring, and were convenient when away from home, but care must be used that they are thoroughly dissolved before use. Mr. Wire asked what caused yellow spots on amidol-developed bromide paper? Mr. Welford thought

amidol itself was not the cause. From the question-box: "Which is the best illuminant for printing in clouds on lantern slides?" Mr. BECKETT said gas was more regular. The HON. SECRETARY agreed, and said gas was more under control, and printing-in also. Mr. PARRY said he had been troubled with yellow P.O.P. prints. Mr. BECKETT said perhaps the first washing water did not carry off the silver, and doubtless the sulphocyanide was impure. Mr. W. L. Barker had recently tested the heat of water. In cistern exposed to sun it was 78°, and from main 63°. Mr. Welford then demonstrated his toning bath. He claimed finality of tone and rapidity, and quite substantiated both of these. In the former it was demonstrated by toning half a print, then immersing the whole; no difference was apparent. The favourite bath was bicarbonate of soda, one and a half drachms; chloride of gold, four grains; water, six ounces. New paper has a great deal to do with rapidity. The HON. SECRETARY asked for approximate keeping time of bath, and was informed not more than two hours. A diluted bath is slower, but gives warmer tones; but finality is lost.

Brixton and Clapham Camera Club.—August 15, Mr. F. F. Buckle in the chair.—Mr. Belton, representing the Paget Plate Company, gave a demonstration on the printing-out plates and opals of the Company. The special methods of printing, both by means of special and ordinary frames, were explained. As regards the printing, Mr. Belton said it was a daylight process, as the plates were very slow. The opals are of two qualities—matt and glazed. The process is precisely the same as for gelatino-chloride paper, but, owing to subsequent reduction in the fixing bath, printing should be deep, the rule being, the colder the tones desired the deeper the printing. Density and colour must be judged by reflected light. When finished, Mr. Belton recommended mounting the prints under glass, as they are then less liable to damage from dirt. They may, however, be mounted and used as transparencies. Printing of lantern slides may be performed in an ordinary frame, and the judging of density will not necessitate the removal of the plate owing to the thinness of the film. At the conclusion of the practical demonstration, several plates and opals having been toned and fixed in combined and separate baths, Mr. Belton passed the slides through the lantern, and the tones were very satisfactory. Next meeting, September 5, Mr. W. H. Harrison, *Some Useful Photographic Standards.*

FORTHCOMING EXHIBITIONS.

1893.	
September 5.....	*Royal Cornwall Polytechnic Society, Falmouth. W. Brooks, Laurel Villa, Wray-park, Reigate.
,, 20-21	*Hove Camera Club. Hon. Secretary, H. Emery, 142, Church-road, Hove, Brighton.
,, 25-Nov. 15...	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1-31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 9-Nov. ...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
November 7-11	*South London Photographic Society. Hon. Secretary C. H. Oakden, 53, Melbourne-grove, Dulwich, S.E.
,, 20-25.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.

* Signifies that there are open classes.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

PHOTO-MICROGRAPHY.

To the EDITOR.

SIR,—Mr. Smith calmly assumes that "cheap French triplets" cannot produce fairly good negatives of microscopic objects, his experience being that "it is impossible they can give a sharp picture of anything."

As a simple test I have hunted up and have forwarded to you an old album containing upwards of two hundred prints, and would be obliged by your looking over it and giving your opinion as to whether I am or am not correct in stating that "I got fairly sharp definition up to, say, 400 diameters."—I am, yours, &c. JOSEPH H. WOODWORTH.

Booterstown, Dublin.

P.S.—As I am not an "expert" in optics, I would be glad of an explanation of how an isochromatic plate can correct a difference between the actinic and visual foci.

[The photographs in the album are certainly very excellent considering the class of object-glass by which they were produced. Our experience goes to show that, while cheap French object-glasses will often show fairly well such low-power objects as the itch insect, bed bugs, fleas, the proboscis of the blow fly, sections of wood, crystallisations, wings of flies, and suchlike objects as those so neatly and systematically displayed in the album, yet is their angular aperture too small for higher-class objects such as those sent us by Mr. Smith, and which include the *podura* scale, *pleurosigma angulatum*, and others of like difficulty of brilliant resolution. We have a foreign triplet by a good maker (Oberhauser), and, although it is one of the best of the kind we have seen, it quite breaks down on objects of the class last named when compared with a good English objective of the same power.—ED.]

TELE-PHOTOGRAPHIC SYSTEMS FOR MODERATE AMPLIFICATIONS.

To the EDITOR.

SIR,—There is little to be said in reply to Mr. Hancock's letter in your last issue, except to thank him for his clear expression of the advantages of the above systems, and his intelligent criticism of the possibilities of errors arising from too high an enlargement.

If the original positive element is corrected with great care, I have abundant proof, and have publicly shown it, that, however great the enlargement may be, the direct method is always greatly superior to secondary enlargement, as from a negative taken by the positive lens alone, to the same dimensions. Further, a ratio of two to one, as between the foci of positive and negative, I have found to give sufficient "sparkle," consistent with a useful and striking amount of magnification, but there is no reason at all that a more even ratio of the foci of the positive and negative lenses should not exist with less magnification.—I am, yours, &c., THOMAS R. DALLMEYER.

THE WORLD'S CONGRESS OF PHOTOGRAPHERS.

To the EDITOR.

SIR,—the following report of the first business at the Thursday session of the World's Congress has not been reported in the general press, but I think it might be of interest to your readers.—I am, yours, &c.,
H. SNOWDEN WARD.

On Thursday, August 3, before the programme was commenced, Mr. H. Snowden Ward pointed out that a suggestion contained in Judge Bradwell's opening address had been overlooked by the Congress, and proposed that it should be acted upon. The suggestion was that Mr. W. Jerome Harrison's paper on *The Desirability of an International Bureau, established* (1) *to Record;* (2) *to Exchange Photographic Negatives and Prints*, should be read in advance of its proposed order, and that a Committee should be appointed to carry out its suggestions. Mr. W. A. Cooper seconded the proposition, which was carried. Mr. Harrison's paper recommended an international bureau connected with national bureaus for the collection, preservation, and exchange of photographs of historical, scientific, or literary interest. The meeting voted that the President should nominate a Committee to undertake what might be possible in furtherance of the scheme, and Judge Bradwell therefore nominated.

H. Snowden Ward (*chairman*), London.
Gayton A. Douglass (*vice-chairman*), Chicago.
W. Jerome Harrison, Birmingham.
John Carbutt, Philadelphia,
Shapoor N. Bhedwar, Bombay.
Léon Vidal, Paris.
W. K. Burton, Tokio.
Mrs. Elizabeth Flint Wade, Buffalo.
Dr. John Nicol, Tioga Centre.

CELLULOID FILMS.

To the EDITOR

SIR,—In reply to Mr. W. J. Stillman's letter in your last number, wishing to know the experience of amateurs as to the deteriorating influence of celluloid on the emulsion, I do not think that the celluloid has any deteriorating influence whatever on the emulsion, although *great* pressure might perhaps tend to cause some fog, but could easily be prevented by packing the films in a flat box. It has also been said that the image on films deteriorates after exposure if kept for some time. To test this, when in the Riviera last winter, I exposed two 10×8 films from the stone pier at Mentone for exactly the same time, no clouds, strong sun, 16-in. lens, *f*-16, and Stanley's Shutter, one-tenth of second. One I developed a day or two after, the other was kept nearly two months. If any difference, there was a little more detail in the shadows of the latter, the same developer used for both, viz., pyro and ammonia.

I exposed in the Memorial Church at Cannes a 10×8 instantaneous plate, and a 10×8 isochromatic medium film, both from the same maker, the rapidity of each supposed to be the same—the plate I developed with the hydroquinone developer, now so much used in France, and the film with pyro and ammonia. The plate was much underexposed, the window being very much blurred; the film was a good negative, with scarcely a trace of blurring. Both were exposed twenty-three minutes.

Films doubtless require more careful treatment than plates, but I think they will soon replace glass to a very great extent.—I am, yours, &c., F. BRASLEY.

INVERSION OF THE RETINAL IMAGE.

To the EDITOR.

SIR,—Many of your readers would, no doubt, be interested in Mr. W. I. Chadwick's paper on stereoscopy. As one who has taken an interest in the curious fact of an inverted image, a fact which most people are quite unconscious and ignorant of, I must say that I cannot consider Professor Fick's theory, as stated by Mr. Chadwick, to be the "most reasonable." To my mind, the difficulty is better explained by the "law of visible direction."

We are all aware that we may roll about our eyes as we choose, and yet all the objects around us remain in the same directions, as they always appeared to us to be in. Now, no camera on earth would stand the same test, for, move about the lens, and a corresponding movement will take place on the ground glass; in fact, the directions of all objects will apparently be changed.

From this it may be argued that there must be in the eye somewhere a *fixed point*, and that through this point the rays of light forming the picture pass to the brain. As I said before, this seems to me a more reasonable theory than that which holds that the nerves of sight and feeling are co-operative.

The amateur and professional photographer, no doubt, does become accustomed to the up-side-down image on the ground glass, but he never sees that inverted image erect, nor will his knowledge of its true position help him in the slightest degree.—I am, yours, &c., DAVID R. ROSE.

Dalhousie-terrace, Edinburgh, August 19, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange a 5×4 hand, or stand, camera complete for a light half-plate camera or lantern.—Address, H. COUCH, 11, Waterloo-crescent, Dover.

Will exchange a Derogy's seven-inch focus cabinet portrait lens for a good cabinet rolling press.—Address, J. HOBTON, Central Photographic Studio, Caroline-street, Cardiff.

Retouching desk for half-plates and under with mirror, &c., never been used, cost 10s. Will exchange for half and quarter-plate printing frames in good condition of same value.—Address, W. H. BROWNE DRAKE, 4, Charles-street, Cambridge.

Wanted, modern half-plate camera, with three double backs, in exchange for 7×5 rapid rectilinear lens and quadrant camera carrier to fit on tricycle, made specially to avoid vibration.—H. MANISTRE, photographer, St. Mary-street, Chippenham, Wilts.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

PHOTOGRAPHS REGISTERED:—

Alexander Campbell Hutchison, North Berwick.—*View of Bass Rock.*

Thomas Bramwell, Alston.—*Two photographs of the 66th Field Battery.*

Sydney Victor White, Reading.—*View of the foundation of a Christian Church discovered at Silchester.*

COLLODION.—We are in hopes of having a special article on the subject soon.

COUCH.—The Convention group given in the JOURNAL was not an enlargement.

C. A. M. W.—Under the circumstances, we would certainly tilt the camera and use the swing back.

LENS.—If you send the lens, we will tell you what we think of it. The other may or may not be good. Try it before you make the purchase.

B. C.—The idea is not patentable. George Mason & Co., of Glasgow, manufacture a similar adaptation to the camera stand to keep the legs rigid.

F. E. G.—It is probable that the transparent spots in the negative arise from tiny bubbles in the emulsion, and are not due to faulty manipulation on your part.

B. T. (Yarmouth).—As the spots, identical in their character, occur on different brands of plates, it is clear that they must be due to something in the development.

BUBBLES.—See "American Notes" in present number. Such pictures are not done by double printing. Let the child practice blowing bubbles for a little time previous to being taken.

D. H. W.—There is no *false* perspective in the picture; it is violent, owing to its being taken with an extremely wide-angle lens; but, if it be viewed from a distance equal to the focal length of the lens, even that will disappear.

ZENO.—Without saying positively that the spots on the prints are caused by particles of bronze powder, we strongly suspect, from their appearance, they are. The name, &c., are printed in bronze, not gold, and particles of bronze powder are plainly to be seen on the uncovered portions of the mount.

T. NICHOLS writes: "Would some kind readers give me a formula for and directions for preparing a printing-out gelatine paper that will yield better colours than those now supplied, and which can be blotted off or mounted wet, like albumen paper?"—Perhaps some "kind reader" will oblige our correspondent.

R. H. THOMAS.—We can say nothing as to why the plates will not work in your hands, unless it may be want of experience. The peripatetic workers in the streets of London and its suburbs appear to get tolerably good results upon them. If the house named cannot supply the Phœnix plates, apply to Mr. J. J. Atkinson, Liverpool.

T. NORRIS.—The titles of subjects can be conveniently put upon the negatives with the simple appliances advertised in our columns as the "Nameit." The titles on the subjects issued by the firm mentioned are written upon the negative with a sable brush and a black varnish. Of course, the latter system requires some skill to do it neatly.

COUNTRY TOWN.—Your case is precisely similar to many others. The "big illustrated," as you term it, has pirated your views of the neighbourhood without let or licence; but, as you failed to make them copyright, you have no remedy. Common courtesy ought to have secured an acknowledgment of the source from which the pictures were obtained. But that is not possessed by some of the illustrated periodicals.

G. SIMMONDS.—As the condenser you require is only eight and a half inches in diameter, you will find it more economical to purchase it complete, or to get a pair of plano-convex lenses and mount them yourself, than to attempt to build them up out of clock glasses—that is, if time is of any value. Although condensers that will answer well may be formed with suitably curved clock glasses, plate glass, and water, it requires some degree of skill to make them so that they will not leak after a short time. For so small a size as this, we should say it would be cheaper to buy lenses and avoid future trouble.

INVENTOR.—If, while you were an ordinary weekly servant, you invented a great and valuable process, which is now being worked as a secret one, and for which you received no remuneration, but, instead, were shortly afterwards discharged, we see no reason why you should not work it on your own account, or in connexion with any one else you may be associated with. We presume that there is no agreement that your invention is the property of your late employer.

H. M. asks: "1. Could you inform me if there is a protection granted prior to taking out a patent for an invention? 2. If so, what would be the cost, and where to apply for the same? 4. Would the specification be sufficient to send?"—In reply: 1. A provisional protection can be obtained for nine months for a Government fee of 1*l*. 2. Make application, on the proper form, to the Comptroller of the Patent Office. The Office supplies the forms. Or the application can be made through a patent agent. 4. Yes; the complete specification can be lodged and a patent secured for four years, the Government fee in this case is 4*l*. The third query has been omitted.

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THE BRITISH
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IMPROVEMENTS IN TELE-PHOTO LENSES.

A communication on the tele-photo lens, by Mr. T. R. Dallmeyer, which appeared in our issue of July 28, has now been sufficiently long before our readers to enable them to note his statements. Since that time, we have been permitted to occupy the strong vantage-ground of being able to speak of the subject from the experimental point of view.

While, in his earlier telephoto lenses, Mr. Dallmeyer seemed to have had in view solely those who aimed at an exceedingly high degree of magnification, in his new series he has realised that there are many who do not care for the extreme of amplification, but would be content with a moderate degree of direct enlarging. In this we think he is right. The former having been attended to, he has now turned his attention to the latter.

While his general system of a compound amplifier, composed of a *pair* of achromatic concave lenses, has been adhered to, Mr. Dallmeyer has altered the internal structure of these concave appliances, and has pressed into his service certain properties obtainable only by the employment of Jena glass. His original concaves were composed of flint and crown glass, and were combined by what is known indiscriminately as the Gauss or Grubb forms inverted. In this, it need scarcely now be said, the flint glass had a much higher degree of refraction than the crown, although the familiar shapes of "crown" and "flint" are reversed. But in the present one—and, so far as we can see, he has no more worlds to conquer in this direction—he has adopted a form of double combination, each separate combination having a contact between two separate lenses, one of which, although it has a higher refractive index than the other, is convex in shape, these contacts tending to a better cure of astigmatism. If this form were adopted for very high magnifying systems of this nature, the reverse curvature of the field introduced would be more than is allowable. If a powerful negative lens be used, the reverse curvature of field is best remedied by the other form referred to. There are planes curved *towards* the lens, planes flat and very nearly flat, and planes with "reverse" curvature, dependent upon the camera extension. In some cases an unsymmetrical form has been adopted in which there are two planes of perfect flatness at considerably different extensions, this being arrived at by reversing the negative combination in its cell.

The practical result of this is that a lens much larger in diameter can be employed, transmitting a ray of light considerably exceeding in obliquity anything previously obtained; that the astigmatism of the oblique pencils caused by the front lens is annihilated or practically so; and that the distortion of curvilinearity is done away with.

This improved back concave or tele-photo attachment can be employed in conjunction with any lens, whether a portrait combination or a rapid rectilinear. We have had it applied to a Petzval *carte* portrait combination of six inches focus, although warned by the maker that it was not by any means the best for such an attachment, and have found that by its agency (its diameter is nearly one and a half inches, and its focus, negatively, four inches) the old *carte* lens, which was corrected to cover a plate of three and a quarter inches, now covers a plate the full size capable of being contained in a 10×8 camera, the largest on which we have as yet tried it. In doing this there is so much light transmitted as to admit of the employment of a drop shutter in good light, or the giving of an exposure of from half a second to three seconds in light of a less intense character.

The distance apart of the front positive system and the back negative one is the factor which determines the magnitude of the image, of course taken in conjunction with the position of the focussing screen relative to both. No matter how much or how little the camera is extended, there is a relation between the two lens systems which, when ascertained and adjusted by actual trial, ensures sharpness. The smaller the separation of the positive and negative systems, the greater will be the magnification of the image, and the farther must the camera be extended. This cannot be explained by instituting a comparison between it and the ordinary camera and lens in which, if the focussing screen be placed either within or without the focus, the image will be blurred without the power of being sharpened. But an analogy exists between it and the screen of the optical lantern, on which to project an enlarged image. An equally sharp result is not obtained on a screen shifted from the twelve-feet position on which the focus had been adjusted away to twenty or forty feet. But sharpness at any distance is obtained by readjustment of the objective. And thus it is with the tele-photo objective. A slight manipulation of the rack and pinion ensures perfect sharpness, no matter how much or how little the camera is expanded.

This constitutes one of the beauties of the system of mounting that has been adopted, for, by its agency, the photographer can, within certain limits, make a distant object of any size he chooses either to cover a quarter-plate, or one of 12×10 inches or more in dimensions. A short time since an American optician applied for a patent for a rigid tube in which to mount both positive and negative elements of a tele-photo objective. But from what we have said it will be seen that this adaptability of size of image to the space which it is found desirable to cover is totally wanting in such a system; whereas, by that adopted by Mr. Dallmeyer, there is absolutely no practical limit to the dimensions to which an object at a distance may be carried.

With regard to exposure, it will, of course, be well understood that, the greater the magnifying of the image, the less is the rapidity, seeing the intensity of the lens is reduced by magnification; so that, according to the intensity of the entire instrument, must one determine for himself whether he will choose a positive lens, *per se*, of high or moderate intensity.

DISCOLOURED NEGATIVES.

In spite of all that has been written in these columns and elsewhere on the subject of imperfect fixation, we are constantly being asked to explain the cause of, and supply a remedy for, discolouration in negatives, that can only be traced to the want of the most ordinary care in treatment during and after fixing. In most instances, by the time the evil has been recognised, it has become irremediable, although, if taken in time, it is often possible to arrest its further progress or even to remove any slight discolouration that may have occurred.

There are many different forms in which this discolouration may arise, and, although they may one and all be traceable, in the first place, to imperfect fixation, or insufficient washing afterwards, yet it does not follow that the immediate result is the same in all cases. For instance, we may have a negative which shows a yellow discolouration as soon as it is dry, or perhaps even before that, and then, again, may exhibit signs of change soon after it is put into the printing frame, while others only develop the fault in the course of weeks or months, and quite independently of whether they are exposed to light or not. Quite another kind of discolouration is met with in the case of negatives that have shown no symptoms of the evil, until, for one reason or another, intensification is resorted to, when it appears in full force.

The chemistry of the changes that occur has never, so far as we are aware, been carefully studied in connexion with gelatine films, and the result is set down, in a general way, to sulphuration in some form or other; but that it is the same in all cases is, we think, far from true. In one class of cases the image itself is involved in the change that goes on, while in others the discolouration appears to be confined chiefly to the film of gelatine. In some instances, too, the colouration is removable, while in others it resists every attempt to get rid of it.

If we glance briefly at the chemical changes that are supposed to go on in the process of fixing, it is not difficult to understand that the after-discolouration may partake of different characters. The nature of the double salts formed under varying conditions has been over and over again pointed out; for instance, it is known that, with a weak fixing bath, or when insufficient time is allowed, an insoluble silver compound is formed, which, with a stronger bath, or under more prolonged action, is converted into a more soluble form, which is removable by washing. It is here where the distinction between imperfect fixing and imperfect washing comes in, the two being only too frequently confounded or considered synonymous.

In the case of an imperfectly fixed negative—that is, one from which the unaltered bromide of silver has been barely removed, and which is *apparently* fixed—there will still remain in the film a quantity of silver, either in an insoluble form, or, what is practically equivalent to it, in a state in which it is precipitated or rendered insoluble by washing. On the other hand, the perfectly or sufficiently fixed film may contain, like the other, a quantity of silver; but it is in the soluble form, and is not precipitated in the course of washing, but may be entirely eliminated if the washing be properly performed. This constitutes the essential difference between imperfect fixing and washing.

It may be accepted, we think, as an undoubted fact that, in order to have discolouration of the film from the action of hypo, there must be silver present in some form, as the hypo itself will not stain the gelatine. The familiar term "sulphuration" as applied to prints or negatives describes the effect produced by the combination of silver and sulphur, these being supplied by the unremoved products of fixation. Sulphur, or rather hypo, alone will not produce the result, as has been proved by immersing a perfectly fixed and washed print in a fresh solution of hypo. The extent and nature of the discolouration will depend upon whether the silver is present in the soluble or insoluble form, or, in other words, whether the fault is insufficient washing or imperfect fixing.

If a plate be cut in halves before fixing, some instructive light may be thrown upon the matter. Let the two halves be placed together in the hypo bath, and allowed to remain until the silver haloids have just disappeared and no more, then let one half be taken out and washed very thoroughly, the second half being allowed to remain for a further period equal to that already given, and then simply rinsed sufficiently to prevent crystallisation of the superfluous hypo on the surface. If the two halves be carefully preserved from the action of light until quite dry, they will probably show no sign of anything abnormal, unless, perhaps, in the case of the portion which has received the shorter immersion in the fixing bath, there may be some slight opalescence, especially if the film be thick; but, directly they are taken out into a strong light, they will both be found to discolour, assuming a yellowish brown tinge of greater or less depth, according to circumstances.

But, in the case of the shorter fixing, the discolouration will be denser, and of a more opaque character than the other, which will be clear and transparent, and apparently confined to the shadows of the negative, whereas, in the first case, the change of colour appears to affect the image itself, and to alter its density. If, instead of immediate exposure to light, the two portions of the negative be carefully put away in a dark place for some weeks, it will be found on examination that, while the imperfectly fixed portion remains unchanged in appearance, the other will have undergone spontaneous discolouration in much the same manner as under the action of light.

Assuming that both halves have been equally protected from abnormal atmospheric conditions likely to bring about decomposition, these two experiments show that there are influences at work quite distinct from sulphuration as commonly understood, and that the effect produced differs according to whether the silver is present in the form of the insoluble or the soluble double hyposulphite; for, while both are sensitive to light, it is found that the latter is more liable to spontaneous decomposition in the presence of gelatine. This is quite as might be anticipated, if we consider the behaviour of gelatine after treatment with, or in the presence of, a soluble silver salt such as the nitrate.

It is not our purpose to enter into the question of the ultimate changes that would occur under circumstances favourable to "sulphuration," suffice it to say that either of the plates mentioned would exhibit it in its worst form. What we particularly wish to point out is how the two faults, imperfect fixing and washing, may be recognised and remedied if taken

in time. It will be readily understood that both may be present in the same plate; and, though the proper treatment for one is not the correct remedy for the other, still, means may be adopted that will effectually cure both.

In actual practice it is surely seldom that the work is so carelessly performed that the whole surface of a negative suffers from either of these forms of neglect. The results are generally seen in the form of patches, arising from inequalities or irregularity in the thickness of the films, against which it is often impossible for the most careful operator to guard; but, by carefully examining his negatives after drying, and especially after exposure in the printing frame, he will often be able to detect the evil in its incipient form, and arrest its further progress.

The result of imperfect fixation is, as we have said, sometimes visible in the form of a slight opalescence before exposure to light, and this is more especially the case when it occurs in patches. When thus apparent, it is easily removed by reimmersion in a fresh solution of hypo. If, however, the negative be exposed to strong light before the discovery is made, more or less discolouration will take place, and this will be intensified by each successive exposure. All that can be done under these circumstances is to arrest the further progress of the decomposition by refixing, and if this be done at once the injury will not be great.

But a negative may be perfectly clear and free from opalescence before exposure in the printing frame and yet show in a short time a clear yellow stain, generally along one edge or over one corner. Reimmersion in the fixing bath if done at once will often remove this, especially if it be simply the result of insufficient washing. But it is seldom that either fault exists alone, and, in order to satisfactorily treat both, the best plan we have found is to soak the film first of all for two or three minutes in a strong plain solution of salt, and then without washing to plunge it into a dish containing a very dilute solution of nitric acid, about fifteen or twenty mimims to the ounce; after this, wash to remove the acid, and refix and wash in the usual way, when in nine cases out of ten the stain will have disappeared.

But, after all, prevention is better than cure, and it is a very easy matter, without adding greatly to the trouble of finishing a negative, to test whether it is properly fixed and washed before running any risk. All that is necessary, as we showed a few weeks back, is to immerse it in a solution of iodide of potassium, when any silver remaining is at once rendered visible as iodide.

KEEPING QUALITIES OF FILMS.

Of late the question has been raised at several of the societies, and at different times in our columns, as to the relative keeping qualities of plates and flexible films, and diverse opinions expressed. In our last two issues the subject is again referred to in letters from two well-known amateurs—Mr. W. J. Hillman and Mr. F. Beasley. In the majority of instances, when the question has been previously raised, several important points in connexion with the subject have been entirely ignored, the various commercial films being treated almost as if they were a standard commodity. As a consequence, the alleged deterioration, if any, has been attributed mainly to the support of the gelatino-bromide of silver.

Glass may be fairly classed as being, so far as gelatino-bromide of silver is concerned, a perfectly inert material. Yet we all know quite well that plates prepared with some emulsions will remain good for several years, while others, with different ones, will sometimes become almost useless after only a few months' keeping. Therefore, in the consideration of this subject, it must be borne in mind that the emulsion itself is a most important factor in the case, quite independent of the material upon which it rests, whatever that may be. Then, again, flexible films themselves are not alike either in their composition or mode of manufacture, not even when they pass under the generic term celluloid, while some are of an entirely different material.

Celluloid or, as the English manufactured article is named, xylonite, is a modification of what was at one time called, after the name of its inventor, Mr. A. Parkes, Parkesine. Numerous improvements have been made in it since, and many patents in connexion with the materials used and its manufacture, have from time to time been taken out, but whether all, or even any, of them are being worked we are unable to say. As a matter of fact, the whole of this manufacture is treated very much in the light of a trade secret, and its working is in the hands of a few large firms only. Indeed, we question if, in connexion with any material having so many applications, and being employed for so many general purposes, so little has been published with regard to the details of its manufacture. It is, however, safe to affirm that it is essentially a compound of nitro-cellulose and camphor, although it may be made by different methods. According to one of the Eastman Company's patents, their film is composed of soluble pyroxyline, camphor, wood naphtha, amyl-acetate—more familiarly known to some as essence of jargonelle pears—and fusil oil. The solution is spread on glass plates and allowed to dry, when it is coated with the emulsion.

What are known as cut films are made quite differently. In this case the camphor is really the solvent of the nitro-cellulose, but this is not of the same kind as the soluble pyroxyline used for collodion, but a lower nitro compound known as xyloidine. It is almost insoluble in ether and alcohol, but when kneaded and rolled, camphor, by reason of the latter's solvent action, heat also being applied, becomes a plastic mass, which can be wrought in various ways. In connexion with the solvent action of camphor, it may be mentioned that there are several substances that are not solvents of nitro-cellulose by themselves, but they become so by the admixture of camphor. When required for such purposes as knife-handles, pianoforte keys, photographic dishes, &c., colouring and other matters are added to the compound, according to requirements. For transparent articles, such, for example, as photographic films, the pigment is, of course, omitted. One important point in connexion with the manufacture of celluloid is the seasoning. When freshly made, it is termed green, and if used in that condition articles formed with it are liable to warp, shrink, or otherwise lose their shape. The "seasoning" is effected by keeping the celluloid exposed to the air, at a warm temperature, for a long period—sometimes for months. The longer it is kept the more unchangeable it becomes, and the more it loses the smell of the camphor.

So far as we are aware, the manufacture of the celluloid used for photographic films is chiefly confined to America, and this, we are informed, is how it is made: The transparent celluloid is first formed in large slabs, which afterwards undergo a lengthened seasoning. When sufficiently seasoned, it is cut into thin sheets and rolled between heated rollers, as it can still be softened by heat, and finally polished, as met with

in the market. When it is required with a matt surface, we were told by Mr. Carbutt, who has given a great deal of attention to the production of flexible films, that it is produced after the sheets have been polished.

From what has now been said, it will be seen that what are classed under the head of celluloid films vary in composition and manufacture. Again, some films are of an entirely different material, having gelatine as its basis. Furthermore, we have met with films having a cellulose basis, that have had an intermediate layer of a gelatinous character between the support and the sensitive film.

The object of the present article is not to express any opinion as to the keeping qualities of flexible films, of whatever they may be composed, but simply to point out that, in discussing the subject, there are films (supporting) *and* films, also emulsions and emulsions. These are conditions that do not seem to be sufficiently taken into account by some who have expressed opinions on the subject, and who, as we have said before, treat "films" as a constant product.

The Origin of Photography.—We are accustomed to the statement of scientific facts in epigrammatic fashion by our neighbours across the Channel, but it is a decided novelty to hear as, according to Mr. Bashford Dean, in the *American Naturalist* of July, Professor Lacaze-Denthiers has stated, that "the observation of tarnishing of silver . . . . was the origin of photography!"

Photographing the Invisible.—This is a feat which, in the production of photographs of the ultra-violet rays and of stars never seen by the human eye, is no novelty, but it is to the general public more in the nature of an abstract problem. At the Academy of Sciences of Paris, however, M. Zenger gives it concrete form by exhibiting two photographs taken the 17th of last August, two hours before and two hours after midnight. They exhibit two faint images of the Lake of Geneva and Mont Blanc, which were at the time absolutely invisible to the naked eye. M. Zenger, however, stated that to some extent the invisibility was relative only, as it depended upon individual idiosyncrasies as regards visual power.

A New Source of Error in Scientific Photography.—The absolute rigidity and freedom from tremor that are essential requirements in such photographic work as spectrum photography, and, in astronomical photography, the ascertaining of polar distances, has lately been shown by Dr. E. Von Rebeur Paschwitz to be subject to hitherto unknown disturbances. He finds that the earth's surface is subjected periodically to wave motions analogous to those disturbing a sheet of water, and often persisting for several hours with great regularity. He observed the motions of a horizontal pendulum, and obtained memoranda on photographic plates moving at the rate of twenty-four inches per minute. He suggests that all observatories should be fitted with instruments to register these tremors, and that they should be systematically examined.

Lord Rayleigh Questions the Need for Large Astro-telescopes in a letter to *Nature* last week. Noting that it is in contemplation to spend over 2000*l.* on a special photographic telescope for Cambridge Observatory, he asks whether astronomers have duly considered the facilities afforded by modern photography? "There is now no difficulty in preparing plates sensitive for all parts of the spectrum. . . . The interference bands of sodium light may be photographed with the utmost facility on plates sensitised in a bath containing cyanin. The question I ask is, Whether the time has not come to accommodate the photographic plates to the telescopes, rather than the telescopes to the plates? It is possible that plates already in the market may not exactly meet the requirements of the case, but I feel sure that a tithe of the sums lavished upon instruments would put us in possession of plates suited for object-glasses that have been designed for visual purposes." He refers to Captain Abney to give an opinion on the probable sensitiveness of plates prepared for such purposes.

A Sensitive Spherometer.—The spherometer is an instrument for measuring the curvature of the surfaces of lenses, and the first constructed was the design of the late Andrew Ross, and obtained the silver medal of the Society of just over half a century ago. It is a tool of great value to the manufacturer of either photographic or any kind of lenses, and has been gradually improved upon by succeeding inventors. It is a sort of low tripod, carrying a screw in its centre, the number of turns given by this screw before it meets the surface of the glass, when placed upon a lens, giving the depth of the curves. Ross's original form could measure to the thousandth of an inch, and by estimation to half that amount. The ordinary instrument will gauge to the ten-thousandth. Mr. A. A. Common proposed to the Royal Astronomical Society to increase this sensitiveness by placing the screw on one of the arms of the tripod. He now publishes a note describing a method he has devised for still further extending this suggested improvement. The new spherometer he describes in *Nature*, and he states it capable of measuring to the marvellous minuteness of the three-hundred-thousandth of an inch!

Light Rays as Sound-carriers.—At the World's Congress of Photography, the Chairman of the Committee, Judge Bradwell, in the concluding remarks of his address said, "I have no doubt there are those within the sound of my voice who will live to see the time when photographic reproductions will be sent from country to country as quickly as we do telegraphic messages to-day." This is a bold prophecy; but almost ere the words were uttered there was on view in the Electricity Building an instrument which, for marvellous utilisation of the rays of light, would almost make one ready to believe in any such prophecy as Mr. Bradwell uttered. We refer to Professor Bell's Radiophone, which is founded entirely on the utilisation of light rays, and as such of interest to photographers, though in this case it is not the lineaments of a friend which are conveyed, but the actual sound of his voice. Not to make the description too technical, we may say briefly, it consists of an instrument for emitting parallel rays of light of great brilliancy, reflected from a thin diaphragm mirror to a receiver placed in one instance an eighth of a mile distant. Opening into the chamber behind the mirror is an ordinary speaking-tube mouthpiece. This is spoken into, the mirror vibrates, the vibrations are carried forward by the rays of light, are received into a special apparatus at the other end, and by a hearer placed in a room freed from sound are distinctly heard, though in slightly muffled tones.

PHOTOGRAPHICAL SOPHISTICATION: ITS TRUTHFULNESS OR OTHERWISE.

Mr. H. Dennis Taylor, in dealing with my criticism of Mr. Van der Weyde's claims with respect to "Optical and Visual Truth," refers to my remarks on one branch of the subject only, without touching those on the other branch, which I considered as more important. I regret to have to differ from Mr. Taylor, the value of whose writings in exposing fallacies of so-called naturalistic focussing is so deservedly recognised, and shall be much interested to learn whether he is with me on this second branch of the subject now under discussion.

The consideration of any such means as that of the so-called photo-corrector for varying the visual angle, and consequent apparent magnitude of any particular object in a picture, may be divided into two parts; the one being the shrinkage of near and the enlargement of distant portions of a picture, so as to destroy the effect of natural perspective, in virtue of which the nearer object occupies proportionally a larger angle to the angle and in the picture; and the other, the modification of the size or proportion (width, height, or both) of particular objects, independent of whether they are enlarged or diminished by perspective, to suit an ideal, conventional or otherwise.

The claim to "correct" photographic perspective Mr. Taylor

defends on the ground that, for near objects, we are able by the aid of binocular vision to estimate the relative distances of their various parts, and so to make allowance for the greater apparent magnitude of the nearer planes. Whatever truth there may be in this proposition, I think it is a mistake to import the question of binocular vision and binocular perspective into that of affording the truest obtainable representation in a single picture. No single picture can give binocular effect, and painters and photographers alike (except when a pair of stereoscopic pictures are used) have to content themselves with what can be shown upon a single surface.

Mr. Taylor draws a distinction between objects within the range of binocular or stereoscopic recognition, which he puts at 100 yards, and those outside that distance. Of course, the actual distance for stereoscopic recognition will vary with the class of subject; thus a twig or other small clear upright line standing some distance in front of another object of distinctly different colour and having well marked lines or pattern on it, will show stereoscopic effect at a distance where on any such object as a cake or a house such effect may not be recognised, but the 100 yards limit may be accepted as approximately near enough for the argument. Suppose, now, a photograph to be taken including a building, the nearest point of which is 100 yards distant, and that it is at the corner of a street, and our camera is placed so that we see one side almost or quite at a right angle to the line of sight, whilst we also see other houses of a similar height for a considerable distance down the street at the corner of which it stands. The houses will regularly decrease in height on the picture, so that the one which is in a plane at double the distance of our corner building will only occupy half the vertical space in our picture. Will it be said that the photographer or the draughtsman is wrong in representing these buildings in the same proportion that they bear to that image on the retina, or to the visual angle included? In Europe and in modern times such a picture will be accepted as true, whatever might be thought about it in China. If this is true of houses at a distance, why should it be otherwise than true of, say, a row of dog kennels so near at hand and at such elevation as to bear the same relation to the eye that the houses do in the first case?

An objection to altering the perspective of the photograph, which has not been dealt with by Mr. D. Taylor, is that it is impossible to diminish one part and leave the rest of the picture unaltered. If some near object is diminished, there must either be something shown which the object actually hides, or immediately adjacent objects must be stretched to fill up the space created. In the case of the "photo-corrector" it is the latter event which happens—the neck is stretched out to make up the deficiency left by the shrunk head, and, whilst there is a fashion for admiring small heads and long necks, no doubt the double sophistication will be approved of by those who desire flattery rather than truth.

My own view is, that pictorial representations are generally preferred by the spectator not so much to the original subjects as to other pictorial representations of similar subjects to which he is accustomed. It is thus that the toleration of the book of beauty of pre-photographic period for small Cupid-bow mouths, eyes preternaturally large and wide apart, ridiculously small hands and feet, &c., can be accounted for. It is also thus that we may account for the rocking-horse position which did duty so largely in hunting and battle scenes, and which has been so much accepted that since the more truthful representations, such as those shown by photography, came to be generally adopted by the best artists, there has been a wail set up that such positives represent "arrested motion," "positions never seen by the human eye," and so on. True, there have been observant sculptors as long since as the classic ages, who have left us much such representations as photography gives us, and some painters, like Meissonier, who have gone direct to nature, and, producing drawings which are found closely to resemble the photographic representations, should therefore also incur the censure of those who accept only the commonplace conventions.

This brings me to the point that, whereas it has been customary for painters and draughtsmen to represent most subjects in linear perspective, buildings with retiring lines, groups of figures with the farther ones represented smaller than near ones, it has been conventional to disregard this effect with single figures, and the public, judging of photographs by what they have been accustomed to see in paintings and engravings, object to the increase of size in the advancing portions of a single-figure subject, whilst they accept it in subjects of any other character. In my criticism, referred to by Mr. Taylor, I recognised the hold which this Convention had obtained, and said (see *Society of Arts Journal*, April 28, 1893): "As people are not thoroughly accustomed to perspective in single-figure pictures, there is something to be said for sophistication to the extent which brought the picture more into accordance with what they were accustomed to."

The other branch of the subject deals with alterations of the dimensions of the subject, where it is not suggested that perspective has had anything to do in causing such alterations to be desired. Mr. Van der Weyde, in his paper, speaks of sitters who "are prone to lament that their hands, to say nothing of their heads and waists, come out much too large. Others, again, fancy themselves much taller and slimmer than they optically, perhaps I may say architecturally, really are, and I have always been compelled to admit that they are right—that is to say, visually right, artistically right—and that photography, in their case, could not do justice to one's visual impression." I maintained on the night of the discussion, and I have seen nothing yet to convince me to the contrary, that heads and waists do not come out too large for truth and nature, but only too large to accord with some conventional ideal.

Mr. Taylor, in his concluding paragraph, says: "The only danger lies in the fact that so many sitters are satisfied with nothing short of the most flagrant flattery on the part of the photographic artist as well as the portrait painter, and that the method may, in some hands, be prostituted accordingly." Does Mr. Taylor consider that the reduction of hands and waists, the making the sitter taller and slimmer in the picture, and the photographer's assent to the proposition to this in accordance with visual truth, is in itself a truthful proceeding, or would he consider it to come under the censure of the sentence last quoted from his article? W. E. Debenham.

CONTINENTAL NOTES AND NEWS.

Eliminating Hypo from Prints.—M. Ommeganck recently informed the Antwerp Section of the Association Belge de Photographie that of all the means employed for the elimination of hypo he found the best to be the immersion of the prints in a bath of borax solution (strength one-half per cent.) and their washing in pure water, the small traces of borax remaining in the prints being advantageous for toning purposes. Toning, however, we may remark, usually precedes fixing in the albumen process. Possibly, however, the idea would be applicable after toning and fixing.

A Permanent Acid Fixing Bath.—The following is recommended by the *Bulletin* of the Photographique Club de Paris:—

Water	350	c.c.
Bisulphite of soda	10	grammes.
Hyposulphite	40	„
Chrome alum	2	„
Citric acid	15	„

The bath is said to keep indefinitely, fix rapidly, and obviate staining of the plates.

Increase of Rapidity in Gelatine Plates by Keeping.—Mons. F. Burle writes to *La Nature*, giving an instance where, as he alleges, gelatine plates have gained in rapidity by keeping. Some Beernaert plates, he says, in the seventh year of their existence were five times more rapid than in the first month of their manufacture. We should like to know what tests Mons. Bourle applied to attain such a result.

Development by Electricity.—Following up the experiments of Schützenburger and Eder, Herr Liesegang has succeeded in developing plates by electricity. Two vessels, one of which is of porous ware, are filled with a solution of bisulphite of soda; the porous vessel is placed in the other, and a current of electricity is passed through by means of two platinum electrodes. The exposed plate is placed in the vessel containing the negative electrode. The image develops in a few minutes, and is of a brownish colour. The deposit is considerably reduced in the fixing bath.

New Method of Development with Diamidophenol.—M. Balagny gave the following plan at a recent meeting of the Société d'Etudes Photographiques:—A three per cent. solution of anhydrous sodium sulphite is made. To develop an instantaneously exposed plate (130 × 180 mm.), 100 c.c. of the solution are taken

half a gramme of diamidophenol being added to it. For a plate having had a time exposure, five to ten c.c. of a solution of acetic acid are mixed with the developer.

A Combined Toning and Fixing Bath without Sulphocyanide.—Herr Valenta recommends the following:—

Distilled water	1000	parts.
Lead nitrate	10	„
Soda hyposulphite	200	„

For use, add fifty parts of a one per cent. solution of gold chloride. The bath is said to answer with most commercial chloride papers. It does not work at its best at the first, and it is therefcre recommended to tone one or two prints by way of trial.

Removing Yellow, Green, Red, or Dichroic Fog.—Dr. Meniéré, of Paris, advises the following treatment:—Soak the negative in ordinary water for five minutes, and then immerse in—

Water	100	parts.
Bromide of sodium	3	„
Bromine water	3	„

Leave in for ten to fifteen minutes. The bleached image is well washed and dried, and the image redeveloped with an amidol-sulphite developer.

UNSUSPECTED SOURCES OF FAILURE.

There can be very little doubt that by far the greater proportion of the failures that occur in dry-plate work are attributed to wrong causes, and that, in very many instances, the poor platemaker or some equally innocent individual receives the blame that is really due to the carelessness of the operator. This happens not infrequently even when the operator is an old and experienced hand; but, undoubtedly, most such cases are to be met with in connexion with beginners, whose knowledge of photography is not yet sufficiently extensive to have taught them how easy it is to err.

Photography has now become so extremely simple and easy a process that, to the average amateur, it is impossible to conceive how he can possibly go wrong, at least in the merely mechanical details of manipulation, although he may, perhaps, recognise the possibility, if not the probability, of there being at first some little difficulty, or at least something to learn in development. But whether novice or veteran is the more really blameworthy it is impossible to say; the first errs from want of knowledge, the latter in spite of it, and he should therefore, perhaps, be deemed the greater sinner.

Several cases, serious, comic, and instructive, have recently come under my notice, and a narration of one or two may, perhaps, serve to impress upon some of your readers the folly of coming to too hasty a decision in such matters, and, above all, of recognising the possibility that they may themselves be in fault, and thoroughly sifting the matter before laying the charge on other shoulders.

In one case, which promised to be a rather serious one, and possibly to lead, if not to a lawsuit, at least to "strained relations" between two hitherto old friends, I was asked to arbitrate on the subject of the quality of certain plates, a large number of which had been supplied through a dealer to a customer who condemned them as worthless. The maker, on testing a sample returned to him for the purpose, pronounced them all right, and declined to take them back; the dealer, on testing the plates, moreover, found them free from fault, but, as they were an uncommon and unsaleable size, he could scarcely agree to have them on his hands as useless stock. In the dilemma, I was appealed to to give an opinion on the plates, and, on trial, pronounced them good in every respect.

The customer accepted the decision; but, though he went earnestly to work to discover where he himself was wrong, so many verdicts being against him, his compliance was of that character that left him "of the same opinion still." By chance I happened to be at his place of business when the matter of the plates was mentioned, and it was proposed to make a joint trial of them, and certainly they turned out all that he had alleged them to be from the first, foggy and hopelessly bad. The fog extended over the whole plate, even to the margin representing the rebate of the dark slide, and that fact, in conjunction with a careful examination of the camera, proved that the latter was not in fault, while there was no reason to lay the fault to the dark room. I accordingly carried away with me two or three plates from the same box to try in my own dark room, when, strangely enough, they again worked without the slightest blemish.

Returning to the charge, another plate was exposed in the professional studio, and that, together with a second that had not been exposed, were placed together in the same developing dish, when the exposed plate came out precisely as previous ones had done under the same circumstances, while the unexposed one remained perfectly clean. Here, at least, proof was positive that the fault lay in some way with the exposure. The camera, as I have said, appeared perfectly light-proof: but, to place that beyond dispute, a plate was cut in half, one half being kept in the dark room without exposure, the other placed in the dark slide, with a portion protected with opaque paper, and exposed as before. On developing the two halves, the unexposed portion was, as before, perfectly clear, the other completely and equally fogged.

Now it became evident that, while the fog arose in the camera, it was certainly not in front of the plate, but behind; so a plate was placed in the slide—a single one with hinged door—and one half of it covered with opaque paper placed behind it. As a matter of form the plate was exposed in the camera, and on development the protected half proved perfectly clear; the other badly fogged, as on previous trials. On carefully overhauling the dark slide, it was discovered that from shrinkage—no doubt caused by the protracted dry weather—the back door of the slide did not lie closely in the rebate, and light leaked in nearly all round the edge of the plate, and so the mystery that had so nearly caused much unpleasantness was explained.

In another case a batch of plates was condemned in a very similar manner, the fault in this case being that many of them—sometimes three or four, or even more, in a box—were marked by a diagonal line of fog across the middle of the plate, one side being clear. In other boxes the whole of the plates might be perfect. The theory formed by the victim in this case was that a light had been taken into the drying room while the plates were in the drying racks, and that some of the batch had thus got fogged in this partial manner. The theory was ingenious, but it was shown that at the particular factory it was impossible. It turned out in this case, after a long series of investigations, that the fault was again due to a defect in the camera, aided by circumstances. The camera was one of the reversible-back pattern, and at one corner of the reversing frame, that which was at the right-hand top when the plate was in the upright position, admitted a leak of light, at least when in that position; for when placed in the horizontal direction, in which case the defective corner was at the bottom and did not get the benefit of the direct skylight, the diagonal streak of fog did not occur. This discovery, of course, put a very different complexion upon the drying-room theory.

Another case in which the blame was sought to be fixed wrongly on the camera—not, in this instance, on the platemaker—gave a good deal of trouble before it was accurately diagnosed. The defect took the form of an irregular blur of fog, occurring only occasionally, but always in the same position on the plate. It was not sufficiently well defined to give the idea of being caused by any minute aperture in the camera front acting as a "pinhole," less still of its being caused by a perforation in the back of the slide—this also being a single slide. However, its always falling in exactly the same position proved that it was caused mechanically by some internal defect in the camera. Examination of the slide with a plate in position showed that the "blur" fell just where the spring pressed upon the back of the plate, this spring being of "blued" steel, nicely rounded at the extremity. Further investigation showed that when the camera was employed in a certain position out of doors, for portraits or groups, the light from the sky, entering the lens, passed through the plate, and was reflected back by the curved and polished extremity of the springs. The application of a little dead black varnish in this instance removed the trouble.

As an example of the comic side of matters, I may conclude by mentioning an incident that occurred to myself, and which for a time presented all the features of an inexplicable mystery. A friend who was just entering on the novice stage brought to me for my opinion a new camera that he had had offered to him, and of course the instrument had to be tried. This was done by each in turn taking the other's portrait, the slides containing the two plates being then taken into the dark room for development. One plate, however, turned out to be hopelessly fogged, while the other gave not the slightest trace of an image. The slide was refilled and the exposures repeated, but with a precisely similar result. That one or other of us should have omitted to draw the shutter once would not have been remarkable, but that it should be repeated after the contingency had been mentioned was scarcely likely; but even then it would not account for the fogging of the other plate, and it seemed too extra-

ordinary a coincidence that twice in succession a good plate and a bad one should be placed in the slide, and the good one in both instances escape exposure.

A third pair of plates were placed in the slide, and for the third time one of them developed a mass of dense fog, while the other was quite innocent of exposure, and the situation began to be decidedly interesting if a little exasperating. It was my friend's plate that had escaped exposure in each case; so, after sitting for the fourth exposure, determined to solve the mystery, I placed my hand under the focussing cloth in order to be perfectly certain that the novice understood what drawing the shutter meant. He proved to be quite capable of performing that simple operation in a fashion, but where he had erred was in drawing *the wrong one!* In fact, one of each pair of plates had been exposed twice, once in the camera and once out of it, while the other was not exposed at all. W. LINDSAY.

SPOTS AND PINHOLES.

WE have heard of late many complaints of spots and pinholes on both paper and plates, but afflictions of this kind seem to be of periodical recrudescence, more perhaps in the summer than at other seasons of the year, which may be reasonably expected owing to the extra dryness of the atmosphere at this period, and the great quantity of dust that is everywhere in evidence. There is nothing new in the phenomenon, and, knowing it, extra precautions should be taken to counteract its evil influence by both manufacturers and users of paper and plates. Considering the immense quantities of both that are yearly consumed, the faults in this direction can scarcely be termed excessive. That occasional batches of defective material are sometimes on the market there is no disputing, for which possibly the makers are the greatest sufferers.

In these days of keen competition loss of popularity is a serious matter. Advertising does a good deal, but the production of uniformly good plates or paper is more to the purpose. Photographers getting hold of a thoroughly reliable brand of either are very conservative, and it depends entirely on the manufacturers to keep their customers or send them roving for something better. That we shall get absolute perfection at all times is simply out of the question. Not until paper is made of rags from angels' clothing and boiled in liquified air, as a photographic expert once put it, shall we get paper without faults of some kind; the less there are, the more we have to be thankful for. The wherewithal of which spots are made may be introduced from the very beginning of the paper manufacture to the final mounting of the print. Firstly, there is the paper itself, faults or oversights of manufacture, and mostly consist of metallic particles of some kind incorporated with the paper pulp, and more or less visible on the surface of the paper. Many are also invisible except by transmitted light, and make their appearance as faults later on in the preparation of the prints.

At one time Rives paper had an unenviable notoriety in this direction, and Saxe was of equally good repute, from which we may infer that more care was observed in one manufactory than the other, and that this particular fault is preventable, and ought to be. Metallic particles make their presence felt, as soon as they come in contact with silver salts, by the reduction of the silver to a metallic state. If large spots are carefully examined, the silver will be seen reduced to a foliated form and attached to the original speck, the bulk of which determines the amount of reduction, specks that were unnoticeable before spring into existence, to the great detriment of the print. As far as my own observation goes, it is only spots of a metallic nature that are of serious inconvenience; other kinds remain as they appear at first, neither increasing nor diminishing. If the prepared paper is held up to the light, the locality of the spot is easily seen, and the paper, by judicious management, may be placed on the negative so that the fault will come in some dark part of the picture where it will be of little or no consequence. Supposing the paper itself is free from defects, they may be introduced either in rolling, albumenising, sensitising, storing, or in the printing frame. If free up to this point, they may be contracted in washing or drying afterwards, and, finally, by the mountant and mount. From one end to the other of the preparation of silver prints they are more or less liable to become defective from spots. The process of albumenising, if carefully performed, is not very likely to introduce them. The only way spots are contracted at this stage is by dust settling on the surface during the drying, although the albumenising is responsible for streaks and markings of another character. The most prolific source of spots is dust during the sensitising process.

A peculiar class of defects is produced by the silver bath settling in tears and drops on the surface of the paper hung up to dry, as if the paper had been greasy. This is sometimes produced by the too dry condition of the paper, or too great strength of the silver bath, or to the albumen itself not being properly ripened before use. Blotting off the surface liquid before hanging up the sensitised sheets will prevent it. Ready-sensitised paper, as purchased, is rarely, if ever, troubled with these spots. In most photographic workrooms the dust is of a very complicated nature. Organic, inorganic, and metallic matter enter its composition, and are more or less dangerous according to the predominance of objectionable chemical substances. Iron, hyposulphite, and pyrogallic acid solution being spilled on the ground dry, and friction by footsteps aid in their distribution in the atmosphere, and are perhaps the chief offenders in this connexion. Sulphur in various forms is also very pernicious. Great care is necessary to avoid dust wherever any moist surfaces containing silver salts are being prepared. Gas and coke stoves give rise to trouble unless the products of combustion are thoroughly removed by good ventilation. If the paper gets to the usable stage without accident, a frequent source of spots is found in dirty pads in the printing frames, or by metallic particles ground off the springs and hinges by the friction of opening and closing. New printing frames are very liable to cause trouble. Every crevice of a pressure frame should be thoroughly dusted before being filled in, especially the rebates and pads. A piece of stout blotting-paper that has been saturated with a solution of carbonate of soda, and dried, should be laid between the paper and the pad. This will not only prevent the paper yellowing, but protect it from any deleterious matter that may happen to be on the pad itself. Spots are sometimes, but rarely, caused by bad hyposulphite of soda, and by imperfect manipulation in toning and fixing, letting the prints stick together, so that they are only partially acted on by the solutions.

Another source of spots is dust settling on the surface of the prints during the time they are washing. This is more likely to happen when they are left soaking all night face upwards and float to the top of the water. New unvarnished zinc in the washing trays will also cause spots if the face of the print lies in close contact with it for a little time. If the work passes through all these ordeals safely and intact, only sheer carelessness will spot them whilst they remain unmounted. When many processes are carried on in the same apartment nothing is more likely to cause defects on a finished silver print than particles of liver of sulphur, the most minute speck of which will in a short time do irretrievable damage by entirely destroying the liver image, and substituting an ugly yellow spot that increases in size from a pin-point to that of a pea, when it seems exhausted. Any print being in contact with this chemical is ruined. It may be a day or two or more before the spot is noticed, but then it soon spreads, and the destruction is complete. A lump of this substance (sulphide of potassium) may have been broken up for intensification purposes or for precipitating residues, and, being very hard, is apt to splinter and fly about, unless great care is taken to prevent it, and so a few particles may get on to the prints. I cannot call to mind anything else likely to cause spots on the finished print in the course of ordinary photographic work if care and cleanliness are fairly observed.

With the gelatino-chloride papers, spots may exist in the unprepared paper, or from the emulsions being imperfectly prepared, or the process of coating carelessly done, or dust settling on the surface during drying. The preparation of this kind of paper is chiefly in the hands of a few manufacturers, who, by the aid of machinery, can produce a more perfect article than it is possible to do at home, and it is a matter of importance to their business that a good paper is turned out; at the same time, it cannot be disputed that we occasionally purchase gelatino-chloride paper that is afflicted with minute spots that increase during toning and fixing, to the great detriment of the pictures, especially those of the vignette order, where a perfectly pure margin is necessary. The nuclei of these spots are easily seen on holding the paper up to the light as tiny opaque specks, and during the toning and fixing develop a kind of aureola that destroys the image where it exists. The more protracted the toning, the more conspicuous these spots become, but with rapid toning they show very little. The tubes in which gelatino-chloride paper is sent out are not a safe protection for the paper from the light, they being perforated by minute holes that let in sufficient light to darken the papers, in patches varying from the size of a sixpence to a crown piece. This may be easily remedied by giving the tube a coating of asphalt varnish or pasting some orange paper on it. Of course, if the paper is wrapped in orange paper inside, it is safe so far as it goes; but the tubes are sometimes again used for untoned prints or sensitive paper, so, unless some extra precautions are taken against the action of light, there is a probability of spoiling the contents.

We occasionally hear of the mysterious appearance of spots with

nothing to suggest their origin, and their rare occurrence does not give one the opportunity of tracing them to their source. Water, when supplied under high pressure, although sufficiently pure, is sometimes the cause of spots; the imprisoned air settles in tiny bubbles over the surface of the print, and thus prevents the proper action of the water on those parts. I have seen water supplied that looked quite *muddy* from this cause, and remained so for some little time after being drawn, when it gradually became clear, but the slowness with which the air separated from the water seemed to me phenomenal. Occasionally impurities are introduced into the water supply by repairs going on to the supply pipes, which may have a deleterious effect on the prints. In some circumstances the pipes themselves contribute to this end, but, generally speaking, the spots can be traced to some more controllable origin; but, when they happen unexpectedly, the photographer is thrown off his guard, and the cause is apt to be overlooked, or, having righted itself, the cause of the defect is enveloped in mystery; but dust, in some form or another, has more to answer for than all other causes put together.

Spots on gelatine negatives are mostly attributable to either dust or bubbles. If we examine an unexposed plate, we may find round spots of clear glass or depressions, where the emulsion is much thinner than on other parts of the plate. These are produced by bubbles in the emulsion, which, as the emulsion sets, break, and leave clear glass, as the gelatine then becomes too thick to flow to fill up the space equally, or some part of the plate may not have been perfectly covered in coating. Such plates as these never ought to be sent out, and I have no doubt it is quite an oversight that they are not thrown to the waste instead of being packed, as no firm with any care for their reputation would put such on the market knowingly. Dust, again, is a prolific source of pinholes on exposed plates. Specks of dust adhere to the film, and protect the part they stick to from the action of the light, and the developer and fixing, of course, develops a pinhole wherever they have been. No plates ought to be placed in the dark slides without first carefully dusting them and the slide too. Backed plates are apt to cause pinholes. Unless extra care is bestowed on them, small particles of the backing get loosened by the springs, and find their way to the surface by the shaking and vibration of travelling. It is an excellent plan to line round the edges of the rebate of the dark slide where the plates fit with strips of black velvet. It will not prevent the backing being loosened, but it will prevent it getting round to the front of the plate. It is a good plan to line with black velvet all those parts that give access to the plates where it can be done without putting undue strain on the slide, for it is a most effectual method of preventing access of dust, which will find its way through the best-fitting woodwork unprovided with such extra protection.

A pad of *cotton* velvet, such as used by hatters for polishing up silk hats, is better than a brush for removing dust from the surface of a plate before putting it in the slide. There is *no fear of scratching* the film even with considerable pressure, and it does not leave it in an electrical condition, as will the frequent passing over the surface of a camel's-hair brush, the film thereby becoming an attractive surface for stray motes. The slides and plates being free from dust, they should be kept in a close-fitting waterproof case until required. We now come to a division of the work where all sorts of defects may be produced *ad libitum*.

Development.—Pinholes are mostly caused by small bubbles which, protecting the film from the action of the developer, dissolve out in the hypo, leaving clear glass. This is, perhaps, the most prolific source of pinholes on the negative of any. The best way to get a good crop of them is to give the plate a preliminary wetting before pouring on the developer. I could never understand why this plan was ever advocated as a preventive of bubbles, as it acts in the very opposite direction, a statement which will be corroborated by any practised worker. What we do when we first bathe the plate in plain water is to partially fill the pores of the gelatine with an inert fluid. We then pour on another fluid (the developer) of a different density. In the act of mixing there is much more tendency to form bubbles than when the developer is used without this preliminary wetting. The film itself is more soluble in plain water than in the developer, which has somewhat of a hardening tendency, and which has probably something to do with the persistency with which bubbles adhere to the previously wetted film. It is almost impossible to avoid bubbles in the weak light of the dark room, unless the whole of the surface of the plate is rubbed or brushed over after the application of the developer to the wetted surface, or the result will be strings of small bubbles that pertinaciously adhere all through the development, and provide a crop of excellent pinholes; but, when the developer is poured carefully over the plate in the *first instance*, it penetrates as it goes something like pouring water over blotting-paper, and causes no bubbles whatever. Every time the *same* developer is used, each application increases the chance of bubbles. The developer becomes more and more glutinous, which will be seen by the persistence of the froth caused by pouring it backwards and forwards from the plate into the developing cup, and with this increase of glutinosity we get increase and persistence of bubbles. A curious thing is that, if the developer only begins to act before the bubbles are removed, their removal then will not prevent the defect, showing, however long the development may be continued, the protected parts never catch up with the rest.

Dust and bubbles are practically the main cause of pinholes on plates. Spots occur from a very different cause, and the use of dry pyro has something to answer for in this connexion, a speck of pyro getting on to a plate will inevitably cause an opaque spot. Splashes of other solutions may accidentally fall on a plate and cause spots; the developing cup may be set down on a sloppy table, and the liquor may drop off the bottom, when pouring on the developer on to the plates, or on the edge of the dish, and so splashing the film. Spots are seldom seen when care is used in the conduct of the dark room, for they are almost always dependent on the carelessness of the operator.

Of course, mistakes are more likely to occur when the operating chamber is only lighted by a small quantity of ruby light, what to many is practically darkness, and the work is really done by guess. The more light, so long as it is a safe light, the better the results will be, and, if the dish in which the development is progressing is shielded as much as possible in the initial stage of development it is astonishing what an amount of light may be used without any detriment to the clearness of the image during the latter part of the process, although I certainly do not recommend exposing the plate unnecessarily to any light whatever. A clear operating room and plenty of light conduce not only to comfort but to the abolition of these annoyances, pinholes and spots.

EDWARD DUNMORE.

NOTES ON A TOUR IN THE HIMALAYAS AND ON THE NORTH-WEST FRONTIER.

II.

THE number of plates to be carried is the next consideration. I made a rough guess, and took with me two gross—one gross of Wratten's ordinary (a plate which never fails in its high standard of excellence for all landscape work), and half a gross each of Edwards' XL celluloid films and Edwards' XL plates. I used the latter for all figure and close subjects, it being a plate that I had always been accustomed to, and which I never had any cause to complain of. This was a rough guess, but it turned out fairly correct, as of the lot only one dozen Wratten's were smashed while being carried on a mule, and one dozen of each kind I left in India on my return, not having required them. I found that, though in the Himalayas I took pictures of everything that I thought would be interesting to give a complete idea of the country, the number of plates I exposed in one day never exceeded eight, and the average over three months' marching was under two a day.

I will now endeavour to give some idea of the details of the kit I used, and which, speaking from experience, I may say I found complete in every respect. I took a whole-plate camera of Chapman's (Manchester), which I have had in continual use for eight years, having used it out yachting in Scotland, in the plains of Italy, and in the mountains of Switzerland. It is of the simplest construction, having no especial struts, and is not brass bound, and, though it will not carry a heavy lens when racked out to eighteen inches in a high wind (what camera will?), yet not one single picture of the 250 I have taken in India has been spoilt by any break-down or shake in the camera or its three double backs. The camera design has one fault, in that the bellows does not rise and fall with the rising front, and in extreme cases the corners of the picture are cut off. When, however, one has to put up and take down the camera so constantly on the march, simplicity and absence of all fancy swings, stays, and screws is the thing one values most, providing no efficiency is sacrificed thereby. Certainly this camera, with its three double backs, speaks well for the soundness of first-class English work, and I can congratulate Messrs. Lane of London, who made it, on the fact that it is now as good as new, while it has never in any way been repaired since I had it.

The only addition I made to my kit was to get three more double slides, numbered from 7 to 12, which fitted tight into a tin velvet-lined box. This was carried by my gun-bearer, always slung over one shoulder by a strap, and was only used to contain Edwards' rapid plates or films, the slow plates always being in slides 1 to 6 in the camera-case. I was thus always ready for either landscape or figure subject as they came. On a march of this kind the portability of the camera legs is not a necessity.

Before leaving London I looked everywhere for a strong, simple set of legs, with a single sliding joint. Not finding anything suitable, I fell back on my old ones, which, though theoretically weak, yet were strong enough to stand the keen winds on the high passes without shaking. The legs were always carried ready fixed to the triangle, with their joints slid in, to reduce them to half their length, the whole being carried on the top of the camera case as it rested knapsack-like on the man's back. In this way I could erect the legs at once, put on the camera, and I found from eight to ten minutes' halt was all that was necessary to get a picture.

Of lenses I took three, an eight-and-a-half-inch focus Dallmeyer landscape, a twelve inch Rose's rapid symmetrical, and an eighteen-inch Swift's landscape. All were fitted with carriers to go into the same flange on the camera front, and all were bayonet-jointed, so that they required only a quarter turn to screw them home. The eight-and-a-half-inch lens is a necessity for all mountainous countries. The angles from the heights to the depths are so enormous, that frequently one can get no picture on one's plate unless a wide-angle is used. The rapid symmetrical remains the most useful all-round lens, and a long-focus lens enables you to take many a beautiful and effective picture of distant mountains, embracing, as it does, an angle much more nearly resembling that of one's eye. All my lenses were fitted with iris diaphragms, and the slight extra expense will be amply repaid in the saving of time these little conveniences effect. I used a shutter of my own making, but any time-and-instantaneous shutter, such as Thornton-Pickard, will do, though, without doubt, it is an advantage to have one's shutter behind the lens. Each lens was carried in a little chamois leather bag, differently coloured, so that the men, in opening the camera case, were always able to hand me out the one I required.

Last, but not least, comes the focussing cloth, which should be of thin white macintosh, lined with some thin non-slippery cloth. The white colour keeps off the great heat of the sun's rays at high altitudes, and prevents the heating of the camera and condensing of the damp on the cold lens. The macintosh is an excellent cover to the camera, and, if buttons and loops are sewn on the front edges, in rainy weather the coolie can take it out of the camera case, and, throwing it over the whole knapsack, can, by buttoning it in front round his neck, use it as a complete waterproof for the camera case on his back and himself. The whole kit in the camera case, including the six plates and the camera legs, made up a load of twenty-three pounds, which is a fair load for a man who marches behind you all day. The other three double-backs, loaded in their tin case, weighed seven pounds, and were, as mentioned above, carried by my gun-bearer. Both these men were permanently engaged, and became soon experts at helping me to set up and pack away the camera, the gunbearer going even so far as to pick up an idea of posing the villagers naturally in the picture, always a work of some difficulty, for, needless to say, the natives' idea is always to stand in a row, at attention, facing the camera. In no country, however, are figure subjects easier than in India; the patience of the natives far exceeds one's own, and they will stand any length of time immovable if carefully posed. Even with the wilder Pathans across the frontier, I had no difficulty in photographing either them or their villages; they seemed only surprised that the operation was over so soon, and a peep through the camera, under the focussing cloth, was the greatest reward to them.

III.

I made for myself a small view-meter, consisting of a small frame of brass, the opening of which was in the proportion of 8½ to 6½. Through, and at right angles to the longest side, ran a stiff brass wire, the end of which was held against the bone just under the eye. By sliding the frame along the wire, which was marked in three places for the three lenses I used, the different angle on the landscape which each lens would embrace was shown, so that, by the time the camera was on its legs, I knew which lens would be required. This view-meter I always carried loose in my pocket, and I found it invaluable.

All my plates were packed as the boxes came from the makers, on edge in two tin-lined cases, each holding about nine dozen plates. This kept the weight of each case down to fifty pounds. I made a dépôt of these in India, and took with me on the march as many plates as I required, packing some four or five of the makers' boxes in each yakdàn, or wooden mule trunk, filling the spaces with clothes. By keeping the weight of each yakdàn below fifty pounds, it can either be carried by a coolie or by mule. The most important packing was, however, the repacking after exposure. In order to be quite safe in this respect, I had prepared, at the kind suggestion of Signor Sella, whose great experience in the Caucasus made his advice invaluable, a number of whole-plate cut sheets of Rivess plain paper. These were dipped in a weak solution of Nelson's gelatine, in which enough chromate of alum was mixed to render the solution a pale greenish colour. The solution must be weak enough not to glaze the paper when dry. Exposed plates, packed face to face with this paper between them, will keep an indefinite time, and those I have exposed six months ago I have now unpacked, and they develop as freshly as if exposed twenty-four hours ago. It is a long business packing away exposed plates. It is most difficult to get a dozen Wratten's plates, with all their paper wrappers, back into the cardboard boxes again. It can be done, however, and it is worth while spending every effort to pack the exposed plates carefully once for all. Two grooved light-tight wooden boxes, each to hold one dozen plates, will be found the greatest help, so that a whole dozen may be opened at once, worked through the slides as required, numbered, and put back into the box. As soon as the whole dozen is worked through, repack all of them, at one operation, into their cardboard boxes. If only one rapidity of plate is carried, one wooden box will suffice; but each rapidity of plate requires its own box, which had better, for convenience sake, be painted a different colour. I wrapped each cardboard box filled with a dozen exposed plates, in brown paper, and then in a sheet of that most excellent Indian Momjáma (cheap waxed calico, bought in every bazaar), which is a good waterproof. Each dozen plates had a label on the outside of the box, with the numbers corresponding to those in the exposure-book. I had no difficulty, in this way, in finding those that I wished to develop first. Finally, on my return to India from across the border, I packed all the boxes of exposed plates again in the tin-lined cases they came out in, and, for safety's sake, enclosed each of these small heavy cases in a larger packing-case, hay being well stuffed between the two.

I will conclude with this advice, that those who go out to bring back a series of photographs of a new country should not confine their pictures only to the prettiest subjects, but should endeavour to take every landscape that is characteristic, even though it be ugly. For instance, all Central Asia (including in this Affghanistan and our own North-West frontier) is a vast barren, stony desert, in which, here and there, where there is irrigation, you find green and fertile valleys, cultivation, fruit trees of all sorts, many of which bowers remind you of an English coppice. One is tempted to pick out these refreshing bits, to leave alone the twenty miles' march over the barren, stony waste, and so bring back to England a number of pictures which convey the idea that Central Asia is a Garden of Eden. In landscapes, as often as possible, get some of the natives of the country to make a foreground, making them look away from the camera, and stand or sit in their natural attitudes. A group of such figures will always localise a picture, add the human interest, and throw back the distance in your landscape by making a bold foreground.

Nothing can add to the interest of travel so much as the wise use of a camera. It makes you observe so much more the characteristics of the country; it takes you off the beaten track in search of something more interesting; it is an excellent passport into native villages and corners, for, children-like, they are all interested in the "picture man," and in return for a few kind words they do all they can to offer assistance; and, finally, it is the best school of all for patience, without which a photographer is no photographer.

F. St. J. Gore, B.A.

PHOTOGRAPHERS' EFFORTS AT UNION.

[Read at the World's Congress on Photography.]

When first I was asked to read a paper before this Congress, I purposed to use the title "Union Among Photographers." A friend objected that if I took that title, and treated the subject truthfully, the paper would be as brief and to the same effect as a certain famous essay, "On Snakes in Ireland," which consisted of three simple words, "There are none!" While this statement is too sweeping to be absolutely true, it contains the germs of truth; so, in deference to my friend's suggestion, I speak of photographers' *efforts* at union.

The subject is such a vast one that I cannot pretend to treat it exhaustively. I shall not trouble you with the reading of the whole, even of the particulars that I have been able to collect and that are contained in the printed slips distributed about the hall. The subject is one that will be taken up, that *must* be taken up, by abler and more leisured writers than myself, and the present is merely a first contribution. It is also a bait thrown out to catch information, and I shall be indebted to any one who will send me additional particulars, or correction of errors that occur in the present brief summary. Such particulars I will endeavour to have published in an English and an American photographic annual.

In order to keep the subject within limits that are at all manageable, I have confined myself almost entirely to professional efforts, and, with one exception, to organizations in the English-speaking world. The matter may well be divided under four heads:—1. Brief historical notes. 2. Efforts now existing. 3. The ideal union. 4. Present possibilities.

The history of the subject is largely a history of failures. But from those very failures we can learn much that will be valuable if we of the present are true to our opportunities. In the history of the subject, both of success and failure, America plays a far more prominent part than the other sections of the English-speaking world, so I give her the first position. The earliest records are those of—

The *Daguerrean Societies*, national, State, and local, which flourished in the '40's and '50's. They were professional bodies, discussed manipulation, prices, &c., and for a time flourished. Gradually jealousy and dissension appeared among them, and before the Daguerreotype was killed the societies formed in its interests had killed themselves.

I have obtained particulars of some forty-five unions, or professional societies, of which no trace appears now to exist, and place their names and brief particulars on record. They are arranged in the order of the earliest dates at which trace of them is found, although some of them were, no doubt, old before the time at which I have met with particulars. They embrace Canadian societies as well as those of the United States. Most of them are defunct, possibly some may feebly exist, and probably many have been merged into amateur societies.

The Photographic Club of New York City, existing in 1845, before professionals and amateurs were separated. Date of dissolution not known. *Photographic Section of the American Institute*, 1859. The oldest now-existing society. Is now purely amateur, though originally largely professional. *San Francisco Photographic Artists' Association*, founded 1866, to remedy price-cutting, and flourished for a few years. *Michigan State Photographic Association*, founded in Detroit, 1866. *German Photographic Society of New York City*, founded 1867; a branch of the Photographic Society of Berlin. Last heard from in 1889. *The Ferrotypers' Association of Philadelphia*, 1868, was a strong and active though small society. Fell to pieces after 1879. *Northern Ohio Photographic Association*, active in 1879, when it attempted, and with fair success, to enforce Sunday closing of studios. *Photographic Association of West Virginia*, founded at Wheeling, West Va., 1869. No subsequent history. *Toronto Photographic Association*, founded 1869 (or early '70). Fell to pieces at once through price cutting by members. *Boston Photographic Society*, founded 1869. Languished till early seventies and was then reorganized on a broader basis as the *New England Photographic Association*, which held several well-attended meetings, with much discussion, but little practical result. *The Indianapolis Photographic Society*, founded 1870. In 1872 became the *Indiana State Association* and flourished for a while. *St. Louis Photographic Association*, founded 1870. *Pennsylvania Photographic Association*, founded in 1870 as a State Association. Had about one hundred members, embracing all the best men, and for a while did good work. *Central Ohio Photographic Association*, 1870. Had no fees or meetings, but had a well-arranged scheme of mutual help by correspondence and the regular exchange of specimens of work. *Brooklyn Photographic Artists' Association*, 1872. Met regularly at various studios for a time. *Photographic Association of Western Illinois*, 1872. Had quarterly meetings. *Photographers' Association of District of Columbia*, founded Washington, 1872. *Maryland Photographers' Association*, Baltimore, Md., 1872. *Buffalo Photographic Association*, founded 1873. *Northern Michigan Photographic Association*, founded 1874, and held meetings to draw up a constitution, but did little else. *Photographic Artists' Society of the Pacific*, San Francisco, 1875. Had some fifty members, but died ere long. *Chicago Photographic Association and Photographic and Fine Art Institute of Chicago.* Were active in 1881; founded some years before. No record since 1889. *Chicago College of Photography*, first session announced 1881. Apparently a good scheme, in theory at any rate, for a college for training professional assistants. No record since 1881. Gayton A. Douglass, Treasurer. *Photographic Society of Nashville, Tenn.*, founded 1881. *Photographic Stock Dealers' Association of America*, founded at Cleveland, O., 1882. *Rochester (N.Y.) Photographic Association*, founded 1883. *Detroit (Mich.) Photographic Association*, active in 1883. No later record. *Northern Michigan Photographic Association*, in existence in 1883. *Photographers' Association of Syracuse (N.Y.)*, founded 1884. *Photographic Association of Fort Wayne (Ind.)*, founded 1885. *Photographic Merchants' Board of Trade*, held its seventh meeting in February, 1885. No later record. *The Secret Order of Scientific Photographers*, founded in Minneapolis in 1885, and issued a printed constitution. Was intended to include all professional photographers, assistants, stock dealers, and manufacturers in America. Last record, 1886. *Jackson (Mich.) Photographers' Union*, founded 1886. *Association of Operative Photographers of New York City*, had an employment bureau and held social and business meetings. Formally dissolved in 1886, after a long and useful career. Cause of dissolution: lack of interest. *Pottsville (Pa.) Photographic Association*, founded 1886. *Texas Photographers' Association*, founded 1887. Held one (or two?) conventions. No record since 1889. *Kansas State Association of Photographers.* Held a convention at Wichita (Kans.), 1888. No later record. *Southern Tier of New York Photographic Association*, founded 1888. Met at various towns. No record since 1890. *Toledo (Ohio) Photographers' Association.* Last record 1890. *Photographers' Association of Lancaster (Pa.)*, founded in 1891. Held one or two meetings. *United Retouchers' Association*, founded, St. Louis, 1892. Intended as a national union with local centres. No records.

To this list I suppose I must add that ill-fated Association which seemed to start under good auspices, but which turned out a fraud rather than a failure, and which has done much to increase the distrust with which many photographers regard all efforts at union. The Photographers and Artists' Mutual Benefit Association. It is to be regretted that such a promising association was not honestly worked, but I think it is more to be regretted that the large number of good and honest men who joined it had so little cohesion as to allow a valuable scheme to be wrecked by the treachery of one or two men.

From the British side I have no such record, partly, no doubt, because I have unfortunately been able to devote but little time to investigation, but mainly because there have not been the numerous efforts. Unions and combinations have often been suggested, but seldom formed. In fact, there are only two of any importance that I can record as failures. The first of these was—

The Photographic Manufacturers and Dealers' Association, founded in London, 1891. It arose out of an informal meeting of photographic advertisers called to take concerted action against one of the photographic magazines. It became a trade-protection society, employed a paid secretary, and opened and furnished an office in London. It made status inquiries, collected bad debts, and held meetings to settle questions of discount and prices. Through jealousy and mutual distrust it broke up within a year.

The Photographic Artists and Assistants' Union, founded in London, 1891. Was intended as a trades union on the ordinary lines, to grant sick-pay, burial-money, and out-of-work grants to its members; to keep registers of assistants, to act as an employment bureau, and to generally work in the interests of the assistants. It held preliminary meetings and drew up a constitution, but only some thirty odd applications for membership were received, so the society never floated.

From other parts of the English-speaking world I have records only of two spasmodic efforts. In 1891 the photographers of Christchurch, N.Z., formed a successful combination to stop price-cutting. And in the present year a number of the Australian photographers made common cause with other members of the public to expose and ruin the free portrait swindlers.

Efforts now Existing.

So far as I am aware, the efforts at union existing at the present time, and likely to be of use to professional photographers, are:—

1. The Photographers' Association of America, with the various State associations, which I consider as its auxiliaries.
2. The Photographers' Association of Canada.
3. The National Association of Professional Photographers.
4. The Photographic Convention of the United Kingdom.
5. The Photographers' Benevolent Association.
6. The Affiliation of Photographic Societies, in connexion with the Photographic Society of Great Britain.
7. The International Photographic Congress.

A very brief outline of the history and constitution of these societies may not be out of place.

1. *The Photographers' Association of America* (Secretary, Adam Heimberger, New Albany, Ind.) may be said to be a continuation of the National Photographic Association founded in Philadelphia in 1868, after a preliminary convention in New York in 1867. The National Photographic Association was a strong and useful association, which fought patent claims, circulated special formulæ, helped the needy, and took up such questions as apprenticeship, insurance, &c. At one time it had 1500 members; it held conventions in various cities, and did much good until 1879, when it practically expired, and in 1880 was merged in the present Photographers' Association of America. The new Association has not been conducted without great friction. Its membership at present is stated as 2936 and the average attendance at its annual conventions (1885–91) has been 588. It has grand and noble objects, few of which have been attained or attempted, mainly (apparently) owing to unsatisfactory management in the past.

Among the State Associations which I consider as its auxiliaries are:—

The Photographers' Association of Ohio, founded 1891, and absorbing the *Photographers' Association of North-Western Ohio*, founded in 1890. It has some two hundred members, and appears to be flourishing. Holds an annual convention.

Photographers' Association of Iowa, founded in 1890. Holds annual convention. Is not so successful as the above-named. Has about one hundred members.

Photographers' Association of Nebraska, founded 1890. Holds annual conventions. Not well supported.

2. *The Photographers' Association of Canada*, founded 1884. Holds annual conventions, and seems flourishing.

3. *The National Association of Professional Photographers* (Secretary, D. J. O'Neil, 47, Charlotte-street, Birmingham, England). Founded 1891, in the interests of the profession. Holds meetings about once a quarter, in the principal English cities alternately. Has some one hundred and sixty members, including most of the best British professionals, but has not done much practical work, owing to the small extent to which it has been supported.

4. *The Photographic Convention of the United Kingdom* (Hon. Secretary, F. P. Cembrano, Cambridge-gardens, Richmond-on-Thames). Founded 1886. Holds an annual convention for reading of papers and

discussion, exhibition and excursions. The "social element" has become predominant. Membership, two hundred and fifty to three hundred.

5. *The Photographers' Benevolent Association* (Hon. Secretary, H. Snowden Ward, Memorial Hall, London, E.C.). Suggested by Mr. A. H. Wall in 1864, but not founded until a meeting of assistants was called in 1873, when a Photographers' Benefit Society was established. At a later date it became purely benevolent. It does considerable good in a quiet way, derives most of its funds from manufacturers and amateurs, and dispense them entirely to professionals and assistants. Has been generally neglected by the profession. Has a fund of nearly 400*l.* in hand, and has the making of a valuable insitution.

6. *The Affiliation of Photographic Societies* (Secretary) R. Child Bayley, 50, Great Russell-street, London, W.) An affiliation started by the Photographic Society of Great Britain, and consisting of a number of amateur and mixed societies, might prove a valuable factor in a comprehensive scheme of union.

7. *The International Photographic Congress.*—Suggested by the jury of the Brussels Photographic Exhibition, 1885. Initiated in 1886, with the King of the Belgians as patron, but did not meet until 1889, when a Congress was held in connexion with the Paris Exhibition. A second Congress was held in Brussels in 1891. On both occasions large Congresses of the best-known photographers devoted several hours a day for several days to the careful discussion of various practical questions, and made recommendations as to standards, &c. Of the intrinsic value of their work there can be no doubt, but to English-speaking people it has been rendered practically useless because they have not been adequately represented, and because the Congress has no adequate means of conveying to them the results of its deliberations. These difficulties would be at once cleared away under a scheme of union that embraced federation with the Congress.

These Societies, as they stand, do not furnish the materials for

The Ideal Union.

And, in order that we may see what can be done towards attsining the ideal, it will be well for me to state what the ideal seems to be.

In each country there should be:

1. A National Association, including as sections or affiliated Societies:
   - *a.* A manufacturers' and dealers' union.
   - *b.* A strictly professional union.
   - *c.* An assistants' union, on benefit-society or trades-union lines; and
   - *d.* State, County, or District Associations, and, where possible, Town Associations, affiliated to the National Association and directly represented in its management.

And, in addition to these, there should be an International Union, with a separate section for dealing with professional questions, but also including the fullest possible representation of amateur societies and workers, for combined conference on all subjects that are of interest to amateurs and professionals alike.

This brings us back to

Present Possibilities,

And to a consideration of what ought to be attempted forthwith for the realisation of the ideal.

1. In the United States, the increase of State and other local associations, and their affiliation with the Photographers' Association of America should be encouraged as far as possible. The possibility of reviving or forming a Dealers' Association and an Assistants' Union, either independently of or within the Photographic Association of America, should be carefully considered. The formation of a benevolent or a provident fund, or both, should be taken in hand.

2. In Canada, the Photographers' Association of Canada should work on similar lines.

3. In Britain, the National Association of Professional Photographers should be immensely strengthened and every effort made to increase the number of its local branches. It should consider the possibility of forming an Assistants' branch, or of encouraging the formation of a separate Assistants' Union; and it should give what attention and assistance it can to the Benevolent Association, as to an institution which ought naturally, and is likely eventually, to be under the control of the National Association. The effort made last year to co-operate with the Convention should not be relinquished, even though it did prove a partial failure; and the advantages offered by the affiliation scheme of the Photographic Society of Great Britain should not be overlooked.

In India, Africa, Australia, New Zealand, and elsewhere attempts should be made to form professional societies similar to those above mentioned. Every such effort should be encouraged and aided as far as possible by the older associations.

Finally—

An International Union

is much needed, and, as it is always economy to use existing institutions rather than to create new ones, I would suggest that a great effort be made to have at least one delegate, and, of course, as many more as possible, from each of the national associations in attendance at the International Photographic Congress. Though that Congress at present is rather scientific than professional in its tendency, most of its subjects of discussion are of great practical importance to the professional worker. Moreover, any subject suggested by delegates or by the societies they represent would be accepted for consideration; and, if even two or three professional representatives joined, there would be no difficulty in arranging a separate professional section.

The suggestions that I make as being immediately practicable are not novel; they are not revolutionary. You will see that I almost entirely suggest procedure on present lines. The only new thing that I ask is that photographers will consider their present societies not only as ends in themselves, but also as means to a greater end. There is much to be done in perfecting the machinery before we can hope for much in the way of results, and the work must be done in the good old-fashioned way, "line upon line, precept upon precept; here a little, and there a little." That much could be done by the ideal Union no photographer doubts. But many, the immense majority, look upon the thing as Utopian. And so it is if we are to wait until the whole is in our grasp before attempting to realise it. This has been the bane of too many photographic efforts at unity. It is their bane to-day. The men who should support them, and often the men who do support them, are unable to do the things that they would, and unwilling to do the things that they can. For the great things they are powerless, and the multitude of little things that they can do they despise. But in our present unions there is so much promise that we ought to feel encouraged to trust and to work for the future. And this year, when international courtesies are being exchanged, when parties of Old-World photographers have been visiting this New World, and when this series of congresses is holding up the ideal of unity, I have felt that we could have no better or more profitable subject of discussion than "Photographers' Efforts at Union." It may be that from our deliberations some practical good may spring. I should like, if possible, to have some resolution sent from this Congress asking the various bodies that I have named to consider what is possible in the way of federation, immediate or prospective; and, even if we have no practical photographic result, I trust that our meeting may twist one small strand in the tie of fellowship that binds the nations, and help us one step nearer to

"The parliament of man,
The federation of the world."

H. Snowden Ward.

ADAMS & CO.'S TWIN LENS IDEAL CAMERA.

Since we, in May, 1891, described Adams' Ideal camera, it has been subjected to several improvements, one of which is hinted at in the heading of this article, and which is of such a nature as may be termed revolutionary.

The leading feature in regard to improvements consists in this: that, whereas the first, or original Ideal contained two finders of the usual small class so well known, as being constructed with a mirror placed at an angle by which the image was shown upon a small ground-glass plate, in the new form the image is thrown upon a white plaque, which reflects it into the eyes of the observer with a singular degree of brightness. But, in order to this, the extraneous light must be prevented, in as large a measure as possible, from falling upon this receptive white plaque, which, we may observe, occupies the same plane as does the sensitive plate in a lower compartment of the camera.

The construction is such that the Twin Lens Ideal is really a double camera, one above the other, and, so far as admission of light is concerned, the one is entirely separated from the other. Both, however, have lenses of identical focus. When operating, the photographer keeps his eyes upon the reflected image in the upper compartment, which, by the folding arrangement shown in the cut, he is enabled to do through a slot without light having access. The moment the object is seen in proper position and sharp focus, the "button is pressed," and the picture is taken.

As there is a similar folding hood on the side, it follows that the full-size picture is seen both ways, both horizontally and vertically. The front, on which the lenses are fixed, is movable in both directions, rising and cross.

The shutter is one of the class which requires no setting. It has a pneumatic release, and is marked in speeds varying from a second to the one hundredth part of a second. Of this shutter it is here enough to say that it has been specially designed for this camera, and is fitted with a patent pneumatic regulation, which permits of exposures being made with certainty and exactness. It works in the diaphragm slot, and has a direct movement across the lens.

Taken all in all, it is an instrument of which Adams & Co. may well feel proud.

Our Editorial Table.

The "Birmingham" Dry Collodion Plates.

Birmingham Dry Collodion Plate Company, Stechford, Birmingham.

We have received samples of the Birmingham Dry Collodion Plates; "yellow label" for landscapes, and "green label" for line transparency work. We find on trial that the landscape plates are of medium rapidity and with pyro-soda development are capable of yielding negatives of excellent quality, having all the characteristic features of a good collodion plate. The makers say:—

"These plates being isochromatic, should only be developed in a ruby light, ordinary canary medium alone is unsuitable.

The exposure required is about the same as that of the best gelatine plates on the market.

These plates while wet being soft and pappy like wet collodion, must not be touched or brushed during development. They may be put straight into the developer, *i.e.*, without previous wetting; the latter does not recede from the surface as in the case of gelatine, neither do any air-bells attach themselves to the film.

Enough developer should be used in a suitable dish to keep the plate always well covered with the developing solution.

All the customary reducing agents, *e.g.*, iron, pyrogallol, hydroquinone, eikonogen, can be used, but ammonia is not so good an accelerating agent as the fixed alkalies, and the latter, inasmuch as they allow less exposure to be given, are therefore to be preferred. These plates can be built up with silver and pyro, after fixing, as in the old collodion process. The temperature of the developing room and solutions should not be below 60° Fahr."

A very useful panoramic album has been made, in several sizes, by Messrs. Percy Lund & Co. It is shown, opened out, in the cut. There are slots in each corner of the leaf under which the corresponding corners of the photograph are slipped, thus dispensing with further mounting. A series of portraits or landscapes can, by its means, be instantly displayed. This is a new series, differing in some respects from one of a similar nature we noticed some time ago.

News and Notes.

Photographic Club.—September 6, *Toning Baths*. 2, Outing to Sutton.

Northern Photographic and Scientific Association.—September 2, Chingford.

Manchester Amateur Photographic Society.—September 2, Lower Peover. Leader, Mr. Davenport.

Hackney Photographic Society.—September 5, Open Night. Members are requested to bring up questions, &c. Morley Hall has been secured for the Exhibition for October 17, 18, and 19. Members' classes will be—1, Not previously medalled; 2, Lantern slides; 3, Hand-camera pictures (enlargements permitted); 4, "Excursion" class.

Gosport Photographic Society.—September 2, Bosham; leaves Portsmouth Harbour at twenty minutes past one p.m.

Tooting Camera Club.—September 21, *Stereoscopic Photography*, Mr. Dollery. October 12, Members' Exhibition of Prints. 26, *Artistic Photography*, Mr. Berger. November 9, *The Sandell Plate*, Mr. Fry. 23, *Double Printing*, Mr. Child.

East London Photographic Society's Exhibition.—This Exhibition will be held at the New Tabernacle, Old-street, E.C., on Monday and Tuesday, October 30 and 31. There are six classes, two of which are open to any amateurs. The prints sent in for competition will be judged by two Judges, who will be nominated by the Editor of the *Amateur Photographer*, after they are sent in, which must not be later than October 10, 1893. The open classes are—Class E, General Photography; and Class F, Lantern Slides. There is an entrance fee of one shilling in each case. A silver medal, bronze medal, and certificate will be awarded in each of these classes. Applications for entry forms must be accompanied with a stamped directed envelope, and sent to the Hon. Secretary, Walter R. Gould, 61, Gibraltar-walk, Bethnal Green, London, E.

"Dagonet," of the *Referee*, is so hard up for matter that he has to give his readers an account of a trip to Portsmouth. He saw the *Victory* there, and professes to be shocked at the sale of photographs on "the grand old sea cathedral." In what way the sale of "cheap photographs" "desecrates" the deck of the *Victory* Mr. Sims does not explain. People with the liver complaint say—and write—funny things. "I saw the spot where Nelson fell, and the cockpit where he died, and the guns that were used on that memorable day, and many a relic of the ever-glorious past; but, do what I would, nothing seemed *real* to me. It was a show—a Portsmouth side-show—and when we came to a table spread out with photographs, 'one shilling each,' I felt inclined to cry out to the crowd of holiday-makers behind me, 'England expects that every man this day will do his duty,' and then explain to them vaguely that I considered it an Englishman's duty to take that table of photographs by storm and cleanse the sacred battleship of England's greatest naval hero from such an iniquity. I hated these photos—loathed them. They made my blood boil. I went down, all alone, to the place where Nelson died, and I apologised to his shade for those photographs. To me they were vandalism of the vilest kind. Let us give tips to the guides; let us pay a fee; let us do anything; but, oh, my brothers, sons of Britannia, heirs of Trafalgar's deathless fame, do not let us desecrate the deck of the grand old *Victory* with a stand of cheap photographs, to be sold for the benefit of somebody or other. If we do, why not have apples, and nuts, and ginger-beer sold on board, and put up a set of put-a-penny-in-the-slot-and-the-figures-work boxes, and a try-your-weight machine, and have all the fun of the fair? If the photographs must be sold in connexion with the *Victory*, then let the naval hawkers of them pitch their stand on the hard. They will do quite as good a trade there—probably even a better one. Britons!—ye in whose veins the blood of the old Vikings flows—on board the grand old *Victory* they first show you the spot where Nelson fell, and then ask you to buy a shilling photograph! Shall this thing continue? No! Rather will I be an indignation meeting all by myself, and meet—show me a more appropriate place—in Trafalgar-square, under the shadow of the Nelson Column, and call upon the Lords of the Admiralty to surrender those photographs or perish."

RECENT PATENTS.

PATENTS COMPLETED.

Improvements in Means for use in producing a Plurality of Photographic Images on one Plate.

No. 13,241. Thomas George Hemery, 13, Hanover-street, Peckham, Surrey.—*July* 19, 1893.

This invention relates to the production of a plurality of portraits on one plate, obtained by successive exposures on the same plate without removal from the dark slide, each and every one separately exposed, as in the case with an ordinary portrait, with or without a subsequent exposure before development of the ground surrounding the portraits, the same being plain or ornamented according to will. This is effected by a screen pierced as the combination of photographs requires, and held in position within the camera on a permanent support as near as may be to the dark slide, such screen giving place to others for other combinations. Each space in the screen is covered by a disc, which, on removal, leaves a vacant space suitable for the exposure of a portion of the plate, and, on being replaced, protects it so that each space may be successively exposed. The lens must be centred on each particular space by the usual perpendicular and horizontal sliding fronts, both slides being carried beyond the margins of camera to allow the lens to travel to every corner.

When the spaces are all exposed, the negative when developed will have a series of portraits on an unexposed ground. That part may be masked in the ordinary way, and the portraits printed with no further trouble, after effects being by double printing as with an ordinary negative. The unexposed portions may be further exposed, and the after effects done on the negative before development in the following manner:—A thin card replique of the above screen, without any discs, must first be placed in the dark slide, angled to secure future correctness always in one, say, the left-hand corner of the slide, and upon it, also angled in the same corner, is placed a sensitive plate. It is exposed to gas, or diffused light, and developed. When dry it is kept for future use for any number of plates, and is the shield of that particular series. The same replique must be again angled in the same corner, and a sensitive plate, similarly angled, placed upon it. The exposures being made, the plate is lifted in the dark room, and the card replique replaced by shields, both plates being angled as before. The series of developed discs on the shield fit accurately the exposed portions of the superimposed plate, and protect the portraits from the momentary exposure to gas. Subsidiary effects can be introduced by paper negatives or positives, litho prints or devices, signatures, mottoes, birth-dates, and the like, by interposing before the exposure to gas, the position being easily determined by fitting the same on the shield by daylight. Each camera will require a special frame or holder fitted in to receive and hold the new screen. The supplementary exposure need not necessarily be made in the same dark slide; any will do, provided that the shield be angled in the left corner, and the exposed plate similarly angled on transfer from its proper dark slide.

An Improvement in the Manufacture of Sensitive Plates or Films for Photographic Purposes.

No. 12,304. Francis William Edwards, 87, Bellenden-road, Pecham Rye, S.E., and Harry Ransom, 122, Newington-butts, S.E.—*July* 22, 1893.

Our invention relates to an improvement in the manufacture of sensitive plates for photographic purposes, and its object is to give a grain, stipple, or line to the pictures printed therefrom, and also to diminish the liability to halation and solarisation (or reversal of the image), which are incidental to photographic plates prepared in the ordinary way.

By employing plates made according to our invention, it is possible to produce photographs in which the subject appears as a series of fine lines or dots, instead of the usual flat tones, thus obtaining in the one operation of printing the special character required for photo-mechanical reproductions.

Our invention consists in giving to the surface of the sensitive film, or its support, a series of fine lines or dots by any of the ordinary printing or stencilling methods, preferably by a specially prepared roller, or a perforated plate. These lines or dots, consisting of a suitable medium, will thus allow the action of the light on the sensitive parts only, and hence the resulting negative will appear as a series of fine lines or dots.

By this method of graining the negative, with a medium easily removable, in whole or in part, after development, the light and shade of the print can be modified as required.

This lining or graining of the sensitive surface will also have a tendency to break up the rays of light reflected from the surface of the support of the sensitive medium, and thus prevent halation or solarisation.

The claim is:—The preparation of sensitive photographic plates or films, with a grained, dotted, stippled, or lined surface, such lining or stippling consisting of any suitable medium applied by any mechanical or other method.

The Employment of Diamidodioxybenzol in Combination with Sulphites of the Alkalies for Developing the Latent Image in Layers containing Halogen Silver for Photographic Purposes.

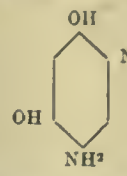
No. 22,576. Julius Hauff, Feuerbach, near Stuttgart, Germany. *July* 22, 1893.

This invention relates to the employment of diamidodioxybenzol for developing the latent image in layers containing halogen silver for photographic purposes, consisting in dissolving, in suitable proportion, in water, diamidodioxybenzol with soluble sulphites, or with soluble acid sulphites, to which latter if added the quantity of soluble bases or carbonates required for the purpose of neutralisation, so as to obtain solutions ready for developing purposes, the action of these solutions being intensified by the addition of a few drops of preferably a five per cent. solution of a carbonate of the alkalies, and enfeebled by the addition of a few drops of an acid solution, or of a few drops of a solution of bromide of potassium.

The orthoamido compounds of the phenols and cresols have not yet been utilised as developing substances for photographic purposes, nor have they been as yet included in patents referring to such purposes.

Without the use of caustic or carbonated alkalies, they are too weak bodies for reduction purposes in order to bring out the latent image, while, if such chemicals are used, they are too energetic as reducing means, and impart a black colour to the whole image.

As a result of my experiments on the preparation of such developing substances which develop the image in weak acid or neutral solution, I have discovered that, by introducing a further amido group in amidophenols which only operate in alkaline solutions, these amidophenols will be able to develop with sulphites only, and that my opinion is capable of the most extensive generalisation. The chief representative of this new group of developing substances is the already patented diamidophenol, which gave me, since the short time that it has made its appearance in the market, the most conclusive proof of its sterling properties for developing purposes. The theoretical testing of other substances under consideration led me to the thought that, by doubling the OH : NH^2 = I : 2 group in the benzol kernel, I may be able to likewise double the developing power, which is not very great, if the above-mentioned orthoamido compounds are employed for developing without carbonates of the alkalies, so that the said orthoamido compounds may be able to develop the image with sulphites only. In testing these orthoamido compounds, the substance of the following constitution presented themselves in the first place:—



that is to say, a diamidodioxybenzol, with two hydroxylamido groups existing together in the ortho arrangement. As a matter of fact, this compound is a very advantageous developing means, which, without the use of caustic or carbonated alkalies, slowly developes the latent image in from three to four minutes, with a deep coating and fine details or outlines. It develops much more slowly than the diamidophenol developing agent, a fact which may be already expected from the other grouping of the developing radicals. For many purposes, however, this is a distinct advantage over the diamidophenol developing agent to which I have given in commerce the name of amidol. Moreover, the new developing means unites the advantage of the dihydroxyl developing means, *i.e.*, a deep black colour, and covering with the advantage of the hydroxylamido developing means, that is to say, clear work, sharply outlined in all its details, and entirely free from mist or haze, without requiring the use of caustic or carbonated alkalies, which are injurious at many points of view.

Example.

In 100 parts of water I dissolve 0·5 parts of diamidodihydroxybenzol and eight parts of crystallised sulphite of soda. With this solution, several successive developments may be effected. To intensify this development, I may use a concentrated solution of a sulphite or a few drops of a five per cent. solution of potash in water, whereas, to retard the development, a few drops of an acid, or of a five per cent. solution of bromide of potassium, may be used.

To obtain greater durability for the solution, I may use, instead of a neutral sulphite, an acid sulphite of soda, only it would be necessary in such a case to add, before developing, the required quantity of a base, or of a soluble carbonate, to neutralise the double sulphite of soda.

The claim is:—The employment of diamidodioxybenzol for developing the latent image in layers containing halogen silver for photographic purposes, consisting in dissolving, in suitable proportions, in water, diamidodioxybenzol with soluble sulphites, or with soluble acid sulphites, to which latter is added the quantity of soluble bases or carbonates required for the purpose of neutralisation, so as to obtain solutions ready for developing purposes, the action of these solutions being intensified by the addition of a few drops of preferably a five per cent. solution of a carbonate of the alkalies, and enfeebled by the addition of a few drops of an acid solution, or of a few drops of a solution of bromide of potassium.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 4.....	Dundee Amateur.....	Asso. Studio, Nethergate, Dundee.
,, 4.....	Peterborough	Museum, Minster Precincts.
,, 4.....	Putney.....	High-street, Putney.
,, 4.....	Richmond	Greyhound Hotel, Richmond.
,, 4.....	South London	Hanover Hall, Hanover-park, S.E.
,, 4.....	Stereoscopic Club	Brooklands Hotel, Brooklands.
,, 5.....	Birmingham Photo. Society ...	Club Room, Colonnade Hotel.
,, 5.....	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 5.....	Exeter.....	City Chambers, Gandy-st., Exeter.
,, 5.....	Hackney.....	206, Mare-street, Hackney.
,, 5.....	Herefordshire	Mansion House, Hereford.
,, 5.....	Lewes (Annual)	Fitzroy Library, High-st., Lewes.
,, 5.....	North London	Canonbury Tower, Islington, N.
,, 5.....	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 5.....	Paisley	9, Gauze-street, Paisley.
,, 5.....	Rotherham.....	5, Frederick-street, Rotherham.
,, 5.....	Sheffield Photo. Society.....	Masonic Hall, Surrey-street.
,, 5	York.....	Victoria Hall, Goodramgate, York.
,, 6.....	Leytonstone	The Assembly Rooms, High-road.
,, 6.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 6.....	Southport	The Studio, 15, Cambridge-arcade.
,, 6.....	Southsea..	3, King's-road, Southsea.
,, 6.....	Wallasey.....	Egremont Institute, Egremont.
,, 7.....	Birmingham Photo. Society ...	Club Room, Colonnade Hotel.
,, 7.....	Glossop Dale.....	
,, 7.....	Hull.....	71, Prospect-street, Hull.
,, 7.....	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 7.....	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 7.....	Oldham	The Lyceum, Union-street, Oldham.
,, 7.....	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
,, 8.....	Bristol and West of England ...	Rooms, 28, Berkeley-sq., Bristol.
,, 8.....	Cardiff.....	
,, 8.....	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 8.....	Halifax Camera Club.....	
,, 8.....	Holborn	
,, 8.....	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 8.....	Maidstone	"The Palace," Maidstone.
,, 8.....	West London.....	Chiswick School of Art, Chiswick.
,, 9.....	Hull.....	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 24.—Mr. E. H. Baystoo in the chair.

The Hon. Secretary passed round an album containing views of the Tower of London, which he had recently taken as a guide, to the members visiting there on the following Saturday.

METOL AND GLYCIN.

The subject of the evening, "Demonstration by Mr. Morgan (Messrs. Fuerst Bros.) of Development by Metol and Glycin," then commenced.

Mr. MORGAN said that as glycin was slow and peculiar in its action, and therefore not a fit subject for demonstration in public, he would proceed at once with metol, which he said was a suitable developer for bromide prints, negatives, and lantern slides. The mixed developer did not stain the fingers, although the dry powder would do so. The solutions used and recommended were as under :—

SOLUTION A.

Water	100 parts.
Metol	1 part.
Soda aulphite	10 parts.

SOLUTION B.

Water	100 parts.
Carbonate potash (or substitute)	10 ,,
Crystallised carbonate soda	20 ,,

3 parts A to 1 of B, with 40 minims of bromide of potassium solution (1 : 10) Metol had a great advantage over other developers, inasmuch as it would keep indefinitely, even as a one-solution developer mixed with free alkali. The exposure was stated to be only one-half of that for pyro. With a normal exposure, the image comes up quickly ; but the operator must not be frightened, but allow it to go on until density has been obtained ; the shadows will always remain clear. Two negatives were passed round, one developed with pyro and one with metol, also prints therefrom.

Mr. Morgan then successfully developed a portrait negative exposed that afternoon at thirty minutes past three (half a second with *f*-11), also a bromide print and lantern slide, the latter being developed with the same solution as the bromide.

Answering a question, Mr. MORGAN said he always used half a grain per ounce of soluble bromide.

Mr. W. E. DEBENHAM said it was a pity that the two negatives shown were not the same density, so that no strict comparison was possible. The same claim of lessening the exposure had been made for all the new developers, and if in this case it could be substantiated, then metol would be the best developer we had.

Mr. EVERITT said that, of the two negatives one was yellow and the other blue ; also, that by printing on gelatino-chloride paper the thinner one was favoured. Platinum would have been better for the pyro print.

The CHAIRMAN remarked that by not giving the same exposure the advantage in this direction was not proved.

Mr. EVERITT suggested test-exposures as between pyro and metol—that is, stepped exposures to a standard light.

Mr. DEBENHAM suggested the reproduction of a negative by a standard light in order to corroborate the other experiments.

Mr. MORGAN said that the pyro negative passed round was exposed and developed in normal time with a normal developer. The metol one was exposed simply one-half the time, and resulted in better gradation and longer scale.

Mr. FRY said that he could not agree with Mr. Morgan on the question of exposure. He liked colour in a negative, and not a blue one. If a pyro negative was under-timed, then a hard result was obtained ; but, with metol and amidol, the negative was thin, and might give a passable print. He thought that a false conclusion had been arrived at.

Mr. DRAGE saw a great advantage in the cleanliness of metol. It could be used four or five times.

Mr. MORGAN had developed eight half-plates in the same two ounces of solution, when the last was the same as the first.

The CHAIRMAN in proposing a vote of thanks to the demonstrator said he liked metol, as it was clean and useful, except for negative work.

This was carried by acclamation, and Mr. Morgan briefly responded.

In answer to a question by Mr. Haddon respecting "Pepperine," introduced some years ago, Mr. BOLAS said particulars would be found in THE BRITISH JOURNAL OF PHOTOGRAPHY, about 1886. He believed it was an alcoholic tincture of pepper.

Hackney Photographic Society.—August 22, Mr. Beckett in the chair.—Mr. Roder showed a print he had toned using carbonate of soda, but it was not clear. Mr. T. H. Smith showed some work done on Nikko paper, with which he was much pleased. Mr. Roofe had used metol, and obtained plenty of density, Mr. NUNN complaining of lack of colour in amidol. Mr. MILLER, of the South London Society, then gave an interesting account of photographic mirrors, finally concluding with a demonstration of how to do it. For reversing work, mirrors are very useful, and for zinc an absolute necessity. Mirror making was best done in the daylight. The glass must be chemically clean, and ought to be optically worked. The bath must be under 60°, and distilled water must be used. The solutions used were ten per cent. solution of white loaf-sugar in distilled water, and to it one-tenth part ordinary alcohol and one-half per cent. nitric acid. Take three ounces of solution, and add four ounces of distilled water, and to this, in turn, seven drachms of reducing solution, made up of ten per cent. of nitrate of silver. Add drop by drop to bath mentioned until precipitate is formed, which redissolve by gradually adding ammonia. Then add three-quarter ounce of ten per cent. freshly made solution of caustic potash. Then add more ammonia as before, and, when cleared, it is ready for use. In twenty minutes glass will be coated, which must be first washed in acid, followed by distilled water, and dried in blotting-paper.

East London Photographic Society.—General Meeting, Mr. Uffendall in the chair.—Mr. BENNETT read a paper *Upon the Desirability of Adapting the Printing Process to the Subject and Quality of the Negative.* The lecturer illustrated his remarks with some prints, showing that what would make a good picture upon one kind of paper, upon another would be an utter failure. He remarked upon the disappearance from the walls of the exhibitions of pictures printed upon the albumenised paper, and said that the impurities and unstapleness of the paper was the reason. He congratulated the present generation of photographers upon the advantage they have over those of the past, inasmuch that, whilst the older generations only had the one process, the present had an almost unlimited choice. He further said that the aim of all should be to portray, as accurately as possible in the finished print, the natural tone of the subject which forms the negative, for, by so striving to this end, we are distinctly upon the threshold of colour photography. In conclusion, he said that the following maxims should not be forgotten :—"Never print from a weak negative upon a paper which is adapted more particularly to one of greater contrasts ;" "Let your print be finished off in such a way as to harmonise with the subject ;" and, lastly, keeping this well in mind, "that colour, like distance, lends enchantment to the view," and only by a careful study of the several points can we attain to anything approaching perfection, and justify our claim (though by many it is disputed) that photography is an art.

Croydon Camera Club.—A whole day devoted to practical photography in the field was spent by a party of the members under the guidance of the President (Mr. H. Maclean, F.G.S.) on August 23, the locality chosen being on the borders of Ashdown Forest. In the course of the day the ruins of Brambletye were visited ; the Medway, which is here little more than a runnel, nevertheless afforded subject matter for several views. The village of Forest Row, containing a number of old timbered, and also some stone-roofed cottages, received due attention. In the after part of the day Mr. Maclean gave a practical demonstration in composition, the subject being *The Wood-workers.* Later, Wych Cross was reached, and members being by this time somewhat satiated with the scenic attractions, a pleasant tramp back through the forest glades and over the golf links to the Brambletye Arms was made.

Birmingham Photographic Society.—August 22, the President (Sir J. B. Stone) in the chair.—The PRESIDENT distributed to the successful competitors the prizes and certificates gained at the last annual exhibition. In the course of a few well-chosen remarks, he said that personally he deprecated the giving of any prizes, from the point of view that it was almost impossible for judges, however skilled, to decide which were the absolutely best pictures, some being superior in technique, some in artistic feeling. Let photography be a useful record, not a mere striving after prizes. The President congratulated the members on the second Warwickshire Survey Exhibition, now being held in the Corporation Art Gallery, and bade them continue with this useful movement.

FORTHCOMING EXHIBITIONS.

1893.	
September 5.....	*Royal Cornwall Polytechnic Society, Falmouth. W. Brooks, Laurel Villa, Wray-park, Reigate.
,, 20–21	*Hove Camera Club. Hon. Secretary, H. Emery, 142, Church-road, Hove, Brighton.
,, 25–Nov. 15...	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1–31	*Hamburg. Das Ausstelluogs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 9–Nov. ...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
November 7–11	*South London Photographic Society. Hon. Secretary C. H. Oakden, 53, Melbourne-grove, Dulwich, S.E.
,, 20–25.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.

* Signifies that there are open classes.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

COLOUR PRINTING IN HALF TONES.

To the Editor.

SIR,—In your "American Notes and News," p. 543, you state that Kurtz, of New York, has "patented a process of printing half-tones in colours by carrying out the idea of the three primary colours, and using blocks in which the grain runs in lines of different directions." If this is a fact, Mr. Kurtz is making a bold attempt to appropriate a method which I devised and carried out successfully twelve years ago. Nobody seemed to be able to realise the significance of such a result by such a method at that time; but when I exhibited the same reproduction at the Novelties Exhibition in Philadelphia in 1885 it received some notices in the local newspapers, and I remember that one of these notices was reproduced in one or more of the photographic journals.

The specimen referred to—a reproduction of a chromolithograph, accompanied by printed descriptive matter—occupied a conspicuous position by the side of exhibits of my patent half-tone block process and chlorophyl process of orthochromatic photography. Mr. Kurtz had an exhibit of portrait work in the same section, a few feet away, and I have no doubt that he saw and studied this reproduction by a method which he now claims as new and original.

Mr. Kurtz's recent specimens are more remarkable than the one I made in 1881, chiefly because he selected more striking subjects, made larger plates, and printed on enamelled paper, which does not deprive the coloured inks of their gloss and transparency like the soft plate paper universally used for fine printing in 1881.

If this process had been really capable of successful commercial operation on a large scale, the firm with which I was connected would have gone into it ten years ago; but while it is possible to produce wonderfully effective specimen prints, the quality of the work becomes so uneven and generally bad under the present conditions of commercial printing, that it does not give satisfaction even when the printing plates are perfect. A striking proof of this is found in the result of the Kurtz Company's first attempt to illustrate a periodical with reproductions of colour sketches supplied by the publishers for the purpose. In the "Outing" number of *The Christian Union* (New York), June 10, p. 1143, some of Mr. F. Hopkinson Smith's beautiful colour sketches of the scenery of the Bronx River are "reproduced," in a manner that must have surprised the artist, to say the least. I would advise anybody who contemplates undertaking this kind of work to see these results before doing so, and I would also like to know the Editor's opinion of them.—I am, yours, &c., F. E. Ives.

116, *Charing Cross-road, London, W.C., August* 28, 1893.

[The example of the Kurtz Company's process of Coloritype sent by Mr. Ives is not only sufficiently poor to deter any one from undertaking it commercially, but cannot possibly have done justice to the originals. The colours and tones are, to say the least of it, crude and false: for example, green foliage on a river bank being expressed in red where reflected in water, though this may be due to bad printing. Mr. Ives' specimen made twelve years ago is of its kind infinitely better than the more modern example.—Ed.]

PLATINOTYPE TONES ON GELATINE PAPERS.

To the Editor.

Sir,—Some of your readers may be interested in a simple process of obtaining platinotype tones on gelatine papers by means of the ordinary combined bath, as used for Eastman's Solio paper.

I had toned some prints in this bath and put them to wash, when the idea struck me to try an experiment. To the combined bath (eight ounces) I added about thirty to sixty minims of hydrochloric acid, when the mixture became quite milky in appearance. I then put the toned prints into it, with the result that they changed to a platinotype tone, resembling an engraving.

I did not expect this result. Whether the prints so treated would be as permanent as otherwise I cannot say, but for those who like that particular black-and-white tone it may be useful, and gives little trouble.

Perhaps some of your readers who are better up in chemistry than myself could oblige us with the theoretical reasons for this result.

I was not successful in toning untoned prints in this mixture.—I am, yours, &c., W. J. Farmer.

68, *Blackburn-street, Blackburn, August* 24, 1893.

PHOTO-MICROGRAPHY.

To the Editor.

Sir,—Mr. J. Woodworth wants an explanation as to "how an isochromatic plate can correct the difference between the actinic and the visual foci," and, in answer, I beg to say that, at the discussion which took place at the Quekett Club, when I brought forward this subject for the first time, Mr. Haughton Gill said "there was no doubt," I had "obtained a sharp image in the focus of the visual rays, but the reason of this was that these plates (isochromatic) were sensitive to the rays which were active in producing the visual focus, and, therefore, it was not necessary to work with a focus nearer the violet end of the spectrum. The plate did not cause the two foci to become coincident, but only enabled a picture to be taken by the visual rays." Our President (Mr. E. M. Nelson) confirmed that view by saying that "Mr. Gill had no doubt perfectly explained their action, which could not be due to their bringing the chemical and the visual foci together, but was due to the image-forming rays being the active rays where these plates were employed." Similar views were expressed when I brought this subject before the Royal Microscopical Society in answer to Dr. Piffard's communication; and, seeing there was no exception taken to my conclusions at the time of introducing it, and that they have not been traversed by any microscopist since, I am certainly surprised to find that Mr. Andrew Pringle, in his communication to the Photographic Society of Great Britain, treats the question of an ordinary achromatic objective working true to focus as if the results were the joint product of the orthochromatic plates and the yellow screen.

Now, I am certain that the yellow screen has no effect on focus whatever, and the results are due solely to the isochromatic, or, in other words, the orthochromatic, plates—an experiment any one of your readers may try for himself if he possesses a microscope and camera.

Set up in the usual way by placing an image in sharp focus on the focussing screen of the camera, and then place a screen of yellow glass between the light and the object; when, on examining the image again, he will find that it remains as sharp as before. Should he wish to carry the experiment still further by photographing the object, let him take the yellow screen away, and, using an orthochromatic plate, he will find the negative image on the plate comes out on the same plane as the positive image on the focussing screen. This image may not be a good image photographically; it will vary with the correction of the objective, the quality of the lens, and the skill of the operator, but it will always be in the right plane. Now repeat the process with an ordinary photographic plate, and the chances are ten to one that the image on the negatives will be on quite a different plane. I have reserved the one chance because there is one particular correction of an ordinary achromatic lens which will work true to focus on any plate, provided it is confined to low powers on the one hand, and oil immersions on the other.

I am supposing, for the purpose of these experiments, that the lighting is done with the ordinary paraffin lamp, it being possible that with other modes of illumination the results might be somewhat different, although I should not expect them to be so.

The necessity for orthochromatic plates alone is what I have been emphatically asserting in contradiction to Dr. Piffard and others, and I presume all we want is the truth, whatever it be. If I am wrong in my conclusions it is a subject important enough to be worth confuting; but if I am right some acknowledgment is, I think, due to me for having simplified a process which threatened to become a very intricate one indeed, owing to the elaborate precautions to be taken by procuring specially corrected lenses, and placing various coloured screens and ray-filters between the source of light and the object.

Now, I do not deny the value of coloured screens, but, when required at all, they will be equally wanted when even apochromatic lenses are used.

I enclose four prints of part of the proboscis of a blowfly, two taken on orthochromatic plates without yellow screen, and two on Ilford ordinary. They were taken under the same circumstances with regard to lighting and focus, and in each case the image on the former plate comes out sharp, while the latter is fluffy.—I am, yours, &c., T. F. Smith.

185, *Brecknock-road, N.W.*

To the Editor.

Sir,—That microscope objectives not specially corrected for photography must work to focus if used with colour-sensitive plates and yellow screen is such a self-evident fact that I am surprised to see it referred to as a "discovery," and discussed at length in the photographic and microscopical journals. Nor is the observation a new one. I especially emphasised the fact in a verbal communication to the Photographic Society of Philadelphia in April, 1890, when I presented the Society with a series of photo-micrographs made under those conditions. A few months after, in a communication to J. W. Queen & Co.'s *Microscopical Bulletin*, in reply to an inquiry from the Editor, I recommended Mr. Pringle's book on *Practical Photo-micrography*, but disputed Mr. Pringle's assertion that high-class work could only be done with apochromatic or specially corrected objectives, and repeated my assertion that any objective that gave a satisfactory image to the eye would give an equally satisfactory photograph under those conditions. All of my photographs were made with comparatively cheap objectives selected from stock, yet were certainly equal to those made by Mr. Pringle with the costly apochromatics.—I am, yours, &c., F. E. Ives.

116, *Charing Cross-road, London, W.C., August* 28, 1893.

THE PHOTOGRAPHIC CONGRESS.

To the Editor.

Sir,—I shall be glad if you will allow me to reply publicly to the inquiries that are being made concerning the Congress of the Photographic Society and affiliated Societies.

It is finally arranged that this Congress shall be held on October 10, 11, and 12.

In a few days all the arrangements will be completed, and a full programme will be circulated as soon as possible after that.

We shall be happy to send a copy of this programme to any one who, not being a member of this Society or of one of the affiliated Societies, sends a post-card request for it to 50, Great Russell-street, Bloomsbury, W.C.—I am, yours, &c., Chapman Jones,

Hon. Secretary Photographic Society of Great Britain.

Photographic Society of Great Britain, 50, Great Russell-street, Bloomsbury, London, W.C., August 26, 1893.

Exchange Column.

**** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Backgrounds, one exterior, in flatted oils, 7 ft. 6 in. by 7 ft. 6 in.; one interior, distemper, 7 ft. 6 in. by 7 ft. 6 in.; and one floorground, distemper, 9 ft. by 7 ft. 6 in.; will exchange for quarter-plate camera, lens, &c., or offer.—Address, A. Miny, 13, Taunton-place, St. John's Wood, N.W.

Answers to Correspondents.

**** *All matters intended for the text portion of this* Journal, *including queries and Exchanges, must be addressed to* "The Editor, The British Journal of Photography," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

**** *Correspondents are informed that we cannot undertake to answer communications through the post.*

**** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* Henry Greenwood & Co., 2 *York-street, Covent Garden, London.*

**** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from 4 to 6, or Thursdays from 9 to 12 noon, when some one of the Editorial staff will be present.*

Experiment; Spotty; G. H. J.; F. E. G.; and others.—In our next.

Cymro.—We would select that lens by which the ground before and behind the sitter is equally good.

W. Hobbs.—The "No. 4B" of the same maker has the same rapidity as the 3B, and will cover the size plate you require.

W. Hillgear.—The yellowing of the whites indicates sulphur toning. Better change the constituents of the toning bath, and keep up its strength.

Doubtful.—"Permanency" is a vague and indefinite term. Hence, as the length of the engagement was not specified, we fear you have no remedy.

J. G. Henderson (Lewisham).—Norton's cloud shutter is made and sold by Messrs. Brooks & Norton, of 728, Nicollet-avenue, Minneapolis, Minn., U.S.A.

Reproduction.—Any letterpress printer will do the work if you supply him with a process block. Waterlow & Sons, and other firms, will make the blocks for you.

Alf. Lloyd.—For sitters with auburn hair and much freckled, there would be an advantage gained by treating the plates with erythrosine, according to the method mentioned.

J. Astley.—It is evident that the stops have not been made for that lens. You will have to scratch or engrave the true values on them yourself. You quite correctly appreciate the system on which to do so.

R. Stanley.—The spots or pits on the collotype plates can only be avoided by changing the gelatine for another kind that does not pit. The defects complained of arise from the same cause as pits in gelatine dry plates.

S. S.—It by no means follows that because a piece of apparatus is patented the patent itself is valid. If a large proportion of the patents that are sealed annually were contested, they would certainly be proved invalid.

London, W.C., wants some pure zinc plates for etching. Pure zinc, in the form required, is not an article of commerce. It may be had from operative chemists, but then it is in grains or rough lumps. The best zinc plates, as supplied by the dealers in printers' material, are quite pure enough for general photo-etching.

G. Botts.—The advantage of a 15 × 12 lens, when used for 12 × 10 negatives, is that it will cover the plate better when used with a large aperture. On the other hand, it will not, on that size plate, include so wide an angle. But, for groups out of doors, where there is generally plenty of space, the larger lens will be the best to have.

P. C. Hansen says: "I shall feel very much obliged if you can tell me if there is any book published giving the particulars of Fox Talbot's method of working the calotype, and where I could get the book."—All the old manuals on photography give full details of the process. An abstract of it was given in our volume for last year. Hunt's *Photography* gives it very fully.

G. F. J.—Use ordinary water colours; nothing more is required. If you have not yet attempted to colour photographs, you will find it advantageous to get some lessons from a skilful colourist. This correspondent also asks "as to the likeliest of our colonies or possessions where there would be scope for a professional photographer?"—Perhaps some one can supply the desired information.

H. Spence.—Parcels of negatives sent through the post can be insured; but compensation will not be paid in case of injury if the parcel was obviously insecurely packed. We frequently receive negatives, or rather fragments of them, simply placed between two pieces of cardboard. In such cases as this the Post Office authorities could not be expected to recoup the senders for their loss.

S. Tallon.—1. We know of no work in English devoted exclusively to orthochromatic photography. See our own back volumes, and the last edition of Abney's *Instructions*. 2. We do not think there would be any advantage in copying the photograph through blue glass.

A. X. B.—Certainly not. The fact that by waylaying Her Majesty with your camera you secured a couple of good negatives of her as she passed, in no way entitles you to style yourself "Photographer to the Queen" and put up the royal arms over your shop. By using the royal arms, and calling yourself "Photographer by Appointment to Her Majesty," without being entitled to do so, you would incur a heavy penalty.

T. Moore.—To obtain the very best reproductions of fine line engravings—that is, those most closely resembling the originals—we should take the negatives by the wet-collodion process, and print them by the carbon process in a black tisure, or by the platinotype process. If our correspondent is not *au fait* with working collodion, the next best thing to do will be to use dry plates, such as are specially made for negatives for photo-mechanical processes.

Experimentalist.—An Albion press will answer quite well for collotype work, but there is a certain degree of risk, in buying a second-hand one, that the bed may not be perfectly true. If that were the case, the glass plates would be continually breaking. However, it is an easy matter to test the press before purchasing by placing a glass plate upon it of the full size and bringing the platten down upon it with a heavy pressure and seeing the result.

Subscriber.—The strength of the solutions is of no great importance; the stronger they are the quicker they act. The prints are first treated with the lime solution, and then with the acid, till the stains are removed. As you say, the engravings are very fine; we should advise you to place the work in the hands of a professional print restorer. Many valuable engravings have been irretrievably ruined by novices' attempts to clean them. Print-cleaning requires considerable experience.

B. B.—1. The photographs of lightning sent are of a not uncommon kind. 2. The most expensive item for working the collotype process would be the press. One suitable for the purpose might be obtained cheaply second-hand, in which case it would be decidedly worth your while to undertake the work yourself. See back volumes for information on the working of the process. 3. Take the equivalent by weight. 4. Two shillings each for mounted whole-plates is a good price as things go just now.

Alfred H. Saunders writes:—"A customer of mine has sent me some pictures that he has copied from a book which is copyright to be coloured, and he wants to know how he stands under the Act. Is he liable in any way to prosecution if he exhibits these slides in public? He does not accept payment for his services, neither is there any charge for admission."—In reply: If such copies are exhibited in public, he certainly runs the risk of being prosecuted for piracy. Write to the publisher of the book and obtain his permission for exhibiting them, and then all will be right.

Retoucher writes: "Can you give me any information respecting the following? I have been much worried recently through being unable to get any work on our negatives, owing to a greasiness apparently, of the surface of the film, or something which, when the medium is applied, causes it to lose its abrasive quality, and to form a slippery surface, which the pencil will not touch. We work on the film with the Autotype medium and varnish after, as we cannot get sufficient work on the varnish alone. I have been retouching for some years, and have never met with this difficulty before. Our negatives are developed with pyro and ammonia in the ordinary manner, and I can discover no cause for this strange defect. Any information *re* the above will be thankfully received."—We have never met with a difficulty of this kind ourselves, and do not see how it can arise, seeing that a medium is applied to the gelatine surface. Perhaps some reader can assist our correspondent.

Puzzled writes: "1. I have been keeping old hypo baths, the washing water from printing-out paper, and the old toning baths for same (sulpho and gold), and now, when I have filled the receptacles for same, cannot precipitate the silver and gold from them. Will you kindly say what is the best and simplest method to do this, and about how much of the precipitants it takes to the gallon of liquid treated, as the methods in all articles I have seen give no quantities whatever as a guide? 2. Also please to say whether, if any hypo got into the washings from prints, it would make it useless? And, 3, whether a zinc tank is suitable for a hypo bath, as the one I have been using lately seems to have been eaten away to some extent by the soda? Your kind replies will greatly oblige,"—1 and 2. As the residues are mixed together, the best thing to use is the sulphide of potassium. The amount necessary depends upon the quantity of silver in the solutions. The sulphide should be added until it ceases to precipitate more sulpbide of silver. 3. Zinc is quite unsuitable for containing solutions of hyposulphite of soda.

CONTENTS.

THE BRITISH
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SOME PECULIARITIES OF PERSPECTIVE.

Pending a full disquisition on the subject of perspective promised by one of our contributors, a remarkable paper, recently published in *Nature* over the signature of Arthur L. Haddon, affords an opportunity for a reference to a topic always interesting to photographers. Much has been said by the skilful and the unskilful about "distortion" by wide-angle lenses, which is both misleading and illusory. One of the most important studies undertaken by all students of art, who go through a curriculum—such, for example, as that of South Kensington—to fit them for teachers, or for independent art work, is that of linear perspective by the aid of rule and compass. Further training is given by practice in drawing from solid objects without instrumental aid. The outlines of the objects so drawn must conform to those which would be obtained if the same objects were represented in the first-named manner; hence, the actual rules for one are identical with those for the other. It is not difficult to explain the underlying principle, and it may be said that there is no disagreement whatever ut the correctness of these rules among experts. Some treatises on linear perspective go to the length of showing mathematically the basis of these rules.

A sheet of glass is supposed to be placed before the draughtsman, and he is supposed to use one eye only; further, it is supposed to be rigidly fixed in one spot. Objects of certain given dimensions, at a given distance from the sheet of glass (called the picture plane), and placed at a specified angle to that plane, are to be depicted in outline on paper in such a way that, if transferred to the sheet of glass, they would actually exactly cover the same outlines of the original object. Clearly, if they do so cover the outlines, the drawing is a correct linear representation of those objects as they are apprehended by the eye. Now, we may at once say that the rules of perspective, accurately carried out, will enable such truthfulness of representation to be achieved, and from this it is right to assert that the rules must be correct.

There are some who have argued that, because the eye is not a perfect optical instrument, judged from the narrow standpoint of strict optics, the picture so drawn must be incorrect, through the distortion it will undergo in the eye. The simple reply to such argument is, that the original object is seen by the same eye, and hence its outlines will be distorted in an exactly similar manner. Let any one place, for example, a thin, straight walking-stick some little distance on the other side of a window pane; he will be able to entirely hide it by placing on the window glass a narrow slip of paper of exactly the same proportions, and so with a drawing.

There are, however, two important limitations about this picture transferred to the sheet of glass.

First, it will only cover the outlines of the object when the glass and object are at one fixed distance from the eye, so that at all other distances it is not a correct representation. The same rule holds good with a photograph. It also will only coincide with the outlines of the object when it is held at one fixed distance from the eye.

Secondly, a draughtsman or painter never paints, for pictorial purposes, a view which embraces an angle of over sixty degrees; rarely does he include that extent. If, however, for a particular purpose he desired to include a larger angle, he would employ exactly the same rules of perspective; and then, with the sheet of glass at a fixed place as before, his drawing would coincide with nature, and would be identical in linear perspective with the outlines given in a photograph taken by a suitable wide-angle lens. Therefore, such photograph must also be correct, subject to the same limitations as to distance, as the sheet of glass. So-called "distortion" would be given equally by lens and pencil if the right distances were not made use of. The bad name given, then, to subjects of wide angle taken by the camera is simply owing to the fact that, besides being improperly viewed, such pictures are common in photography, and very rare in paintings or drawings.

There is, however, a further school of disputants, who argue that the received ideas we have attempted to set down as clearly as possible, do not represent all the truth, and that, in certain positions, objects produce effects other than those usually believed in. These theorists do not fairly meet the sheet-of-glass theory, they go round it. one proof given by them being the fact that skilful artists do not adhere to the rules of perspective. These arguments will find singular corroboration in this paper of Mr. Haddon's that we referred to. The original article will be found in *Nature*, p. 402, and a further communication on p. 416 of the current number. The article is entitled, "Compulsory Laws of Error in Drawing," and, of course, some of the disputants we refer to would say that these so-called errors must virtually be truth. The article referring to "phenomena connected with the art in drawing, or depicting form in outline," . . . . "is to prove that error made in such drawing comes under the dominion of natural law, or compulsion, and is not the result of individual misconception of truth. . . . the intelligent and the dull being equally liable to commit the errors in forms." He divides these errors into three kinds:—

(1.) "A general law making us fundamentally incapable of drawing in perspective . . . . perceivable in the form of direct *divergence* of lines parallel in nature, which in perspective should *converge*."

(2.) "Another general law is a natural incapacity to erect a proper perpendicular for an object, unless the same occurs close on the line of direct sight (forward). The deflection occurs in the nature of an inclining of the top of the line towards the central line of sight."

(3.) "The next general law is less distinct, but still abundantly provable on test. A certain line is not drawn with perspective inclination to the *vanishing point* n front of the observer, but *is drawn on a perpendicular*, or, as s evident, in such a manner as would be the true fact of its direction, void of the influence of perspective."

A large number of instances of geometrical figures, and how the errors tend with them in drawing, are given, and finally, Mr. Haddon states, "I have traced them (the errors) clearly in the draughtsmanship of Orientals, and even in the drawing of the greatest painters." We strongly advise all of our readers who take an interest in scientific perspective to read the articles referred to. They give much food for thought, and an exact appreciation of their bearing may enable the reader to see the extent to which they might be made to prop up false theories as to the proper delineation of objects by photographic lenses.

ECONOMY IN WORKING.

Although the possibilities in the way of saving are far less at the present than they were in the days of wet collodion and albumen paper, there is no doubt that a very great deal of unnecessary waste occurs, more especially on the part of amateurs, although professionals cannot be held altogether blameless. Time was when every amateur had his little arrangements for the recovery of the silver from his print cuttings, as well as his spent fixing and toning baths; while the workers of wet collodion carefully collected the developing and intensifying solutions after use for the sake of the unreduced silver they contained. In large establishments the saving thus effected formed a very important item in the year's business, and even on a small or amateur scale we have, in former days, seen handsome "ingots" of silver resulting from the residues of a season's printing.

In those days, however, it must be remembered that the negative plate, when it came from the silver bath, however carefully and closely drained, was rich in the precious metal in the form of soluble nitrate clinging to its surfaces, and, while much of this mingled with the developer, and took part in the formation of the image, yet the greater portion, in most cases, was recoverable with proper precautions. In our modern developing operations there is, of course, no free silver recoverable, and the solutions, except in so far as they may be used again, are not worth saving.

Turning to printing again, in the old days there was the printing bath, a tolerably concentrated solution of silver nitrate, to be dealt with; and those who have had experience in sensitising paper will be aware how the valuable metal can be wasted in the form of drippings, splashings, and drainings, quite independently of that which can be saved from the prints themselves. The actual quantity of silver involved in the formation of the positive image is but an infinitesimal proportion of that used in sensitising, and it has been estimated that seventy or eighty per cent. was recoverable, with proper care, from the dippings, washings, and fixing of prints. Now, however, both in the case of ready-sensitised albumen and gelatine chloride "print-out" papers the quantity of free silver present —that is to say, silver in the soluble form and recoverable from the washing water—is very much less than formerly, so that it is to the cuttings and fixing baths that we must look more particularly for our residues.

Here again, however, we find a difference between the practice of to-day and former times. The system of using cut sizes of printing paper, which has grown so much in popularity during the last few years, is in itself an important economy, since it avoids the necessity for trimming the prints, and thus does away practically with that form of "residue." Thus, in the old days it was customary to cut up a sheet of paper into thirty-two *cartes-de-visite*, although, as was well known, as many as forty could be cut out of the sheet with a little management. Here, then, was at once a practical waste of twenty per cent. in the shape of trimmings.

One other important fact must also be borne in mind in comparing the possible savings of to-day with those of the past, namely, that, both in the case of plates and paper, the greater portion of the waste is incurred by the manufacturer, upon whom falls the chief onus of exercising economy. Our sensitive films, both negative and positive, now come into our hands ready for immediate use and at a minimum cost, since we are not asked to pay for the waste occurring in the process of preparation. Obviously, then, it is not possible to expect as great a return from residues as in the days when the whole process of preparation was performed by the photographer himself.

There are, however, one or two directions in which the users of sensitive photographic films, but especially amateurs, never think of looking with a view of economy. We refer more especially to the treatment of spoilt negatives, not, be it understood, with the intention of using the plates again, but merely as regards the extraction of the silver contained. In the case of a fairly successful amateur, perhaps, the proportion of spoilt negatives would scarcely be great enough to justify any special system for their treatment; but we know from our own experience that waste plates rapidly accumulate as the result of experiments of one kind or another, and that, in the course of time, these give a very good return for the trouble of recovering the metal they contain. The same rule must hold good in large professional establishments, especially where the negatives are only preserved for a stated time.

Most operators, when a plate is seen to be spoilt, at any rate go to the trouble of fixing it, if for no other purpose than to extract the silver from the portions unreduced by the developer. If they do not, they certainly ought to, for the trouble is little, and the fixing bath offers perhaps the easiest method for extracting the haloids and presenting them in an available form for reconversion. But the developed image which is not touched by the hypo still contains a considerable portion of silver; not as much, it is true, as that removed in the unreduced form, but still sufficient to make it well worth systematic collection, the only question being the most convenient way of proceeding.

As we have just said, the fixing bath is the simplest means of presenting the residues in an available form for subsequent treatment, and all that is wanted in order to bring the developed image within its range is to reconvert it into one or other of the haloids, preferably chloride, on account of its ready solubility. The best way of effecting this is with a solution of bichromate of potash, acidified with hydrochloric acid, the strength being quite immaterial, since, after the silver is converted, no harm can be done. The image being bleached with

this solution, the plate is rinsed and passed into the hypo bath, which then dissolves out all the silver. The bichromate solution is to be preferred to any of the metallic bleaching agents, such as cupric chloride, as it leaves the silver free from other metallic contamination.

When the bath is fully charged with silver, it may be precipitated by means of one of the alkaline sulphides, such as potassium sulphide or "liver of sulphur," and, after washing by decantation, the sulphide of silver may be collected and dried ready to be sent to the refiner. In order to convert it to the metallic state for subsequent transformation into nitrate, it will, of course, require to be fused in the furnace with a suitable flux; but, as we imagine few amateurs of the present day will go to the trouble of converting their own residues, we intend to say nothing on that process.

Another method of precipitating the silver, and which reduces it in the metallic state, is by means of metallic copper, iron, or zinc; but this has the disadvantage of contaminating the silver with the baser metal, which is very difficult to separate again. Some strips of copper, iron, or zinc, are placed in the fixing bath and allowed to remain until all the silver has been precipitated as a black powder, which should then be carefully washed and dried.

The treatment of paper residues may be carried out in a similar way by means of the fixing bath. In the case of Solio and similar processes treated in the combined bath, the latter contains all the removed silver as well as any excess of gold not used up in toning; but, when the separate baths are used, the washing water employed before toning will contain all the soluble silver, and should therefore be saved. In order to render this process as convenient as possible, the prints should first of all be soaked for, say, ten minutes, in a minimum quantity of water, time being allowed for the silver contained to be fairly well extracted. This water may then be poured into a jar, and the prints again covered with a similar quantity, which will remove all the silver that is worth saving. A few drops of hydrochloric acid will throw down the metal as chloride, and by the time the next printing operations have to be performed the water may be poured off.

Clippings and trimmings of prints may be burnt, as in the case of albumen paper; but, owing to the smaller quantity of silver they contain, the gelatine and, above all, the barium sulphate used in the preliminary coating, the ash is far bulkier and more impure, and, in fact, is so difficult to treat that it becomes scarcely worth saving. But fortunately the fixing bath is available, and if the trimmings are immersed in the acidified bichromate solution already mentioned, and afterwards in the hypo after it has performed its legitimate duty, the latter will effectually extract the silver without touching the other impurities. Spoilt or over-printed proofs may be subjected to the same treatment for the extraction of the silver, but the gold in toned proofs may be ignored as not worth the trouble of recovery.

The gold toning bath, for use with gelatino-chloride paper, is a much richer source of "residues" than its predecessors for albumen. Not only is it a more concentrated solution, but it is impossible to work it so closely as the albumen bath, and there is consequently always more of the precious metal remaining after use. Add to this that there seems to be no satisfactory means of preserving the bath after it has once been used, and we have cited sufficient reasons for paying considerable attention to the toning bath. The treatment is very simple, and consists in adding to the used bath some crystals of sulphate of iron, which will form a purple-black precipitate, more or less bulky, according to the quantity of gold present. It is not to be supposed, however, that it is all gold, for much of it will consist of basic iron salts; before collecting, the precipitate should therefore be treated with dilute sulphuric acid until it ceases to lose bulk, and, finally, well washed before drying.

In conclusion, we may remark that the principal difficulty with amateurs in saving their residues is in the length of time it requires to get a sufficient quantity to make it worth while sending to the refiner; but, if the necessary collecting jars be set aside in some out-of-the-way corner, the process of collecting is not a difficult one, and may go on uninterruptedly from one end of the season to the other, or, for that matter, from season to season, until one day a nice little "nest egg" will be found.

Low Prices.—One cabinet and two *cartes* for one-and-ninepence! This is the price we saw announced outside a West-end photographer's a few days ago. The establishment is not in a back street, as might be surmised, but one of the principal thoroughfares of a fashionable part of the south-west district. One would imagine that such prices as these should act as a deterrent to many from apprenticing, or "articling," their sons to photography as a profession.

The Forthcoming Exhibition of the Photographic Society of Great Britain.—The last day for sending in exhibits for the forthcoming Exhibition of the Photographic Society of Great Britain is Monday, September 11. Cases should be forwarded by that date to Mr. Goldstein, 7, Great St. Andrew's-street, W.C. Unpacked pictures may, however, be handed in at the Gallery, 5A, Pall Mall East up to nine o'clock on Wednesday, September 13. We understand that there is every promise of a successful Exhibition from the numerical consideration, between three and four hundred pictures having already been received, while rumour has it that the Exhibition is not likely to suffer by comparison with any of its predecessors from an artistic and technical point of view. We wish the Exhibition the success it deserves, and trust that it will be supported by all interested in photographic progress, and in the fortunes of the Society.

Caution to Photographic Tourists Abroad.—It seems that the spy scare is again aroused on the Franco-German frontier. Last week two persons were arrested at Kiel, and are now awaiting their trial, charged with being French spies. Possibly the German authorities had greater reason for their arrest than appears in the telegrams to the daily press. They were travelling, it seems, in a pleasure yacht flying British colours, and, when arrested, had with them photographic apparatus, plates, photographs, sketches, and maps of the district. Now, these things are usually to be found in the possession of every photographic tourist abroad. Whatever may be the outcome of the present arrests, it is pretty certain that great vigilance is being displayed on the frontier; therefore English tourists with cameras in those districts must be particularly careful where they plant them, or they may inadvertently place themselves in an unpleasant position. We repeat the advice we have before given to photographic tourists to the Franco-German districts, namely, to provide themselves with passports from our Foreign Office; and, further, to have them visèd at the consulates of the two countries here in London. The cost and the trouble is but a trifle, while the inconvenience it may avoid might be great.

Fallacies.—Almost every week we are told, by some one whose knowledge of what was done in the past is extremely limited, of the circumscribed resources at the disposal of the older photographers, and how they were to be commiserated. In a paper read at the last meeting of one of the Metropolitan Societies, on the subject of

printing, the author congratulated the present generation of photographers upon the advantage they have over those of the past, who, he said, had only one process, while the present had an almost unlimited choice. Now, it is difficult to see, if we except gelatine paper, what processes are available to the modern worker that were not also available to his older *confrère*. Had we not the platinotype process ten years ago, and the carbon some twenty years before that? Collodio-chloride we have had about as long as carbon; matt surface printing was in a high state of perfection forty years ago—indeed some of the modern formulæ for this class of work are identical with those employed at that period. Printing by development is one of the oldest methods of obtaining prints from negatives. Where, then, with the exception referred to, is the unlimited choice of process which the present worker has over him of twenty years and much longer ago? By the way, in the paper it was recommended to suit the process to the negative. The older workers proceeded differently, they aimed at producing negatives of such quality that they would suit any of the processes then, and now, in vogue.

Aluminium versus Magnesium.—Winter is now approaching, and there is very little doubt but that artificial light will be invoked, as an aid to photography, to a greater extent during the dark days than it ever was before. There are few districts now in London, and most other large cities, where electricity is not as available as gas from the mains. Therefore it may be expected that this is the light that will be adopted by professional photographers. Amateurs who have employed artificial light at night for negatives have hitherto relied upon magnesium; but, at the last meeting of the Photographic Society of Great Britain, Mr. Bolas demonstrated that that metal now had a formidable rival in aluminium, by obtaining a fully exposed negative by the light evolved by the combustion of a grain and a half of the powdered metal in an ordinary flash lamp. Aluminium promises several advantages over magnesium, one of which is the absence, in its combustion, of the irritating smoke evolved by the latter metal—a great gain when working in ordinary rooms—the greater amount of light from a given weight of metal, and economy, aluminium powder costing but about half the price of that of magnesium, and the possibility of its costing still less if the demand for it be increased. Added to this, the powder is not prone to oxidise like magnesium. As at present met with commercially, the powder requires to be freed from some oily matter used in its manufacture. If a demand is created for it for photographic purposes, there is little question that it will be supplied ready for immediate use.

Reversing Mirrors.—Now that mechanical processes are so much to the fore, anything that will aid in the production of suitable negatives for them becomes of increasing interest. At a recent meeting of the Hackney Photographic Society Mr. Miller demonstrated a method of silvering reversing mirrors, the formula for which was given in our last issue. In his paper, Mr. Miller says the glass "ought to be optically worked." We would emphasise this by substituting *must be*, for, unless the surface be optically plane, the mirror would be worthless if good definition be essential, as, of course, it is in all mechanical processes. So important a matter is this, that it may be mentioned that the best mirror may have its good qualities entirely destroyed by the slightest pressure from its mount, which would alter its figure. Therefore, the glass should always be left perfectly free in its setting. The most perfect lens would have its definition quite ruined by being worked with a defective mirror. While on the subject of mirrors, we may add a few words on the preservation of the silvered surface. When out of use, they should be protected as much as possible from the action of the atmosphere, which, particularly in large towns, readily tarnishes the surface. This can, it is true, be cleaned off with a pledget of cotton-wool and a little fine rouge, but it must be borne in mind that constant cleaning wears away the silver coating. Tarnish and even scratches on the surface do not impair definition any more than do dirt and scratches on a lens, they simply cause so much loss of light, and necessarily entail prolonged exposure. It has just been said that the surface of the mirror is easily polished with cotton-wool and rouge, but it should be added that the precaution should be taken that it is perfectly dry before commencing, because, if the silver film be at all damp, it would come away from the glass in flakes. It is a good plan to make the mirror warm a few minutes before repolishing it. With care a mirror can be in constant use for many months, or even years, without resilvering, but by careless use it may be rendered useless in a few weeks.

THE NEW PHOTO-TELESCOPE FOR GREENWICH OBSERVATORY.

So long ago as 1835 the Treasury consented to give to the Greenwich Observatory a large telescope, for want of which the Astronomer-Royal and the astronomical staff had been somewhat crippled in their endeavours to adequately photograph the spectra of the stars.

The construction of the telescope was entrusted to Sir Howard Grubb, F.R.S., and some idea of the perfection aimed at, and happily attained, may be gleaned from the fact that three years were occupied by the Messrs. Chance in turning out perfect castings of the glasses which were to form the object-glass, which is twenty-eight inches in diameter. Precisely how many castings were made before the required perfection was attained we know not, but we understand they were numerous, as the slightest imperfection ensured rejection.

The object-glass was delivered at the observatory early last year, and the final erection has for some time been delayed by the construction of a suitable dome and the requisite fittings. These are now completed, and a few weeks since Sir Howard, along with Mr. Christie, the Astronomer Royal, devoted some time to the final testing, which, as Sir Howard mentioned to us at the time, had been much impeded by want of clearness in the atmosphere. It is gratifying to know that the 4500*l.*, which is the cost of the instrument and its equipment, could not have been better invested, as it is pronounced to be one of rare excellence, and one of which the nation may well be proud.

The talented optician by whom it has been constructed has shown himself to be such a master in regard to high-class objectives, that we can the more readily understand that, although this 28-inch one has been specially made for spectroscopic photography, it is also available, by the alleged reversal of one of the lenses, for visual observation. We have not yet learnt the precise way by which this has been accomplished, although we know that chromatic correction—that is, from the visual to the actinic—can be effected by a slight separation of the components of the object-glass. Concerning this, however, we must wait for further information, which we presume will be forthcoming on an early occasion, probably at the meeting of the British Association.

Comparing the diameter of the object-glass with some others, it will be seen that, while it is not the largest in the world, still it is believed that, owing to the perfection of its construction, it will be little behind any of them—even the best.

The telescope which it has superseded has an aperture of thirteen inches, and, by squaring the respective apertures of the two (784 as against 169), it will be seen what a great light-grasping power has been obtained. The scientific world will look with interest for the revelations that are confidently expected as the result of the work of this instrument.

MAKING READY FOR EXHIBITION.

It is probably well within the memory of most of my readers that "full many a time and oft" prints displayed at various exhibitions, although possessing in themselves many intrinsic merits, have failed to obtain due recognition of their beauties by reason of the incongruous, offensive, or detractive setting in which they were shown.

That a judicious choice of mount and frame very largely modifies the impression which a print gives to the beholder, even the least reflective photographer will, without doubt, allow.

Granted that there exists this modifying power, it immediately follows that an injudicious choice of surrounding must needs exercise a very deleterious influence upon the effect which a picture will produce

upon the artistic sense of the spectator. It must not be forgotten that what is quite good enough for the common herd, may be vastly too bad for the man of exquisite artistic refinement, and of such temperament it is to be presumed most judges, and some of the critics, belong. This being the case, the ordinary exhibitor, if he desires a good place well on the line, and also the contingent chance of a medal —where such guerdons are offered—obviously needs to be superlatively careful not to transgress any of the canons of good taste when selecting a mount and frame for his master-work of the year.

There are many items of advice which might be profitably set down, but to fully exhaust the subject would need a treatise of itself, instead of the few lines by the way, whose first aim is merely to impress upon photographers to give the question of a suitable surround for their prints more attention than they in some cases have been accustomed to bestow.

Here, however, are some few hints. In the first place, it is to be remarked that the greatest offence is usually given by violent incongruities of colour between mount and print.

Colours may harmonise—in the sense that various slight modifications produced by addition or subtraction of related colours in a tint may be termed harmonious differences—or may contrast, as purple does with yellow. Neither of these juxtapositions produces a discord.

But when two rival primary colours are brought into immediate contiguity—say, Antwerp blue and cobalt—a jarring of the eye ensues, analogous to that which is produced upon the ear by the jangling of music out of tune.

What is true of the two above quasi-primary colours is, although not so self-apparent, true of the secondary colours derived from them, and also of the tertiaries, upon which are based the so-called "neutral tints," which, in most instances, they are far from being.

Many people, without effort, instinctively recognise this clashing of shades of colour; but, on the other hand, a considerable proportion are not quite awake to the importance of the subject, while a large residue really cannot distinguish between any of the minor modifications.

To those who are at all in doubt as to the limit of their colour sensitiveness, I would say, select a white Whatman mount (not necessarily a rough-grained one), and for frame employ a plain black reed.

To do this is, to my mind, to eliminate all risk of giving offence. It is, however, to be remarked, that relying upon such a simple *entourage* is sometimes merely to adopt a choice of evils; because, although I personally consider that a print of the highest quality in tone should, as a rule, not only have the juxtaposition of the white mount, but should be enhanced thereby, there certainly exists a preponderating proportion of photographs which need some reinforcement of the high lights, some subduing of the shadows, or some modification in the warmth or coldness of their tone, which cannot be otherwise attained than by the employment of a specially suitable mount and frame.

Thus, if the high lights lack brilliancy, a neutral grey mount will adventitiously brighten them; and if the shadows are unduly heavy, an unusually dark mount will lend an appearance of light to them by force of contrast.

In a similar position may the particular shade of colour employed in the printing process be modified. Thus, cold tones may be caused to look warmer than they really are, or hot tones made to appear cooler; the danger in using mounts where tints are potently warm or cold is that their effect is apt to be so discordant and assertive that it often only succeeds in producing a feeling of disgust. None the less, used with a nice appreciation of *tout ensemble*, the aforesaid are very valuable. Sometimes the power is well seen by the effect produced by the misuse of the expedient under discussion. Thus, I was lately shown a capital portrait which, however, suffered from being printed in a process which had ensured the rendering of the "female face divine" in a sickly brown hue, which was the reverse of pleasing. Pointing this out to my friend, said he, "All right; I'll soon counteract that." Next time I saw the print it had apparently turned green, the appearance being brought about by surrounding it with a brilliant crimson plush mount. This was my friend's notion of how to counteract; in reality it was, of course, an aggravation. Crimson being complimentary to green, an illusory tinge of the latter colour is, as may be demonstrated by experiment, imparted to the print. It is no exaggeration to say that relatively small low-tinted pieces of paper may be so arranged as regards large high-coloured ones, that the beholder shall not be able to say what colours the small pieces are tinted with.

Some people advocate that a mount and frame should possess the negative virtue of being quite unnoticeable; that they should be, whatever else, unobtrusive. There is without doubt much sound sense in this; but what is the definition of unobtrusiveness in the above? That which is very self-assertive in a dwelling-room may look small, mean, even shabby, on the walls of an exhibition.

On the other hand, we occasionally find that the bright and attractive setting, which was well enough in the middle of the shop window, is, when transferred to Pall Mall, or a similar exhibition, slightly too gorgeous and demonstrative.

Anyhow, one's frame should not be too bashful and retiring. Its object, aided by the mount or flat, is, firstly, to differentiate the contained picture from all the others which are fighting for attention; secondly, to strengthen and magnify the picture's beauties. This a wishy-washy, milk-and-water, humble and lowly arrangement, is not calculated to do. Here let me stop to add to the advice I have given to those who think they lack the needful taste and judgment to go as they please in the matter another maxim, viz., *don't stint yourself in margin.* If two prints from the same negative be mounted on boards, of which the area of one is twice that of the other, the one on the larger board will not only present an appearance of greater importance, but will have its pictorial effect considerably fortified. This is sufficiently well known amongst the more experienced that it not infrequently happens, when conditions of exhibitions or of competitions are drawn up, we find a regulation forbidding more than a certain maximum margin.

Of course, besides the self-evident absurdity of unduly applying the principle of wide margins to such an extent that we get the appearance of "a postage-stamp in a ten-acre field," considerations of cost, both of frame and of wall-space, exercise a wholesome check upon any tendency to overdo the matter, in addition to which, apart from any express rule on the subject, a hanging committee, other things approximately equal, would most certainly be inclined to pass over any print which is characterised by a wasteful and ridiculous excess of surround.

HECTOR MACLEAN, F.G.S.

SOAP-BUBBLES IN THE STUDIO.

OF all the beautiful and ingenious toys which have been placed in the hands of children of late years, it must be said that, either on the ground of amusement, or the higher level of education, they are not to be compared with that delightful plaything, the soap-bubble. Present a little girl with one of Mr. Edison's wonderful dolls, which, by virtue of a concealed phonograph, can talk, sing, laugh, or cry in the most natural manner in the world, the chances are that in half an hour you will find her nursing an ancient creature with one eye missing and an internal economy of sawdust. But when do children tire of blowing soap-bubbles?

Professor Boys tells us that there is an ancient Etruscan vase in the Louvre at Paris, on the sides of which children are depicted in the very act of blowing bubbles with a pipe; but, he quaintly adds, there are no means now of telling whose soap they used. Hence it is quite certain that the practice of this delightful art is of great antiquity.

It is small wonder, therefore, that so many photographers should desire to portray some of their more juvenile clients in this way; but the mechanical difficulties are very great, and so far their endeavours have frequently met with failure. To begin with, a soap-bubble itself is not a particularly easy thing to photograph, as many who have tried to do so will acknowledge; it requires very careful lighting, and is apt to burst at the critical moment of exposure; but the latter difficulty arises from the use of an unsuitable soap solution, and may be easily overcome by making up a solution as follows:—

Take three quarters of an ounce of freshly prepared oleate of soda, which can be obtained from any large chemist, and place it in a perfectly clean quart bottle with a pint and a half of distilled water, or clean rain water. When the oleate of soda has dissolved, add half a pint of Price's best glycerine, and shake the bottle up; but the oleate must be allowed to dissolve without heating the solution, as this would spoil it to a great extent for making good bubbles. Castille soap may also be used in place of the oleate of soda, but it does not answer the purpose so well.

Bubbles blown with this solution are so wonderfully strong and elastic that they may be tossed about on the coat-sleeve, or on a flannel-covered tennis racquet, without breaking, and, if the mouthpiece of the pipe be stopped with the tongue to prevent the bubble from contracting, the bubble will remain upon the bowl of the pipe for a sufficient length of time for the photograph to be taken in a satisfactory manner.

If it is desired to show a bubble apparently floating in the air, as in Sir John Millais's well-known painting, this may be accomplished

in the following manner. A piece of horsehair or exceedingly fine wire is bent into a circular loop about the size of a five-shilling piece, with a crosspiece of horsehair or wire arranged in the fashion of the handle of a bucket. If the loop of horsehair is first thoroughly wetted with the soap solution, a bubble brought into contact with it will adhere to the loop, and can be detached from the pipe. The loop and bubble are then suspended in a suitable position by means of a fine silk fibre, which is invisible in the resulting photograph.

A very good substitute for a soap-bubble may be obtained from any glassblower in the form of a thin glass globe, similar to the silvered balls exhibited in the shop windows at Christmas time. This, when cemented to the bowl of a clay pipe, is scarcely to be distinguished in a photograph from a real soap-bubble.

HARRY SMITH, F.I.C.

THE PHOTOGRAPHIC CONGRESS AUXILIARY OF THE WORLD'S COLUMBIAN EXPOSITION.

THE following additional papers were read:—

THE LINE SCREEN PLATES AND THEIR USE.

WHILE I appreciate most highly the honour conferred upon me of preparing a paper to be read before you on the subject, "Fine Line Screen Plates and Their Use," I also fully appreciate that the task is full of difficulty, and that to treat the question properly much more time than I can take would and ought to be required.

The manufacture of screen plates has occupied my attention for the five years past, and necessitated many experiments, and expensive ones, and required large research; yet the field beyond still seems more immense than that already passed over.

The subject is one requiring much thought and study and constant experimenting. Without taking up time, I will at once proceed to my subject, giving, in my own plain way, my impressions and the results obtained by me, being fully aware that same may be the subject of much just criticism.

The object of fine-line screen plates briefly stated—their use being for the production of half-tone relief blocks for typographic printing.

Screen plates are rulings on glass, having opaque lines with transparent spaces, and can be produced by mechanical means, or by mechanical and photographic processes combined. In actual use, according to the character of the work to be reproduced, screen plates may have from 65 to 200 lines to the inch, the most generally useful screen having 130 to 132 lines to the inch.

The screen is for the breaking up of the continuous gradation of light and shade in a photograph into absolute opaque lines and dots, with transparent spaces between.

It is not an easy matter to convey to the uninitiated the exact meaning of the above terms, but it can be easily understood by the examination of a photograph having a continuous gradation from light to shade, and a reproduction from same by the intervention of fine line screen plates. In the latter the picture is exact in facsimile, the impression to the eye is the same as the original picture; but, instead of the gradation of light and shade as described above, it will be found to have an even tint or colour of dark lines and dots, with perfectly white spaces to correspond, to give the effect of the original picture.

It will thus be seen that by the intervention of the screen, as will presently be described, it is possible—

First, To make a half-tone negative in absolute black lines and dots with transparent spaces between to correspond; and, second, from this an engraving with an even surface, that when mounted on a block, type high, is capable of producing the most beautiful impressions known to the typographic art.

To do my subject full justice, some mention must be made of the earlier attempts to produce typographic printing blocks. As long ago as October 29, 1852, Mr. Fox Talbot took out a patent. He used folded gauze to obtain a grain. Later on, December 4, 1872 (twenty years after the above), Walter Woodbury patented the use of "mosquito netting" and "Brussels net," and again in a patent, May 30, 1873, he claimed the use of fine ruled lines. Lastly, Woodbury obtained a patent, October 5, 1883, for the use of fine ruled lines, netting, gauze, dots, or a print from a grained stone.

Of all the above European patents, none seem to have had any practical value, and the first published attempt to obtain relief half-tone blocks by the aid of photography was the patent of Meissenbach in Munich, whose method consisted in imposing a transparent positive of the subject to be engraved, in connexion with a sheet of glass covered with diagonally ruled lines alternating opaque and transparent, and rephotographing this positive and ruled screen together, and reversing the direction of the lines upon the screen by inverting the screen after about one-half of the exposure is completed. This method, with various modifications, as will be explained further on, is in use by a good many engraving firms to the present day.

Looking back with the knowledge and trained eye of the present day, it is amusing to think of the earlier attempts and what ideas were had in regard to the requirements of a fine-line screen plate. Among the first partially successful attempts was to rule a copper plate diagonally one way with fine lines, then from this to pull an impression on fine white enamelled paper and with black ink; then from this to make a negative by the wet or collodion process, having perfectly opaque lines with transparent spaces, the negative so made being used as a screen plate.

It may be said that at this stage the operator's hopes were mountain high, and success seemingly assured, only to be dashed to the ground by unexpected and unforeseen obstacles in the path.

First, The extreme difficulty of obtaining a perfect impression having pure black lines without breaks or flaws; and, 2nd, an unsurmountable obstacle in copying from the impressions that was entirely lost sight of in the anxiety to obtain a perfect ruling, this obstacle being no less than the nature of the lens itself. To explain, the view of the ruled impression, on a *direct* line from the lens, *i.e.*, the centre of the impression, the lines and spaces were in proportion as the original in the resulting negative, but, *receding* from the centre, the spaces were less wide in proportion to the distance from the centre, the result being that from a large ruling a comparatively small screen could be produced of any value. Oh, the hopes dashed to the ground! It is only the enthusiastic workers that can understand studying and toiling, buoyed up by fond hopes and fancies, at the last to find some obstacle, not seen or calculated on, seemingly unsurmountable. Success, though, is a succession of failures, and this was the first real step to success. The next was to coat a perfectly flat or crystal plate glass with an opaque film, then to cut *through* this film lines of various thicknesses and number to the inch, according to the character of the work intended for reproduction. When this was accomplished, success was assured; it can readily be understood that lines so produced were perfect in proportion throughout the whole plate.

As to the nature of the film on the glass plate and its list of failures before perfection, it is out of the province of this paper to explain. Suffice it to say that, the glass plate having been prepared with the film as described, it is placed on a perfectly level bed plate of an engraver's ruling machine and fastened firmly in place.

In the operation of ruling the most extreme care is necessary. When once the machine is set in operation it must be kept going with an even, steady motion until the ruling is complete; any stoppage, even for a short time, will make a difference in the spacing at that particular place that can readily be detected on examination.

The cutting tools are diamond points, made so as to cut through the film, but without cutting or scratching the glass. These tools are made to cut any width of line desired, and are the perfection of workmanship. It can be surmised they are very expensive. This screen plate, placed in front of the sensitive plate in the camera or in connexion with a transparent positive and reversed during the exposure, constituted the first real success in the making of half-tone negatives for the production of half-tone relief blocks.

Screens prepared as described were open to the objection of rapid deterioration, and especially if used in the camera plateholder in front of the sensitive wet plate moist with the nitrate of silver solution of the bath. The solution would get on to the screen, and in a short while would be spotted and useless. Various means were resorted to to overcome this serious difficulty, until at the present time the screens are cemented with a colourless cement to a cover or protecting glass, that ensures permanency to a great degree.

At the present day there are two well-known methods of manufacturing original screen plates. One is to rule or cut through an opaque film prepared on perfectly flat crystal plate glass; another is to prepare a wax ground on the same kind of glass, then to cut lines through this, after which the glass (laid bare in lines) is etched to a certain depth with hydrofluoric acid; this gives ridges or furrows, which, after the glass is cleaned of the remaining wax, are filled with India ink. This gives a very intense black line with clear glass for space.

On a first cursory glance it would appear that plates so prepared would be more permanent or better adapted for the purposes intended, but such is not the case; there are serious difficulties attending their manufacture any way you will, and of the two well-known methods it would be a question to decide between.

The defects as they exist in both methods the manufacturers are, no doubt, endeavouring by all the skill at their command to overcome. It should also be borne in mind that at the present day the rapid advancement of this beautiful art demands a screen plate that only a few short years ago would have been considered a marvellous achievement.

So far this paper has only generally treated on the production of single-line screen plates. The subjects now under consideration will be, the proportion of opaque line to transparent space and the manner of use to give the best results.

The cross-line screen plate, how produced, the proper proportion of opaque line to transparent space—manner of use and why, as a screen, it is the best and most generally used.

The production of screens and the causes leading to it, &c.

In the use of the single-line plates the effect of "lines and dots," "black lines" more or less wide to represent the detail, and "dots" to represent the high lights, as seen in the resulting etching or reproduction, is by far the most truthful and pleasing manner of reproducing with the single line plate.

Experience has taught that the best method to obtain this result is to use two single-line screen plates of exactly same number of lines to inch, but one having the opaque line *three times* the *width* of the *transparent;* the other, the opaque and transparent lines equal but running in the opposite direction.

The use of the screen would be as follows: 1st, a special kit is devised for the camera plateholder—that will hold the screen firmly and at a certain distance in *front* of the sensitive plate; the exposure is given of sufficient length of time to bring up all *detail* in the shadows, and the separation of the screen and sensitive plates should be such that the opaque lines, resulting in the *high lights* of *negative* will be of same width as the black lines of the screen—in other words, the light from the high lights of picture or positive, passing through the narrow openings of screen, *will spread* and make a black line in the negative, as above described, if the screen and sensitive plate are separated proper distance; while in the middle tones the black lines will be *more* or *less* wide, according as the detail is light or dark.

A negative made in the above manner, while giving an exact reproduction, would lack *contrast;* the high lights being represented by very narrow black lines would not be *as light* as they should be; these lines must be *broken up into dots*, and to do this the screen with even lines must be brought into use. After the exposure, as described, the plateholder is taken to the dark room and placed with the back or door to the wall—remove the slide—take out the screen and in its place put in the one having even lines—an exposure now should be given to *simply cross the lights*—no more, or the reproduction will lose in detail and be too light.

The foregoing is the true principle of obtaining a correct reproduction of an original by the use of single-line screens. The elements to secure success being that the operator understands thoroughly the old wet-plate or collodion process of photography, as all negatives for this or any engraving method should be made with wet plates.

In the use of the single-line screens it will be seen there are two exposures, the plateholder must be removed from the camera taken to the dark room and the screens changed; if the special kit holding the screen and sensitive plate is firmly held in place, and the plateholder fits snug on the camera box, there will not be a particle of danger of movement of the sensitive plate already having one exposure, and the results, if properly done, are elegant. Yet the time taken up in making the two exposures is considerable. The risks of getting a perfect negative are nearly doubled from what it would be if one exposure only was given; and in these days of sharp competition, when work must be finished with dispatch, any saving of time is a great boon. Therefore a method devised of obtaining results equally as good, if not better, with *one exposure* was a great advance.

The discovery of the *cross-line* screen plates marked a new era. The results were found to be as a rule far superior, and the chances of failure from the fact of one exposure considerably lessened.

How Produced.

If the glass is covered with a wax ground, the lines cut through this, then etched with hydrofluoric acid as described, then it would be necessary to rule either two plates in the same direction and when brought face to face the lines would cross at right angles, or, after ruling the plate one way diagonally, to turn it about and rule it the other way so the lines would cross at right angles on the same plate, the latter process or method having the disadvantage of being liable in the etching to eat away the corners of the intersection and not fill properly with the ink, most likely in isolated places, thus making the working of the plate somewhat uneven. In the other method, or where the lines are cut through an opaque film, success depends, 1st, on the evenness of the film; 2nd, on its character; if too brittle, ragged edges would be the result; and, 3rd, on the tools employed in cutting the lines; two plates would have to be ruled singly and in the same direction, then brought face to face.

The ruling machine used for the purpose must be as perfect as mechanical ingenuity can devise—any deviation in a line, no matter if a hundredth or one two-hundredth of an inch, can be instantly detected on examination.

The proportion of black line to transparent space in a cross-line screen:—

In reproducing a subject when the reduction is great, or when the light parts are very strong as compared with the shadows, a screen in which the proportion of opaque lines predominate would give the best result; but the most generally useful screen would be prepared as follows: Take two single-line screens ruled exactly alike, diagonally, in same direction, and in which the opaque line is one-half the width of the transparent; bring them together face to face; the lines will then cross at right angles, and the transparent spaces will be equal in area to the opaque lines. This will make the most generally useful screen for all purposes, the manner of adapting the use of the screen to different subjects being well known to the professional negative-maker.

The manner of use or action of the cross-line screen, as will be seen from the foregoing description; the opaque lines cross at right angles, making a *square* transparent opening. To illustrate the working: Put the screen and sensitive plate in the plateholder, separated the proper distance; place in position on the camera, point the lens to a *white card*, and make the exposure. If properly timed, the light passing through the transparent openings of screen will not form square, but round, black dots in the negative, and will *joint solidly* at the edges, leaving the *intersections of the line as a transparent* dot. This white card would then represent the high lights of a picture. It is evident, then, that in the detail these black dots in the negative would be more or less large according to the gradation of light and shade in the picture, while in parts of subject having black without detail there should be no opaque dot whatever.

The reproduction of screens and causes leading to it:—

The nature of screens reproduced by photographic means:—The making of an original screen, not only from the difficulty attending it, but the very expensive outfit required, makes it necessary to charge what would seem to be an exorbitant price for them. Nearly five years ago the writer of this conceived the idea of manufacturing screens, first making an original, then reproducing from it, and at a price within the reach of any good engraver. At that time good workable screens could not be had at any cost, and the number of engravers in the United States making half-tone reproductions could be counted on the fingers of one hand. This seems an exaggeration, but it is literally true.

Look at the half-tone work of to-day and the countless numbers engaged in it; see the beautiful reproductions, artistic in every sense of the word, that are being done with the use of the fine-line screen plates and the half-tone process, and may I not feel a pardonable pride for my share in the advancement of this beautiful art?

The impossibility of obtaining original screen plates, and the great demand created for them as soon as their possibilities once became known, led to formulating the following reproduction process as worked by myself for the last four years:—

First. The original screen plate is made by the method described, of first coating a prepared glass with an opaque film; the lines are cut through this diagonally, one way only, the cut or transparent line one-half the width of the opaque. Whether an original would have eighty or up to two hundred lines to the inch, the relative proportions for practical working should be the same. The original being prepared, the next important step is the selection of the glass for the reproduced screens. It is absolutely necessary that the glass be crystal plate, perfectly flat, and without bubbles or scratches, and best if about one-tenth of an inch in thickness. This is prepared as collodion dry plates. It was not without many failures and discouragements before a suitable method could be formulated, one that would give an intense black line with clear glass for space, and, though finally got, yet it requires the most extreme care, failure will result.

The original screen and sensitive collodion dry plates are placed in absolute contact; one exposure is made; the plate is then turned and another exposure given with the lines crossing at right angles. The plate is then developed, fixed, and intensified, and after washing and drying is ready for sealing to a cover or protecting glass.

In the method just given for reproducing by making two exposures to obtain the cross lines, the cross section, or where the lines cross, is somewhat enlarged, so that the transparent opening is *not* exactly square; and for this reason, provided the lines are *perfectly opaque*, and the openings or spaces transparent, it makes a very much *better working* screen than the original itself, giving more of the effect of a well-shaded photograph, and without a certain harshness peculiar to a reproduction with a screen having the lines cross with sharp angles.

It is a notable fact that, if a screen could be prepared with the transparent openings *round* and in the proper proportions, it would give the most pleasing effect and be much the easiest to work, but such screens could not be made commercially. I succeeded at one time by a process of copying to obtain such a screen, but it was before the days of sealing. I used it as long as I was able to preserve it, but from that day to this I have not had time to make another.

It might be argued that the film of collodion on a collodion dry plate would be some obstruction to the light, but, if clear as it should be, between the lines it will be as transparent as the glass itself, and so thin that it could not possibly be any obstruction.

I could readily enlarge on the subject at hand, but feel that already too much time has been taken and that my paper should come to a conclusion.

I thank you all for this opportunity of explaining principles that generally are very far from being understood, and I trust that in so doing I have not been irksome to you. M. Wolfe,

"COARSE-GRAINED NEGATIVES"—HOW TO PREVENT THEM.

It is an acknowledged fact that there is a difference between the grain of a highly sensitive plate and one of a lower degree of speed, but from experience I have found that this difference need not be so great as is generally supposed, unavoidable.

Extreme care in the manufacturing of the emulsion is necessary to prevent it. Without this great care there may be great sensitiveness, but there will be coarseness. From such plate it is impossible to get a fine-grained negative, but it is possible to get a coarse-grained negative from a fine-grained plate.

After years of observation I have noticed that as a rule photographers make a better class of negatives during the cooler months than through the hot season. The grain of the negative is finer and the general appearance cleaner. The reason may appear obvious. Use ice, some one will say, and all the difficulties will be overcome. The suggestion is good, but it does not fill all requirements. The negative may appear without fault up to the time of putting on rack to dry, and still when you examine it after drying it does not possess the quality you expected to find. The reason is, that during the sultry days of the summer the drying of the negative takes several hours, the gelatine film becomes partly decomposed, allowing the particles of silver bromide to come together, they having an affinity for each other, the sack of gelatine which kept them apart being partially destroyed, forming coarse particles. The negative has then a woolly appearance.

All negatives have the finest grain and appear the cleanest immediately after fixing. What we want is to retain this quality when dry. How shall it be accomplished during the hot season, when everything is warm and the drying so prolonged? My method is as follows:—

I have a small ice box for my developer made like this: [Illustration omitted] in which are the two stock solutions. When I mix the developer, I take enough ice water to bring it to about 60° Fahr. I first rinse out my tray with ice water, then develop the plate: the fixing bath also is kept cool. If the water I wash my negatives with is too warm, I simply rinse with it and allow the negative to soak in cool water in a grooved box about one hour, changing water two or three times. Then I rinse once more and put on rack to dry. Between this point and the time when the negative is perfectly dry, it is liable to injury during the summer months when the atmosphere is 90° or over and often very humid, taking eight to ten hours to dry perfectly, thus changing the density and producing coarse grain. I have seen negatives that were developed, fixed, and washed in the evening, having wet patches on them the next morning. They were taken to another room to perfect the drying. The consequence was, where the drying commenced to be more rapid, there was at once a change of intensity, ruining the whole lot.

It is important, therefore, that the negative should dry as quick as possible, in as cool and clean air as can be had. The best arrangement I have seen for this purpose is now being used by one of the most eminent photographers in this country, Mr. M. J. Steffens, of Chicago. It is a small electric fan, by the use of which the negatives can be dried in half an hour or less. Connexion is made to a sixteen-candle lamp wire.

Just a word more as to another cause of coarseness. It may be produced by using a developer too strong in alkalinity. A strong alkali has the same effect upon the film as less soda with heat. M. A. Seed.

ORTHOCHROMATIC PHOTOGRAPHY AND ITS PRACTICAL APPLICATION.

It is very evident that the prominence given to orthochromatic photography at this World's Congress of Photographers reflects the growing interest in the use of colour-sensitive plates, not only to produce monochromatic results from nature and the production of the artist, but a close realisation of that long-sought desideratum—photographs in the colours of nature.

Since the first intimation by Col. Waterhouse for the use of dye-eosine in collodion to overcome the inability of the collodion process to render other than the blue and violet rays of the spectrum, scientists have worked assiduously to overcome the difficulties that were inherent in the old wet, and the dry-plate process of the present, and to no one are we so much indebted for the present success in orthochromatic photography as to Dr. Hermann Vogel of Berlin. We owe also much to the research of Mallman and Scolik of Vienna, Bothamley of England, and others we might mention, who by their liberal contributions to the literature of orthochromatic photography have done much to aid those who have made it their business to produce commercially the plates for the photographer's use.

The dyes now generally used, either by mixture with the emulsion before coating the glass plate or celluloid film, or dyeing the ordinary gelatine plate afterwards, are eosine, erythrosine, rose bengal and cyanine, the latter we believe but rarely used, owing to the unsaleable character of the plates made with it. To the above may be added axaline, a compound of Dr. Vogel's invention, said to consist of chinoline red and cyanine blue.

Orthochromatic photography has had its greatest advocates in Germany and Austria, in the reproduction of works of art in monochrome. Since the introduction by myself, in 1885, of orthochromatic plates, the use both by the amateur and professional photographer has had a steady growth. The intelligent amateur, as seems to be always the case on the introduction of any improvement in photography, was the first to test its merits, then the professional copyist of art works took hold of them, and their results now vie with the best products of Europe.

The professional photographers of America were the last to take hold of and use the orthochromatic method, and the wonder to me is that they are not more used by them. One reason is, I believe, a want of acquaintance with the orthochromatic plate, and with many the idea prevails that a colour screen must be used under all circumstances; this arises, it seems to me, from an unwillingness on the part of photographers to read the literature provided for them on the subject, which, if read, would make many things plain that they remain in ignorance of, and, as is often the case, lose business for want of the little knowledge so easily acquired.

It is, however, very pleasant for me, as a manufacturer of orthochromatic plates, to say that since 1891 the increased use of these plates has been very large as compared with the time of their introduction in America up to that date.

The use of the colour-sensitive plate may be used under all conditions when a plain bromide plate has previously been employed. Its use is to harmonise contrasts, whether in the dress of the sitter or a view from nature. Greens and yellows are rendered with more detail and colour value, while blues and light reds in drapery are given their proper colour value instead of being rendered lighter in the photograph, as is common on the ordinary gelatine plates.

The Colour Screen—When and How to Use it.

For ordinary landscape work a very light yellow screen is all that is necessary, a dark yellow or one of orange shade would falsify distance. The most suitable place for the colour screen is at the back of the lens board, sliding it in two grooved cleats, and should be placed in position when focussing. A screen of such a tint as this one would require an increased exposure of four to six times, depending on the state of the atmosphere, the yellower the light the shorter the exposure, and towards evening may be dispensed with; the value of a light yellow screen is best shown where the vista is slightly hazy, or where the clouds are included

in the view. Their outlines and forms will be much better rendered in the negative.

Use of Screens in Copying Paintings.

In this class of work the selection of the proper colour screen is of more importance than in landscape work, and the photographer should be provided with two or three, ranging in tint from a moderately strong yellow, medium, and dark orange. Paintings are best photographed in direct sunlight, and by examining the painting through the colour screen it will not be difficult which one of the screens to select. For instance, take a modern French painting, consisting of light and brilliant colours, a yellow screen will answer; but with a German or English painting, containing strong reds and dark blues and green, we would select an orange-colour screen, and correspondingly increase the time of exposure. It may astonish some of you to learn that as much as ten minutes' exposure is given in direct sunlight on paintings that are old or painted in strong colours.

Photography in the Colours of Nature.

The objective point that has been striven after for years seems w near of being accomplished. I do not mean the actual photographing of either objects of nature in colours, but through and by the agency of the orthochromatic plates. By the patient and scientific research of Dr. H. Vogel, of Berlin, and Frederick E. Ives, of Philadelphia, the first as achieved by triplicate negative and a like number of superimposed impressions, reproductions of objects in colour so true to the originals in colour as to be quite a commercial success, and in this country is being carried out by Mr. Kurtz, of New York. Of Mr. Ives' work I have seen a great deal; it differs in result from that of Dr. Vogel's in that the final picture is a triple image—a positive—on glass, viewed through three colour screens in an instrument invented by him, called the heliochromoscope, and the object as viewed is seen in all of nature's brilliant colouring.

Colour Photography (so-called)

Is now achieved by making three negatives of the object on orthochromatic plates through three different colour screens, viz., violet, green, and red. I have here samples of such colour screens. In printing by the collotype, or half-tone block, as in Mr. Kurtz's work, inks in the three primary colours are used, viz., blue, red, and yellow. The proper selection of tints, however, is a very important matter. Reproductions by this method are shown in Mr. Kurtz's exhibit in the gallery, north end of Liberal Arts building.

Developing of Orthochromatic Plate.

The same developer as used for the plain plate may be used for the colour-sensitive plate, except that we find it best to use it slightly diluted; as the colour-sensitive plate more readily takes on density, and the exposure should always be generous, it is necessary in order to get full colour values.

Keeping of Orthochromatic Plates.

A certain amount of doubt as to the keeping qualities of orthochromatic plates has been disseminated in this country. I can only say, with regard to those of my own make, that I have evidence of many cases where they have yielded perfect results from nine months to a year and more after leaving the factory. Plain plates orthochromatised by the bathing process, writers tell us, are not to be depended on over a few weeks. From past experience I am led to believe that plates from a proper orthochromatic emulsion have as good keeping qualities as the plain plates from same emulsion.

In conclusion, I may say that I am firm in the belief that colour-sensitive plates will in time replace the plain bromide plates, as the latter has the old wet-collodion.

John Carbutt.

MEDICAL PHOTOGRAPHY.

I have often wondered that the art of photography is not more generally employed in the interests of the medical profession. Those who teach the various sciences included under the one general term of medicine can not fail to find it a most valuable assistant. This is so clear that I will not linger longer in discussing it; let me rather say that the disfavour with which photographic attempts in medicine have been regarded by the medical profession is directly due to the poor work which has been done. These poor results have been made by photographers who were either ignorant of what the physician's eye would seek for in the picture, or so poorly skilled in the art of selecting and lighting the right kind of subject, that failure was inevitable.

In medical, as indeed in all other kinds of photography, the first step towards success is to know what to take, what not to take, and how to pose and light the subject to be taken. For instance, all portions of the human body that are not too complex in structure, and have decided outlines, with well-marked contrasts of colour, will be good subjects for the camera. Bones, either healthy, diseased, or fractured, and with or without the ligaments belonging to them, photograph well. I may here say that I was once called upon by a professor of obstetrics to make a set of negatives of the various planes and straits of the female pelvis. Enlarged prints from these negatives were then made, and very successfully used for class demonstrations. Being enlarged to rather more than life size, the smaller details could be easily seen, even from the farthest corners of the lecture-room. In doing work of this kind, which is intended to show only certain portions of the bone, and no more, the camera must be directed with *absolute accuracy*; otherwise the student would receive a wrong impression. Photographers ignorant of anatomy will not easily recognise the importance of what I allude to, and they must be prepared to have their early efforts in this direction sharply criticised by their medical clients, who will naturally expect scientific accuracy as the first desideratum. The photographer should always demand the fullest instructions from the medical man as to what the finished photograph is to show, and how much subject is to be included.

As I before hinted, all deformities and diseases that are *striking to the eye* make good photographic subjects. I have succeeded well with children with hydrocephalic heads, or with advanced cases of black gangrene of both feet, and with cases of advanced starvation. But the interior portions of the body are more difficult to photograph satisfactorily, the various organs crowding one another too closely, and being too nearly of one colour, or (what amounts to the same thing) of the same actinic effect upon the film. To produce really effective photographs of diseased abdominal or thoracic organs, I should recommend the stereoscopic camera, and orthochromatic plates, which, at least, give better marked contrasts in the different colour values. The anatomical relations between the different organs will be admirably brought out in the stereoscope, but care must be taken not to separate the lenses of the camera too widely, and thus produce exaggerated perspective.

It is hardly necessary to add that there is no advantage in using the stereoscopic camera for such a thing as a skin eruption on the breast or back; these, and other flat portions of the body could be as well photographed with the single camera.

Enthusiastic medical men, who take up photography with the idea that it is a mechanical sort of thing soon learned, will find their results quite unfit for use or for show, unless they are willing to learn a little of the principles of posing and lighting in photographic portraiture. These principles can best be learned in the portrait gallery itself, though there is no want of excellent text-books that explain the matter. To those ignorant of these things I may give the following example: Supposing the subject to be a man with a large lacerated wound of the left side, and that he was set in a chair with the wounded side toward the window of an ordinary room, the camera being set in front of him; what sort of a photograph would be obtained? The patient's body would be divided into the two portions vertically, the one greatly over-lighted and the other correspondingly under-lighted and black. The delicate and important details in the wound would be "burnt out" by the light, while the whole of the right side would be smudgy and without detail. Far better results would be obtained by so posing such a subject that a soft, even light from the north falls upon the head and body at an angle of, say, forty-five degrees. A properly arranged skylight will make this easy, and judicious exposure and development will give a clear, rotund image of good printing quality.

To photograph a sick or wounded person by the magnesium flashlight would not only increase all the photographic difficulties, but be injuriously exciting to the sufferer.

There is a very extensive and interesting field in medical photography open for microscopists, particularly in the enlarging of microscopic objects for use in class teaching and lectures. I should certainly prefer an illuminant of unvarying power, such as the electric light, for this sort of work, but I cannot here enter into the question as to the desirability of direct *versus* diffused lighting. Different subjects, as I said before, require different treatment; but I can and do advise the use of low-power objectives rather than high ones as giving greater depth of focus or "reach," and being also in other ways easier to work with. The time of exposure and development must be found by experiment. A simple yet effective apparatus may be fitted up as follows:—After taking out the eyepiece end of the microscope, level the body of the instrument, and insert the eyepiece end into a small camera, say, for plates 5×4 inches, and make the connexion light-tight with a bit of black velvet. The body

of the microscope must now be so directed as to come opposite the centre spot of the ground glass of the camera, and stand exactly at right angles to it; or, in other words, the whole photo-micrographic apparatus must be in a right line axially. The slide is now inserted and focussed upon after the lighting, whether reflected or transmitted, has been seen to. A want of sharpness in photo-micrographs is, perhaps, more often owing to improper lighting than to any other cause, except the use of too high-power objectives. It will be found convenient to stretch a thin, strong cord around the large focussing screw of the microscope and carry it back to a spool or similar arrangement set on the board supporting the apparatus at the right of the camera, and within easy reach of the hand. A cheap and efficient sulphate of copper cell can be made with two pieces of plate glass, say, four inches square, and a rubber ring one-eighth of an inch thick. The ring is laid on one glass, and a few drachms of ammonio sulphate of copper solution poured on. The other glass is then laid down, and the two strongly clamped together by two pairs of short laths made of hard wood, connected by screws. In all this class of work I should advise that soft negatives with plenty of detail be aimed at rather than vigorous ones with great contrast. The soft negative is more useful for slide-making and enlarging, besides which it is much easier to intensify a thin negative satisfactorily than to reduce one in which there is too much contrast. I do not like the action of reducers, and avoid them as much as I can.

The peculiar walk of certain forms of nervous disease might be registered if a full battery of cameras with chronometric shutters was at hand. I need hardly say that such apparatus is very expensive, and requires the greatest care and skill to manipulate. Animal locomotion, as it is now termed, is within the range of possibility from the photographic point of view; but, aside from the value of such pictures as triumphs over technical difficulties, it may be doubted whether they are worth the trouble and expense of making from the medical standpoint. I may repeat in closing that suitable subjects suitably lighted should be chosen, and those avoided that offer no chance of success.

ELLERSLIE WALLACE.

ISOCHROMATIC PHOTOGRAPHY.

AMONG the great discoveries and achievements that characterise our present century, and have accomplished results never before dreamed of and formerly deemed impossible, photography holds a prominent place in practical utility and as a helpmate to art and science.

Portraiture has been brought to simplicity, and in the fraction of a second we can secure the features of those who are dear to us. Foreign countries and nations are brought to our sight in pictures produced by the camera; movements of animals, too quick to be distinguished by the human eye, are truly and accurately recorded by the highly sensitive photographic dry plate; the stars are photographed, as well as the minute bacilli and bacteriæ whose multitudes inhabit the drops of water and the cells of animal life, and which in many instances are the causes, heretofore unknown, of diseases.

Since photography has rendered it possible to secure the rays of light to the sensitive plate, it has been the aim of scientists and practical workers to bring it to perfection, and the greatest improvements have been achieved in the preparation of dry plates ready for use and of the utmost sensitiveness. The great *desideratum*, to obtain photographs in natural colours, is now brought in the reach of possibility, as shown by the fine specimens of reproductions which are on exhibition in the photographic department of our great World's Exposition, and the time may not be far distant that portraits and landscapes are photographed in all the beautiful tints and colours as seen in nature. The most important step in this direction was the production of colour-sensitive plates by which one of the shortcomings of photography is corrected, that is, the insensitiveness of the ordinary plates to the yellow, orange, and red colours, which cause these colours to appear much darker, while the blue and violet appear much too light in the ordinary photograph.

The aim of isochromatic or orthochromatic photography is the production of plates equally sensitive to the different rays of the spectrum, so that in the monochrome of the finished picture all the colours are rendered equally correct in their respective values.

This colour sensitiveness is obtained by the addition of certain ingredients, mostly of the eosine group of analine dyes, to the sensitive bromide of silver emulsion, and the plates so prepared are called isochromatic or orthochromatic plates.

A great drawback to the introduction of the isochromatic plates into general use has been the necessity of a colour screen in order to obtain the isochromatic effect. A yellow glass had to be placed before or back of the lens, or a yellow pellide in place of the diaphragm, to filter the light, and to subdue the greater actinic power of the blue and violet rays. The isochromatic effect being increased in the same proportion as a screen of deeper yellow colour is used, it necessarily follows that the required exposure is prolonged in the same ratio and to such a degree that the use of a colour screen for portrait work and instantaneous exposures is out of the question. If the yellow screen is not perfectly even in structure and thickness, and absolutely plain, it will cause distortion of the image by aberration. Change of chemical focus and reflection may also be caused by its use, and therefore it is apparent that plates which produce the most isochromatic effect without the aid of a colour screen are the most valuable. As such plates can now be obtained which combine great rapidity with good colour sensitiveness, and are no more difficult to work than ordinary plates, their advantages should be appreciated by the photographic fraternity.

In portrait photography the blue eyes, auburn hair, are rendered more truthfully; imperfections in the complexion, such as freckles, are less noticeable; and dresses of any colour are photographed correctly, so that ladies need no longer consult the photographer as to what colour of dress to wear when having their pictures taken.

In landscape photography the main advantage of the isochromatic plate is that distant objects are photographed much more distinctly than with the ordinary plates. A slight haziness in the atmosphere is neutralised by the use of isochromatic plates, while an ordinary plate would not produce any satisfactory result under the same circumstances. White clouds in a blue sky can not be photographed except with the isochromatic plates, and how much clouds add to the beauty of a landscape is known by everybody. In sunset scenes the superiority of the isochromatic plates is as apparent as in the autumn landscapes, with their wealth of yellow and orange-tinted foliage.

In seascapes or marine views the horizon is not lost, water and sky being properly rendered.

In commercial photography the instances where isochromatic plates should be used are too numerous to mention. Wood work, which is generally of a yellowish tint, is photographed more perfectly; inscriptions on waggons, railroad cars, samples, floral designs, &c., which may not show at all when photographed with an ordinary plate, are perfectly reproduced.

Now, for the copying of paintings in oil or aquarelle nothing but an isochromatic plate should be used, and its advantage for this class of work is most strikingly apparent. In an old oil painting the lights are generally yellow, while the half tones are of a bluish tint. It is impossible to obtain a good copy of such a painting with an ordinary plate. Plates of full isochromatic effect are necessary for this purpose.

Another advantage of the isochromatic over the ordinary plate is its greater sensitiveness when the light is yellow, as is frequently the case in fall when the sky is cloudless, or in photographing by gaslight.

I have now said enough of the advantages of isochromatic plates, and beg to be excused if I have made statements of facts supposed to be well known; but the isochromatic plate being undoubtedly the plate of the future, it seems to me that its full value should be more generally understood and appreciated.

G. CRAMER.

A WEEK'S TOUR IN THE BORDERLAND.

Now that the excursion season has commenced in good earnest, and the many votaries of the camera are preparing to take their annual holiday, a few words on a district liberally supplied both by nature and by art with a wide and varied choice of subjects for the photographer, may chance to prove not less serviceable than they are timely.

The region referred to comprehends that portion of the Scottish Borders which is included within the shires of Roxburgh and Selkirk.

It is doubtless the case that of the many places of interest in these counties some are already over familiar to most field-workers, by reason of their lying directly in the beaten parts of the tourists; but it is no less true that a large number (including many spots of much historic and artistic interest) are hidden in out-of-the-way corners and unfrequented by-paths whither the mere visitor is of all persons the least likely to find his way.

The following brief sketch of a week's tour in those parts is intended to serve as a daily outline for the itinerant photographer, by showing him how best he may utilise the short time at his disposal.

For his first day's excursion, let him take the train in the early morning to Riccarton Junction. A four miles' walk over the hills will bring him to the famous castle of Hermitage, the ancient seat of the Douglas family. On his way thither he will do well to halt for a few minutes on the Nine-Stane-Rig, where there are still some remains of the circle of standing stones from which the hill takes its name. Here, if song and tradition may be believed, the refractory vassals of the tyrannical Lord Soulis executed summary vengeance on their master in the painfully original manner related in

Leyden's celebrated ballad. This circumstance may serve some as an excuse for perpetuating a rather unpicturesque spot in gelatino-bromide. Having descended from the heights, the tourist will find himself in the valley of the Hermitage Water. By taking a westward course, and following the windings of the stream for his guide, a short walk will bring him to the castle, which stands on a grassy platform on the northern bank.

This massive and venerable pile is comparatively unknown to the general tourist. It is, nevertheless, perhaps the best and most entire example of an early Border castle now existing in Scotland, its only possible rival being that of Caerlaverock in Dumfriesshire. The natural dignity of Hermitage is greatly increased by its lonely situation in the midst of a region singularly bleak, flat, and desolate, and by the bold simplicity of its architecture, which is that of the beginning of the fifteenth century, with some small remnants of earlier work, and a few additions of a later date. The whole forms an excellent subject for the camera, and several plates may be here profitably expended.

If he go expeditiously to work, our photographer should have no difficulty in re-arriving at Riccarton in time to catch the early afternoon train to Hawick. This done, let him walk or drive to Branxholm Castle (the Branksome Hall of Scott's *Marmion*), distant about three miles to the south of the town. On his way thither, just as he begins to ascend the hill that lies at the farther end of Hawick, he will notice an interesting bowl-shaped barrow standing in a garden by the wayside. This memorial of prehistoric times is locally known by the name of the "Mote." With a little trouble a spot may be found whence a satisfactory negative of this curious relic may be obtained. Further on, upon the summit of a little hillock on the left side of the road to Branxholm stands the old peel-tower of Goldielands. The building is of small size, and without pretensions to either architectural or historical interest; but as an example of the most common type of fortified dwelling-house it has some little claim on the attention of the visitor.

Branxholm Castle, though much modernised to adapt it to the purposes of a nineteenth century residence, still retains many features of its original condition. An ancient ivy-clad tower, abutting on the western gable of the more modern portion, remains almost intact. Under ordinary circumstances, the building is not open to the inspection of tourists, but an excellent picture of the exterior may be obtained from the southern bank of the Teviot, near the suspension bridge. Having returned to Hawick, our photographer will probably be inclined to devote the remainder of the evening to rest and refreshment. Should he, however, prefer a pleasant country walk, he will find Harden Hall, a picturesquely situated old mansion, distant about four miles west of the town, well worthy of a visit. He should pass the night at Hawick, and, in the morning, proceed by rail, *viâ* St. Boswell's Junction, to Jedburgh. He may profitably devote the whole forenoon to an examination of the magnificent remains of Jedburgh Abbey. It was founded in the year 1118 by David I. of Scotland, and is a noble example of the Later Norman style of architecture. Many excellent negatives can be obtained here. The western and cloister doors are particularly worthy of the attention of the photographer, and a good general view of the whole extent of the edifice, with a river foreground, may be had from a spot on the banks of the Jed, a little south of the precincts.

In the afternoon the tourist should pay a visit to Ferniehurst Castle, situated a mile and a half south of the town. This interesting building, which has been lately repaired and partially restored, is chiefly of sixteenth century date. Though of less importance than Hermitage, it is not wanting in the elements of the picturesque, and makes a good subject for the photographer.

The remainder of the day may be spent in examining the Watling-street, the ancient Roman road from Northumberland into Scotland. It passes about two miles to the east of the town, whence it may best be reached. At the point where it crosses the Oxnam Water, a Roman station has been discovered in recent years, the remains of which have been partially excavated. The foundations and ground plan of several buildings may be seen within its area. A number of interesting antiquities have been discovered in the vicinity.

The visitor should pursue the Roman way northwards to Bonjedward, where it crosses the Teviot. Here he will get a train back to Jedburgh. In the course of his walk he will, weather permitting, find many favourable opportunities for employing his camera.

The next morning he should proceed by rail to Kelso. He may utilise the short time spent in waiting at Roxburgh Junction by photographing an old building known as Sunlaws Tower, which overhangs the River Teviot beneath the railway embankment. On reaching Kelso he will naturally devote some time to photographing the ruins of the Abbey.

This, another of the monastic foundations of King David I., dating ten years later than the Abbey of Jedburgh, is also a fine specimen of the Norman style. It is, however, much less perfect in its plan, a large portion of the edifice having been demolished. The pedimented porch in the northern wall is of unique character, and its rich details make it a suitable study for the camera.

Having finished his work in the town, our photographer should proceed on foot to the hamlet of Crosshall, which lies within the border of Berwickshire, about six miles northward of Kelso. Here he will find an antique cross, on the shaft of which are sculptured the figures of a knight and a greyhound. Its origin is still a matter of debate among archæologists. Resuming his walk, he will reach Hume Castle, two and a half miles westward of Crosshall. The building is of some celebrity in the annals of Border warfare, and is a prominent object in an otherwise flat landscape. Our photographer should have no difficulty in getting several good negatives here, after which, by taking the southward road, a walk of five miles will bring him back to Kelso.

The next day, leaving Kelso, let him take the train to Melrose, and spend the forenoon in photographing the oft-depicted abbey. By exercising a little judgment, he will be able to obtain a number of pictures of the ruins which shall possess some measure of individuality. Afterwards, passing through Newstead, a quaint village remarkable for the number of its sundials, a five-miles' walk alongside and across the Tweed will bring him to Dryburgh Abbey, beautifully situated in a wooded nook by the waterside. Both here and on the road hither he will meet with many picturesque "bits," which will keep him busy for the best part of the afternoon. From St. Boswell's Junction, a mile distant, he may return by rail to Melrose in time to pay an evening visit to the Eildon Hills.

Next morning, crossing the Tweed to Gattonside, a suburb of Melrose, and taking the eastward road that runs parallel to the river, a walk of an hour and a half will bring him to Smailholm Tower.

This old fortress, situated on the summit of an irregular and rocky hill, is a conspicuous landmark throughout the length and breadth of the shire. It is a good example of its class, in better condition than are the majority of the neighbouring strengths, and, naturally picturesque in its outlines, is still more so by its situation.

The afternoon may be employed in visiting Abbotsford, distant two and a half miles westward of Melrose. Should the visitor desire to photograph the house or grounds, he ought to seek and obtain permission to do so some days beforehand. By neglecting this, he is likely to meet with a refusal.

The last day of the tour should be spent in visiting St. Mary's Loch in Selkirkshire. This may best be done by journeying by rail to Selkirk, and there taking the coach which, at regular intervals, conveys passengers to the loch.

The spot is one of great natural beauty, and a day's ramble in the vicinity will afford the photographer many opportunities for exercising his artistic taste.

He will thus be enabled to add to his already extensive pictorial series a number of views of an interest apart from their historical associations, and to bring to a close, in the very heart of the Borderland, a holiday tour which, should he enjoy favourable weather, cannot fail to prove both pleasant and profitable.

MATTHEW WILSON.

CENTRAL PHOTOGRAPHIC CLUB.

We are happy to be able to announce that the executive of the Central Photographic Club have secured suitable premises at one of the best and most agreeable hotels in central London, namely, Coleman's Hotel (late Ashley's), Henrietta-street, Covent Garden, a building associated with the earlier days of at least two existent flourishing photographic societies. The rooms available for the use of members will include such as give the usual club accommodation of smoking, reading, meeting, and dark rooms, and seem in every way well adapted for the purpose.

Country members visiting town will have the advantage of securing hotel accommodation, as it were, on the Club's own premises, and certain obvious difficulties as to service of refreshments, tariff, &c., will be easily and happily overcome. It is expected that the premises will be available for the use of members in a few days.

In the meanwhile the opening meeting of members and those intending to become members will be held at the Club, Coleman's Hotel, Henrietta-street, Covent Garden, on Wednesday, September 13, at eight o'clock. This will constitute, as it were, the formal opening of the Club, and will give an opportunity for the amendment of the rules, necessitated by the abandonment of some parts of the original scheme, and for other business of a formal nature. Mr. George Mason, of Glasgow, will take the chair. Intending members and others interested will be welcome.

It should be said that the Hon. Secretaries are Messrs. W. Fenton-Jones, 12, King Edward-road, Hackney, and C. H. Oakden, 53, Melbourne-grove, East Dulwich, to whom communications relating to the Club should be addressed.

Our Editorial Table.

SICHEL'S CATALOGUE OF PHOTOGRAPHIC FRAMES, MATERIALS, APPARATUS, &c.

O. SICHEL & Co., 52 Bunhill-row, S.E.

MESSRS. SICHEL'S catalogue appeals largely to professional photographers. In it are given illustrated details as to a large variety of mouldings for photographic frames, all evincing taste in design, mounts, fancy frames, studio cameras (these appear of great elegance

and strength), field cameras, stands, albums, &c. In the section devoted to accessories are many charming things in the way of studio furniture, while there is an extensive assortment of backgrounds, and designs for the backs of cards. Altogether a useful catalogue for the professional photographer, anxious to be up to date.

Catalogue, &c., of the Cantilever Enlarging Apparatus.

W. Hume, 1, Lothian-street, Edinburgh.

Mr. Hume's catalogue is largely devoted to descriptive particulars with illustrations of his well-known Cantilever enlarging apparatus. Some serviceable hints as to lantern manipulation, enlarging, &c., are also included. Other photographic goods, such as cameras, lenses, microscopes, &c., hand cameras also find places in this well-arranged pamphlet (for it is a cut above an ordinary catalogue in point of utility). No lanternist or enlarger should be without it.

The Sandell Films.

R. W. Thomas & Co., Thornton Heath.

The Sandell film just introduced by Messrs. R. W. Thomas & Co., is an application of the principle embodied in the Sandell plates, the films of celluloid having a multiple coating of gelatine emulsion. One by one the principal makers are selecting celluloid as a support for the sensitive medium, and we have no doubt that ere long there will be none left who have not added the coating of cut films to their specialities. Including, of course, among their characteristics the advantages of lightness and portability, the Sandell films also embody the leading features of the Sandell plates, and yield negatives of a similar character. Consequently, what we have before written of the Sandell plates applies with equal force to the films, at any rate in respect of the quality of the results. Celluloid is notoriously more difficult to coat than glass, with an equal certainty of escaping from mechanical defects and irregularities; but, judging from the sample of the Sandell films, Messrs. Thomas appear to have surmounted these obstacles, and to have produced a film which leaves nothing to be desired on the score of technical excellence. It should be said that the manipulation of the films is precisely the same as the multiple coated plates.

News and Notes.

Northern Photographic and Scientific Association.—September 9, Totteridge.

"Cream" (of the World's Fact, Fun, and Fancy) is the title of a new weekly penny paper, which, under the editorship of Mr. Francis George Heath, will shortly appear.

Manchester Amateur Photographic Society.—September 9, Dunham Park. Leader, Mr. Prince. Train, London-road (L. & N.W.), ten minutes past one; Oxford-road, fifteen minutes past one. Fare, 1s. Book to Altrincham.

Mr. R. P. Drage, the late Hon. Sec. of the London and Provincial Photographic Association, has gone on a six months' tour in India, Japan, &c. He takes a large supply of films for photographic work *en route*. Mr. Drage's numerous friends will wish him a pleasant journey and a safe return.

Great efforts are being made by the executive of the Triennial International Photographic Exhibition, to be held in Bristol next December, to render it a worthy successor of former exhibitions held there. Mr. H. A. Hood Daniel, the president of the Bristol and West of England Amateur Photographic Association, and the Hon. Sec., Mr. E. Bligh Bond, are throwing themselves energetically into the work.

The Congress of the Photographic Society of Great Britain, to be held in the rooms of the Society of Arts on October 10 and 11, is expected to be largely attended by provincial photographers then likely to be in London for the Exhibition. We understand that an attractive programme of important papers is in preparation. The proceedings terminate on Thursday, October 12, with a free lantern entertainment in the gallery of the Exhibition at Pall Mall.

Hackney Photographic Society.—September 12, *Failures*. Members will please bring failures for discussion thereon. The Society's Exhibition will be held on October 17 to 19 at Morley Hall, Hackney. There are four open classes —Portraiture, General work, *Pictures previously medalled or awards taken*, Lantern slides. The Exhibition is open first day at half-past seven, when the awards will be made known, and the successive days at twelve midday, to enable City men to get up in dinner hour.

The Seventh Annual Exhibition, under agreement between the Society of Amateur Photographers of New York, the Photographic Society of Philadelphia, and the Boston Camera Club, open to all photographers, will be held by the Society of Amateur Photographers of New York, at the galleries of the American Fine Arts Society, Fifty-seventh-street, near Broadway, New York, from April 16 to 28, 1894. Entry forms can be had by applying to the Committee. Exhibition Committee, T. J. Burton; R. A. B. Dayton; R. L. Bracklow. Address, 113 West Thirty-eighth-street, New York.

Leytonstone Camera Club.—September 9, Essex Dairy Farm (Cattle Studies), by kind permission of Mr. Smyth. Leader, Mr. H. E. Farmer. The Club will proceed by the train leaving Liverpool-street (G.E.R.) at thirty-five minutes past two p.m., calling at Leytonstone fifty-two minutes past two, arriving at Loughton twelve minutes past three. Open Special Evening at Headquarters, eight o'clock. 13, Ordinary Meeting at Headquarters, eight o'clock, for the purpose of Testing and Selecting the Slides to be sent in to the National Slide Competition. It is hoped that every slide-worker will bring six slides (those with connective interest preferred).

"Trade Depression."—A correspondent writes:—"I cannot believe that the photographic trade is depressed, judging by what I see and read in your Journal. When a new thing comes out it is "boomed," and large profits are made; as the number of persons engaged in the trade increases, prices must fall; moreover, there is the fact that at first all the world is purchaser, and after, all those who have not already purchased. Where are Lancaster's 65,000 cameras? Where Dallmeyer's, Ross's, Underwood's, Tylar's—*et hoc genus omne?* Photographic instrument and material makers have one *desideratum* to find—a cheap film. When this is found, a large and hitherto unsuspected market will be opened."

A Photographic Association for Widnes.—On Wednesday, August 30, a well-attended meeting was held at Bedford Chambers, at which it was decided to establish the Widnes Photographic Association. Officials were appointed as follows:—*President:* V. C. Driffield.—*Vice-President:* G. E. Warner.—*Council:* J. S. Sinclair, A. Wareing, W. Priestnall, O. White.—*Hon. Secretary and Treasurer:* George Ray, Bold, near Widnes. The inaugural meeting of the Society will take place on Wednesday, September 13, at Bedford Chambers, when the President, V. C. Driffield, will give a practical demonstration on the *Determination of the Density of Negatives and Bromide Printing.*

The *Joker*, a halfpenny "humorous" sheet, is circularising photographers in the following strain. We question the likelihood of any "benefit" to the photographer arising out of the scheme. "We beg to call your attention to a scheme which, in America, has proved most advantageous to both newspaper proprietors and photographers. In our paper, the *Joker* (which has a circulation of considerably over 100,000 weekly), we shall insert a coupon, six of which will entitle the holder to a free photograph of himself on presenting same to any one of the photographers who join us. The benefit to photographers will be: First, very few people would be contented with one photograph, but will give an order for more, which can be charged for at such rate as the photographer pleases. Second, as the names and addresses of those photographers who act for us will be published weekly, this will prove a splendid advertisement for them, particularly as the mere fact of our selecting a special photographer in a district will in itself be a testimonial for that artist, as we shall only connect our paper with firms of the highest standing. If you care to participate in our scheme, will you kindly write us to that effect?"

Pinholes.—Pinholes in a plate arise from one or other of three causes: (1) Dust specks in the course of manufacture; (2) dust specks during exposure; and (3) dust specks during development. The first-mentioned pinholes, says *Photographic Scraps*, may be at once and definitely distinguished from those resulting from either of the other causes. If they are due to dust in the course of manufacture, the pinholes will be real ones—that is, they will show as specks of *bare glass*. The other *so-called* pinholes will be, on the contrary, only transparent spots where the gelatine is present; but, owing to the presence of dust during exposure, the light has not been able to act, or, during development, the developer could not get at the film under the dust. It will thus be seen that one can tell instantly whether the spots are due to faulty plates or careless development, and we beg those who experience such troubles to kindly look to this point before they write us. The slightest care will save us and them much trouble. There is another class of spots too often described, unfairly, as pinholes, which arise from the presence of minute air bubbles in the developer—such air bubbles are much more frequent during hot weather, and with a stale developer.

Printing Half-tone Blocks.—The secret of success in making half-tone work commercially profitable is to understand the printer, says *Process Work*. Give him the block he can print, and more orders will follow. Printers are now begining to wake up in regard to the printing of process blocks, and, if they do not make a good job of a half-tone block nowadays, it is not for want of trying. In most cases it is the master printer who is to blame, in giving his man unsuitable ink and paper. It is surprising what a difference there is in results between one sample of paper and ink and another. The fundamental rule is, that it is no good trying to print a half-tone block on coarse-grained paper with thin ink. A highly glazed and sized paper is best, and the ink must be tacky and intensely black. It is no good trying to get colour by means of heavy impression. The ink itself must give the colour. It is important, in printing half-tone subjects, to give the block a clean up occasionally with a fine, stiff brush—an old tooth brush does very well—and turpentine or benzole. Speaking of this cleaning up, we well remember a machine-minder describing to us a great find he had made in the way of a fluid for cleaning up half-tone blocks. He had a mixture—it such it could be described—of hydrochloric acid and turpentine. "Cleans 'em up fine, and no mistake," he proudly exclaimed. So it did, and by the end of the job he had cleaned all the picture away, and, when the customer received the job, of course the unfortunate process man got the "wigging."

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 16,202.—"Improvements in the construction of Supports for Glazed Photographic Pictures and other Articles capable of being similarly supported." E. FRITH.—*Dated August* 28, 1893.

No. 16,319.—"Baker's Rapid Photograph Mounter or Roller Squeegee." T. BAKER.—*Dated August* 30, 1893.

No. 16,354.—"Improvements in the production of Photographic Negatives." E. ALBERT.—*Dated August* 30, 1893.

No. 16,373.—"Improvements in or in connexion with Cameras." F. W. BRANSON.—*Dated August* 31, 1893.

PATENTS COMPLETED.

IMPROVEMENTS IN AND RELATING TO PHOTOGRAPHIC CAMERAS.

No. 18,899. DR. RUDOLF KRÜGENER, Bockenheim, Frankfort-on-the-Main, Germany.—*July* 22, 1893.

MY invention relates to a photographic camera, in which single sensitised sheets are employed. A number of these single sheets are put together on an improved principle to form packets, and in that state are placed in the camera directly, that is to say, without a special case or the like. By reason of the peculiar packing of the single sensitised sheets, extreme simplicity is realised as regards the exchange of such sheets in the camera and the construction of the latter.

Besides the great cheapness and facility of handling resulting from this feature, the improved camera possesses the further advantage that despite the large number of exposures which may be given one after the other, it is very light, and that by virtue of the improved mode of packing and exchange the bulk of the camera may be exceedingly small, which is of great importance for large sizes.

As above stated, the essential feature of my said invention lies in the peculiar packing and exchange of the sensitised sheets. One mode of packing is characterised by the employment of a long strip of paper or the like. This strip is laid together in folds, which are a little larger than the sensitised sheets to be employed. To the lower end of the said folds are pasted small strips, extending across the strip. These transverse strips are bent outwards a little, and, in conjunction with the respective upper fold of the strip, hold the sensitised sheets between two layers of paper. Packed in this manner, a considerable number of sensitised sheets can be put in a very small space of the camera.

The above-described mode of packing and the resulting mode of exchanging the sensitised sheets may be used in cameras of various constructions. In one arrangement the apparatus comprises the camera proper, a magazine, and a chamber for the reception of the sheets which have been exposed. The camera and magazine are separated from each other by a glass plate, against which the sensitised plates bear as they are focussed. The exchange or conveyance of the sheets which have been exposed into the said chamber takes place by conducting the prolonged end of the strip over a roller, and from this roller to the outside through a slot which precludes the passage of light. When pulling this end of the strip, the transverse strip which is foremost at the time will raise the sheet which has been exposed. By the above-mentioned roller and small block, preferably covered with velvet or similar soft material for protecting the coated side of the sheet, the latter is bent, shifted forwards, and finally falls of itself into the chamber. Now the strip is pulled a certain distance further from the camera, the superfluous end being then torn off. By this means the sheet which has been exposed is laid away, and at the same time a new sheet is put ready for a fresh exposure, as by pulling out the strip the following sheet is liberated and placed against the glass plate, which takes place by a small spring plate pressing the whole packing forwards. After the exposure, the fresh sheet is conveyed in the same manner as the preceding sheet into the said chamber, and another new sheet which has not yet been exposed passes into the focus.

In a second arrangement the chamber is provided vertically above the magazine, and separated therefrom by a tongue. In this instance the sheets which have been exposed move straight upwards, are taken from the strip by the said tongue as the strip is pulled further, and pass in this manner into the chamber.

According to a somewhat different mode of packing the sensitised sheets, a number of single strips are used instead of a continuous strip. All the upper ends of these strips are bent round and lie one upon the other, whilst the lower ends are furnished with transverse strips like those used in the first mode of packing. These transverse strips support the sensitive sheets, which are prevented from falling by the upper bent ends of the main strips. Then the entire packet is so placed in one of the apparatus that the upper free ends of the main strips protrude through a slot formed in the wall of the camera. On pulling the foremost upper sheet after the exposure from the camera, taking hold of the end protruding from the latter, the sheet which has been exposed is conducted into the said chamber by a plate or other suitable device, the following sensitised sheet being at the same time put ready for exposure. In order to preclude the passage of the light through the slot after a number of strips have been pulled out, the said slot may be kept closed by any suitable device—for instance, by a plate held in guides and adapted to slide down in proportion as the strips are pulled out, or the said slot is specially covered over by a flap on the outside.

Instead of pasting on to the strips small transverse strips for holding and raising the sensitised sheets, a very narrow width of the latter may be fixed with paste to such strips. When pulling the strip the sheets are finally torn off and drop into the magazine.

Of course my improved method of packing and exchanging sensitised sheets may also be employed with cameras of any construction without departing from the scope of the invention.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 11 ...	Darlington	Trevelyan Hotel, Darlington.
,, 11 ..	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 11 ..	North Middlesex	Jubilee House, Hornsey-road, N.
,, 11 ...	Richmond	Greyhound Hotel.
,, 12 ...	Birmingham Photo. Society ...	Club Room, Colonnade Hotel.
,, 12 ...	Derby	Smith's Restaurant, Victoria-st.
,, 12 ...	Great Britain	50, Great Russell-st. Bloomsbury.
,, 12 ...	Hackney	206, Mare-street, Hackney.
,, 12 ...	Manchester Amateur	Lecture Hall, Athenæum.
,, 12 ...	Paisley	9, Gauze-street, Paisley.
,, 12 ...	Rochester	Mathematical School, Rochester.
,, 12 ...	Stockton	Mason's Court, High-street.
,, 13 ...	Leicester and Leicestershire ..	Mayor's Parlour, Old Town Hall.
,, 13 ...	Leytonstone	The Assembly Rooms, High-road.
,, 13 ...	Munster	School of Art, Nelson-place, Cork.
,, 13 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 13 ...	Southport	The Studio, 15, Cambridge-arcade.
,, 13 ..	Stockport (Annual)	Mechanics' Institute, Stockport.
,, 14 ...	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
,, 14 ...	Glossop Dale	
,, 14 ...	Hull	71, Prospect-street, Hull.
,, 14 ..	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 14 ...	Manchester Photo. Society	36, George-street, Manchester.
,, 14 ...	North Kent	Gravesend.
,, 14 ...	Oldham	The Lyceum, Union-st., Oldham.
,, 15 ...	Cardiff	
,, 15 ...	Croydon Microscopical	Public Hall, George-street, Croydon
,, 15 ...	Holborn	
,, 15 ..	Leamington	Trinity Church Room, Morton-st.
,, 15 ...	Maidstone	"The Palace," Maidstone.
,, 16 ...	Hull	71 Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 31,—Mr. W. D. Welford in the chair.

It was decided that the monthly lantern nights of the Association should commence in October.

Members were invited to contribute slides for the Lantern Evening of the Photographic Congress, to be held in the Exhibition Gallery of the Photographic Society of Great Britain, 5A Pall Mall East, on Friday, October 13.

"WHAT IS A PINHOLE LENS?"

In reply to the above question from the box, Mr. T. BOLAS remarked that the late Colonel Stuart Wortley took some large photographs with a lens having a very minute stop. This might be the sense in which the term was used.

OPENING OUT THE APERTURE OF A PORTABLE SYMMETRICAL LENS.

Mr. P. EVERITT, alluding to the mount Mr. Haddon had made for him which allowed of the full aperture of the lens being used, said he had taken a negative with the opening *f*-9 (approximately), and the print from it (which he passed round) showed that definition had not been greatly impaired.

Mr. W. E. DEBENHAM thought that with such an aperture there would be less equality of illumination, the corners not being proportionately so well lighted as with the original stop.

Mr. BOLAS said that Messrs. Swift made a type of portable symmetrical in which the mount acted as diaphragm for facility of focussing. He was surprised at the good definition obtainable. The lens with the large opening was not intended for actual use.

Mr. EVERITT pointed out that a portable symmetrical working at *f*-9 could be used for instantaneous work.

Mr. A. MACKIE stated that Mr. Williams, who did a great deal of instantaneous work ten years ago, used a portable symmetrical for the purpose.

The meeting subsequently became a Special General Meeting, called with reference to a consideration of some of the rules.

Hackney Photographic Society.—August 29, Mr. E. Puttock in the chair.—Mr. T. H. SMITH showed some Nikko paper, toned with the sepia bath, but said it was a very tedious process. Mr. BARNES showed a Barnet plate, and asked the cause of markings appearing like fog. Mr. BECKETT thought the plate was not at fault. The HON. SECRETARY said he would get an opinion from the firm. Mr. HENSLER had used the P.O.P. Ilford formula more concentrated, and found it tone quickly and regularly. Mr. FARMER had been advised to use ferrotype plates for squeegeeing. Mr. A. BARKER said old ones were apt to blister. The HON. SECRETARY advised using an enamelled metal plate, such as now sold. A question was asked: "Is quick negative drying advantageous?" Messrs. HENSLER, TUNSTON, and others deprecated it. Dr. ROLAND SMITH read a paper on *Daylight Enlarging*. It was a great advantage to enlarge. No enormous cameras should be necessary. He used a window facing N.-N.E. or N.W., fitting a tight frame to exclude light, and having attached a dull spot to reflect in. Camera slips on to groovings of frame, and two mop-handles are used, on which is placed board to take enlarging paper. A rapid rectilinear lens was advised—not portrait. Eastman's slow bromide paper, with ferrous-oxalate developer, was recommended. He used the same stock for four years, but, after using, placed out (in tubed bottle with film of paraffin) in sun. The HON. SECRETARY preferred amidol, found ferrous oxalate blocked out detail too much.

Liverpool Amateur Photographic Association.—August 31, Mr. P. H. Phillips (the Hon. Treasurer) presiding.—After the election of three new members, Mr. F. Anyon, a member of the Council exhibited twenty-one prints, representing fourteen different printing processes, and clearly explained the method of working each. Instructions were also given for producing the best results. A great deal of useful information was contained in the address, which was very interesting throughout.

Northern Tasmanian Camera Club.—Fifth annual meeting, Mr. R. L. Parker in the chair. The Secretary read the annual report and balance-sheet, which showed that the club was still increasing its membership, and that the new year started with a fair credit. The members continued to make good use of the library, thus gaining much useful information from the various journals subscribed to by the club. The attendance at the monthly meetings during the year was larger than previously, the members evidently taking great interest in the work of the clubs. After four years' services as Secretary, Mr. F. Styant-Browne intimated that, owing to increasing business engagements, he had reluctantly been compelled to resign, and the members that evening would have to elect a successor. The following officers were elected for the ensuing year :—*Patron :* His Excellency Lord Gormanston.—*President :* The Rev. A. H. Champion, M.A.—*Vice-Presidents :* Dr. H. A. Roome, Mr. F. Styant-Browne, Mr. R. C. Kermode.—*Committee :* Messrs. F. Stewart, W. H. Twelvetrees, and C. Nickolls.—*Librarian :* Mr. F. S. Browne.—*Secretary and Treasurer :* Mr. J. Sparrow. The Chairman, on behalf of the members, then presented the retiring Secretary with a purse of sovereigns, intimating that the members wished its expenditure in an optical lantern and accessories, having preferred giving Mr. Browne the choice of procuring the make of lantern he most desired. Mr. Browne thanked the members for their kind appreciation of his services. A hearty vote of thanks was accorded the Chairman for the use of the room during the year; and the first lady was enrolled as a member of the club.

FORTHCOMING EXHIBITIONS.

1893.	
September 20–21.....	*Hove Camera Club. Hon. Secretary, H. Emery, 142, Church-road, Hove, Brighton.
,, 25–Nov. 15	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1–31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 2–14	Midland Camera Club, Botanical Gardens, Moseley, Birmingham. Hon. Secretary, C. J. Fowler, 4, Woodstock-road, Moseley, Birmingham.
,, 9–Nov. ...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
,, 17–19	*Hackney Photographic Society, Morley Hall. Hon. Secretary, W. Fenton Jones, 12, King Edward-road, Hackney, N.E.
,, 30, 31	*East London Photographic Society, New Tabernacle, Old-street, E.C. Hon. Secretary, W. R. Gould, 61, Gibraltar-walk, Bethnal Green, E.
November 7–11	*South London Photographic Society. Hon. Secretary, C. H. Oakden, 53, Melbourne-grove, Dulwich, S.E.
,, 20–25.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18–Jan. 22, 1893	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

PHOTO-MICROGRAPHY.

To the Editor.

Sir,—I am very glad to gather from your columns of late that considerable attention is being given to some interesting points in connexion with photo-micrography. Two letters in your issue of to-day evidently allow of, or perhaps call for, some reply from me.

First, my friend Mr. T. F. Smith "goes for me" because I hold that the results under discussion are the result of the use of both colour-correct plate and yellow screen. I hold, and claim to have proved, that the use of a plate more or less abnormally yellow-sensitive is the first step towards the result; the use of a light strong in rays more or less near D is the second step. The yellow light, in plain language, ekes out the effect of the extra relative yellow-sensitiveness of the plate. Mr. Smith does not appear to see the importance of his own words: "I am supposing . . . . that the lighting is done with the ordinary paraffin lamp.' In fact he uses a light which is practically equivalent to my limelight transmitted through a yellow "screen." If Mr. Smith will use a light relatively strong in blue-violet rays, and then another with the yellow rays relatively strong, whatever he may "expect," he will find the effect of the yellow light. My experiments showed that the worst result was got with "white" light and an ordinary plate; a colour-correct plate greatly improved matters, while a colour-correct plate and a yellow light gave the best results of all.

We need not discuss the opening statement of Mr. Ives': "That microscopic objectives not specially corrected for photography must work to focus if used with colour-sensitive plates and yellow screen is such a self-evident fact," &c. The statement seems to me loose, but let it pass. Mr. Ives' chief complaint is that I gave credit for noticing certain facts to Dr. Piffard, whereas Mr. Ives had pointed out the same facts on a previous occasion specified by him. In giving the credit to Dr. Piffard for having lately called attention to the facts in question, I acted according to my lights. I was not aware of Mr. Ives' verbal communication to the Photographic Society of Philadelphia, nor have I seen the transactions of that Society of the time mentioned by Mr. Ives. But I must say that, knowing Mr. Ives' intimate connexion with, and knowledge of, colour-correct photography, I can easily believe that he noticed long ago the effects of orthochromatic methods with uncorrected microscopic objectives. I can only say that I knew nothing of Mr. Ives' work in this direction, and, so far as I remember, I have not said that Dr. Piffard was *the first* to notice the facts alluded to. I know too much of the scientific world to claim priority for myself or for another.

Mr. Ives proceeds to say that on a certain occasion he recommended my book on *Photo-micrography*, and for this I thank him heartily; but he says he disputed my assertion "that high-class work could only be done with apochromatic or specially corrected objectives." Well, I did not then know as much as I do now, and I might have made the assertion; but, after a careful search through my book, I cannot find any such statement. This was *not* kind of Mr. Ives. I have over and over again, almost every time I have written or spoken about photo-micrography, said that very good work *can* be done without apochromatic glasses, and, if I overlooked a statement by Mr. Ives, he has overlooked a dozen by me, as well as disputing what I never asserted. I have said, and I say again, that the highest class of work requires apochromatic glasses; and I believe that all the best work has been produced with these objectives. I cannot say what Mr. Ives calls the highest class of work, nor can I say whether his productions are equal to mine; but, if he will permit me to see some of his work, I will either gladly "own up," or say boldly that I do not call his work the highest class. If Mr. Ives builds on the illustrations to my book, I can understand his position to some extent, even without seeing his work of the *same nature*, for these illustrations were chosen, in my own words (p. 10), "to illustrate various types of subject and varied treatment," and they were not all done with apochromatics. It is not only an opinion, but a fact, that apochromatic objectives represent the highest point of excellence at present attained, both for visual and photographic purposes, and I should be much surprised if any real authority were found to deny it.

I am taking for granted that Mr. Ives is conversant with the best work of such men as E. M. Nelson, Van Heurck, Comber, T. F. Smith, Bousfield, R. Zeiss, and even the "buga" of A. A. Carnell. If he is not, he has still something to learn about high-class photo-micrography.—I am, yours, &c.,

Andrew Prinole.

RETOUCHER'S TROUBLES.

To the Editor.

Sir,—Having experienced the same difficulties as the retoucher in your correspondence column mentions, namely, that of not being able to get sufficient lead on the negative, I can give a remedy which may be of use to my brother artist in photography.

There is one condition of the unvarnished gelatine film suitable for retouching upon, that is, the matt-surface looking film, with a texture like the rose leaf; you can work on such a surface with or without medium. When the surface of the film has a polished appearance, a kind of metallic lustre, there is greater difficulty in getting the lead on. By applying medium, and working with gentle pressure, you can get the lead on. Too much pressure upon the pencil brings the medium off again. A softer pencil enables you to put more lead on the negative. If the varnish is very hard and glassy, first apply the medium with the finger, rub it well in with a circular motion, then bring the finger right down the same part several times, this abrades the surface; then apply the medium again with handkerchief, just a little medium. You will then be able to put sufficient on the negative.—I am, yours, &c.,

A. W. C.

To the Editor.

Sir,—In reply to "Retoucher," while unable to assign a cause for the trouble, I would advise him to go over the negatives lightly with an old silk handkerchief moistened with methylated spirit before applying the medium. I have found this to remove all trace of greasiness from a negative when wishing to apply water colour to it; also to see that the

medium has not, by evaporation or chemical change, become too thick. Hoping that these hints may remove the difficulty,—I am, yours, &c.,

Clare, Suffolk, September 4, 1893. THOS. STOKOE.

MR. W. E. DEBENHAM ON "PHOTOGRAPHIC SOPHISTICATION." A REPLY.

To the EDITOR.

SIR,—After reading Mr. Debenham's criticisms in THE BRITISH JOURNAL OF PHOTOGRAPHY for September 1 on my article on "Optical Truth and Visual Truth," published August 26, I feel somewhat at a loss to reply to him, since it seems to me that I have not succeeded in making the main point of my arguments quite plain. When correcting the proofs, I actually sent back another diagram, and a little additional matter, with the intention of making my point still plainer if possible; but, no doubt because it was too late, my article appeared as it originally stood.

Mr. Debenham wishes to know whether I approve, or not, of Mr. Van der Veyde's apparatus being used for modifying the sizes or proportions of head, arms, waist, and other features of the sitter, "independently of whether they are enlarged or diminished by perspective to suit an ideal, conventional or otherwise."

I at once reply, No. I should call this a most illegitimate use of such an apparatus. I am quite agreed with Mr. Debenham in his remarks made at the Society of Arts on this subject of conventional flatteries. I was not attempting to deal in detail with this aspect of the subject—or second branch of it, as Mr. Debenham calls it—except, perhaps, by implication.

Then, in his fourth paragraph, Mr. Debenham puts forward two cases for my consideration, one being the case of a block of buildings viewed in perspective from a distance of 100 yards, and the other, a case of, say, a model of such building on one-tenth of the scale, viewed from one-tenth of the distance from a corresponding point of view, so that the geometric perspective is exactly the same in both cases. He then challenges me to show why, in the latter case, a rendering of the view by photography is not to be considered true to the visual sense, while the photographic rendering in the first case is to be looked upon as faultless. I can answer this quite agreeably to the theory which I have already put forward, although I must remark that my arguments do not apply quite so strongly to representations of solid geometrically shaped objects showing a vivid perspective, whereby the eye, or mind, is more certainly impressed with the sense of relative distances, and therefore sizes, than it is in the case of objects of uncertain and varied outlines. My explanation of why the above two subjects should be somewhat differently treated lies in the fact that, in the first case, the two eyes of the observer at the distance of 100 yards are practically the same as one eye; whereas in the second case, while the scale of everything, including the distance of the point of view, is reduced to one-tenth, yet the distance between the two eyes remains the same—that is, the distance between the eyes is *ten times as much* in proportion to the scale of the buildings in the second case as in the first. Leaving out any considerations of atmospheric perspective, in the first case the observer can only guage relative distances, and therefore sizes, by means of the effect of geometric perspective, while, in the second case, besides the effect of geometric perspective, he has also the further effect of binocular vision, which, of course, tends to give a greater sense of relief than in the first case.

In the first case, the fact that one end of the buildings is twice as far away as the other may be approximately realised; but, in the second case, it is possible to realise this fact far more completely, and I fully believe that the nearer parts of the buildings in this second case will appear to two-eyed vision relatively smaller than they do in the first case. This is, after all, merely another way of stating the fact, which I find experimentally verified, that one-eyed vision tends to over-estimate the relative sizes of nearer objects, when viewed closely, *as compared with two-eyed vision*. This, of course, is but the correlative of the truth that two-eyed vision of near subjects is apt to under-estimate the relative sizes of nearer objects as compared with the effects of geometric perspective, pure and simple, which are experienced when viewing the same subject with only one eye. But it is just the effects of *two-eyed* vision of near subjects which the painter seeks to transfer to his canvas, and if, in the process, he unconsciously perpetrates something not quite true to the laws of geometric perspective, it need be owing to no desire to conventionalise his subject, but owing to the unavoidable discrepancy between one-eyed and two-eyed vision.

What I assert is, that the perspective of near subjects must be somewhat modified, or "sophisticated," as Mr. Debenham calls it, in order that the plane representation on canvas or paper may give the same sense of relative sizes of parts as are obtained when viewing the original subject with two eyes from the same point of view.

I agree with Mr. Debenham that "no single picture can give binocular effect," but I maintain that it can give something in the nature of an equivalent for it, some compensation for the *absence* of binocular effect.

But I own Mr. Debenham makes a very good point against Mr. Van der Weyde's apparatus, inasmuch as he points out that no reducing of a hand or a foot can take place without a corresponding shrinkage of the part of the background behind against which it is seen. This would be an insuperable objection were the background of such a nature that a modification of its proportions would be of consequence; but in most cases of studio work it would not matter. He then assumes that no diminution of the head could take place without, at the same time, lengthening out the neck. Although I should strongly disapprove of making the head smaller in the first place, I may yet point out that the neck need not be lengthened, seeing that the head, besides being reduced, may also be lowered in position.—I am, yours, &c.

York, September 2, 1893. H. DENNIS TAYLOR.

To the EDITOR.

SIR,—Please allow me to correct some printer's errors, which, in some places, change the meaning of my writing in the article on "Photographical Sophistication," of last week.

In the sixth paragraph the first sentence should read, "My own view is that pictorial representations are generally referred (not preferred) by the spectator," &c.; and, a little farther on, I am made to hold up the book of beauty as eminently responsible for ridiculously small hands and feet, &c. What I wrote was, "the book of beauty or (not of) the pre-photographic period," and I wished to describe the generality of the artistic work of the period, not of the particular work which did not include such striking examples of the conventionalities mentioned as were to be met with elsewhere.

In the fourth paragraph I am made to speak of a "cake or a house," rather an odd conjunction. Whether "cake or" stands for "side of," or what else I do not now remember.

The concluding sentence should read, "Does Mr. Taylor consider that the reduction of heads and waists, the making of the sitter taller and slimmer in the picture, and the photographers' assent to and proposition that this is, in accordance with visual truth, is in itself a truthful proceeding, or would he consider it to come under the censure of the sentence quoted from his article?"—I am, yours, &c., W. E. DEBENHAM.

KEEPING QUALITIES OF FILMS.

To the EDITOR.

SIR,—As there is at present a controversy going on as to the keeping quality of celluloid negative films, facts bearing on the practical solution of the question may be of interest to your readers, and I would like to mention that to-day I gave an exposure to a Thomas's rapid film purchased in January, 1891, and developed a perfect negative in every respect. The film had been knocking about in the slide for over six months.—I am, yours, &c. GEORGE MANSFIELD.

Morristown, Lattin, Naas.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

To the EDITOR.

SIR,—Will you kindly remind your readers that Wednesday, September 13, is the only day for receiving exhibits at the Gallery for the annual Exhibition of the Society, and that they may be sent at any time up to September 11 to our agents. Full particulars can be obtained on application to the Assistant Secretary at the Society's rooms, 50, Great Russell-street, W.C.—I am, yours, &c., CHAPMAN JONES, *Hon. Sec.*

Photographic Society of Great Britain,

50, *Great Russell-street, Bloomsbury, W.C., September* 1, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange thirty lantern slides of Germany, plain, for some coloured slides, any subject.—Address, G. MOORE, Buckfastleigh, Devon.

Backgrounds, one exterior and one interior, about 8×8. Will exchange for others. Can send photographs of both.—W. HOBBS, Gold-street Studio, Saffron Walden.

Prize pigeons, ten pure bred silver duo Antwerps and two red chequered Antwerps, will exchange for half-plate camera and lens and three double slides.—Address, WALTER BOX, the Studio, Cannock.

Will exchange whole-plate portable bellows body camera, very light, three double slides, also a tripod stand, in exchange for studio camera and accessories.—Address, F. DAVIS, 8, Zingari-terrace, Forest Gate, Essex.

Wanted Archer Combined quarter-plate camera or half-plate Watson's Acme, McKellen, or similar pattern, any size, in exchange for Marion's 6½. 10s. embossing press.—Address, W. H. HUNTER, 73, Trafalgar-road, Peckham, London, S.E.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

G. H. I.—A lens of sixteen inches focus would be required.

F. GARNER.—We do not remember the name of the maker, but the lens is undoubtedly of French origin.

G. BROWN.—This correspondent inquires if we "know anything of the Photographic Apparatus Supply Society?"—Reply: No.

SPOTTY.—1. Yes, occasionally. 2, Yes. 3. Furnish us with particulars as to toning bath, quality of water, and we may be able to help you.

M. E. C. W.—Almost any cabinet lens could, we think, be fitted to your half-plate camera. Write to the principal makers for the diameters of the flanges necessary.

R. WARD.—It is not necessary that the thick glass plates for collotype be bevelled at the edges when they are printed in an Albion press. In the case of the power press—machine printing—they should be.

A. W. ERSKINE.—Possibly the deposit is ferrocyanide of silver. Do you use hypo to follow? If neither of these is the cause, perhaps an acid solution will remove the deposit, which may be due to lime, &c., in the water.

F. E. G.—1. The addition of fresh hypo solution will be necessary when it is seen that the bath is losing rapidity of action. No definite strength can be given. 2. Add sufficient until no further precipitation takes place. 3. We have as yet no further information.

EXPERIMENT.—The reason why the blotting-paper causes the stain could only be ascertained by careful chemical analysis. It must be obvious to you that we hardly have the time to devote to such an operation. Procure two or three samples, and experiment with them as to their suitability.

D. WEBSTER.—We are by no means surprised that you have not improved the appearance of the lens mount. By cleaning it with emery cloth you have cleaned off the lacquer and exposed the bare brass. The only thing that can be done now to improve matters is to get the mount relacquered.

WATCHMAKER.—No rolling press will give the same gloss to gelatino-chloride prints as can be obtained by drying them in contact with glass. Those who desire the extra high gloss do not, as a rule, consider the method of obtaining it too troublesome. The rolling press mentioned is a very good one for the money.

TONY.—So far as we are aware, no one supplies gelatino-bromide emulsion ready for use. Therefore we suspect you will have to prepare it for yourself. It is possible, however, as you only require a little for an experiment, that some dry-plate manufacturer will oblige you with a small quantity, but it will only be as a favour.

TRAVELLER asks: "Would you inform me if, when I go to Australia, I may take any quantity of films for hand-camera use, or will there be any duty for same, and will the Custom House want to see them? If any duty, what is the largest amount I can take without having to pay anything?"—Perhaps some of our readers who have carried films to Australia will supply the desired information.

DRY PLATE.—It is quite out of the question to give in this column such details of the working of the wet-collodion process as would be of any value to one who has no knowledge whatever of it, or has never seen it worked. Our correspondent's best way will be to get one or other of the old manuals of photography. When the rudiments of the process are mastered we shall be pleased to assist our correspondent further.

J. BENNELL.—By shortening the tube of the rapid lens, so that glasses are brought together, it will cover a larger field; but it will have to be worked with smaller stops than before. We should advise you to have a separate mount for the glasses, to be used only when the widest angle is desired. Then they can at any time be returned to the original mount, and thus the commercial value of the instrument will not be impaired.

O. M. O. asks which side of a studio, running north and south, should be glazed, the east side or the west, as only one side can be of glass?—The best side to glaze will depend upon circumstances. If the studio is likely to be used most in the early part of the day, the west side will be the best to glaze, so as to avoid the morning sun. If used most in the afternoon, then the east side had better be glazed, thus avoiding the sun on the side most used in the after part of the day.

A.A.B.—The composition is composed of gelatine and glycerine, with sometimes treacle. The proportions are varied according to the degree of hardness or softness desired and the kind of gelatine employed. It will be better to purchase the composition ready prepared. It may be had of different degrees of hardness. Tubes for moulding rollers are supplied by all dealers in printers' material. Ordinary printing ink of good quality is what is used in printing half-tone blocks.

C. C. SMITH says: "Would you let me know if there are any books published on the process of photogravure, and where they are to be got?"—For a few pence the Assistant Secretary of the Photographic Society of Great Britain, 50, Great Russell-street, will supply you with a copy of the Society's *Journal*, containing a lecture on photogravure by Mr. Denison, which may meet your requirements. Our own back volumes contain a large amount of information on the subject. We do not know of any reliable book on the subject.

S. A. Y.—This correspondent says that "we can purchase almost everything connected with photography cheaper if it is made abroad than we can if it is of home manufacture, and why is this not the case with dry plates?" adding that "it would be a great boon to an amateur if he could buy his plates cheaper."—Quite so. We imagine that it would be an advantage to every one to have his goods, whatever they may be, at a cheaper rate. But the fact remains that foreign plates, quality being equal, are much dearer than English ones; also that probably more English plates are used on the Continent than those of Continental make. We strongly suspect "S. A. Y." will not get cheaper plates from abroad than those manufactured in this country, for some time to come, at least.

R. W. H. says: "I have been much tried by spotting, such as you see on the enclosed photograph. I have tried everything to remedy it, but with no avail. I may say I find it only on the two kinds of mounts enclosed. The mounts came over last year at the time the cholera was about. They were disinfected. Do you think the disinfectant used has anything to do with the spotting?"—Without knowing how the mounts were treated, it is impossible to offer an opinion that would be of any value. We have seen many examples of similar spots on prints the mounts of which had not been disinfected.

T. WILLIAMS says: "I want to convert my bath room into a dark room, but it must be on the 'Box and Cox' system—that is, it must still be a bath room when required as such."—We strongly suspect that bath rooms are frequently extemporised as dark rooms. The usual way is to have a wooden shutter, if the window is large, with a small glazed opening, the shutter being hinged so that it can be open and shut as required. If the window be small, a light wooden frame, either covered with non-actinic paper or glazed, will suffice. This may be secured to the window frame with a couple of "turn buttons," or may be permanently hinged to it. The bath itself is sometimes used as a sink, but it is better to have a proper sink if space will allow.

F. R. F. writes: "A friend of mine has a photographic portrait of Garibaldi, received from him and signed on the mount. It is an albumen print, framed and hung, and is now decidedly yellow and beginning to fade. I pointed this out, and being asked what should be done suggested that the print should be copied, removed from the mount, and a platinotype be substituted for it. I venture to ask you kindly to advise in your 'Answers' column if any better course can be adopted, and whether any method, beyond taking the print from the frame and keeping it from the light, could be employed to prolong the life of the original print."—We should advise the print being copied as it is, an orthochromatised plate being used for the negative. In this way, if the detail has not disappeared, a copy as good, or nearly so, as the original was in its pristine state can be obtained. It is scarcely advisable to remove the print from the mount, as the treatment with water often hastens the fading. Light will have but little action now on the print.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1741. Vol. XL.—SEPTEMBER 15, 1893.

OVER-INTENSIFICATION OF NEGATIVES.

An unusual number of letters having been received during the past and present week from querists who find that they have been over-intensifying their negatives, we take this means of replying to them all.

When a negative has been under-exposed and the action of the developer has been prolonged in the hope of getting the details in the shadows coaxed out, by the time this latter effect is produced, if produced at all, the high lights will have acquired such a degree of density as to require a duration of printing so prolonged as to entirely destroy the delicate shadows. The transition from the highest light to the deepest shadow is too abrupt, and the print resulting is hard.

We have intentionally produced a negative having these characteristics in order to see the effect obtained by the discriminating action of light in imparting density to the weaker parts. This we have done by varnishing the hard negative by a collodion emulsion of chloride of silver and exposing its back to light. The action thus produced is obvious. The thinner portions of the negative permit more light to be transmitted to the sensitive varnish than do the more dense portions, and hence, by the darkening of the former in due proportion, a marked degree of equalising is produced.

We do not here enter into full manipulative details, feeling assured that these will scarcely be required by our readers, more especially as it is scarcely three years since we treated of this special phase of the subject. On that occasion, however, we recommended applying the sensitive coating to the back or glass side of the negative, but we have since found it preferable to coat the film side. Further, we may state that a simpler and not less effective collodio-chloride coating than the one we then gave may be prepared by the three following stock solutions:—

A.	
Nitrate of silver	1 drachm.
Water (distilled)	1 „
B.	
Chloride of calcium	64 grains.
Alcohol	2 ounces.
C.	
Citric acid	64 grains.
Alcohol	2 ounces.

To every two ounces of plain collodion add thirty drops of the A solution, previously mixed with one drachm of alcohol; then one drachm of B solution, gradually shaking well at the same time; lastly, half a drachm of C solution. It is ready for use almost immediately after mixing, and will keep well for a considerable time.

When negatives have been simply made too dense, without being hard, they may be made thinner by one or other of the expedients so often published, such as treatment with a very weak solution of ferridcyanide of potassium, followed by immersion in a solution of hyposulphite of soda, or by treatment with a solution of bichromate of potash, to which has been added very little sulphuric acid. Exceptional care must be taken that this latter mixture is used in a highly dilute form, as its solvent action on the image is so great that, if strong, it will remove it altogether.

It is when a negative has been intensified by bichloride of mercury, with a subsequent treatment with ammonia, that one is most apt to over-intensify, even to such an extent as sometimes to necessitate more than a day's exposure in the printing frame to secure one print. The cure for this may in nearly all cases be readily effected by reimmersing the negative in the mercury solution, by which the dark-brown opaque colour of the image is rendered translucent, and usually of a yellowish colour, that, without any further treatment, serves to convert it into a good printing negative. It should not be forgotten that the action, both of the mercury solution and the ammonia, is a progressive one, and, by attention in watching such progress, either in intensifying or in reducing, the operator who uses his judgment will have complete command of the situation, it being well understood that the solutions employed are sufficiently weak to enable him to have control over their action.

Although we have assumed ammonia as the reagent in intensification, it is well to realise that there are several others, each of which imparts its own colour to the deposit. Amongst these may be mentioned sulphide of ammonium (the most powerful of all), hyposulphite of soda, sulphite of soda, and others.

TESTING MOUNTS AND MOUNTANTS.

The many examples of fading and spotty prints we are continually receiving, with the query as to whether the evil is not due to the mounts, renders it necessary to say something more on the subject than can be said in brief replies in the correspondence column. At the present time it seems that considerable suspicion exists with regard to photographic mounts, and in some instances it is well founded, and in others just the reverse. It is too frequently assumed, if a mounted print fades quickly, while a corresponding one which was kept unmounted does not, that the mount must of necessity be the cause. This is a fallacy, as the fading may be, and in many cases is, really due to the mountant. We have frequently had cases brought under our notice where prints mounted in optical contact with glass have become yellow in a very short time,

while others, kept unmounted, have not suffered. In these cases it is clear, as the mount is a glass plate, that it cannot be the cause of the evil.

There is a very simple way by which photographic mounts may be tested without subjecting them to a chemical analysis. The method is that described by Mr. Foxlee in our ALMANAC for the current year. Briefly, it is this: A light print is made on albumenised paper, toned, fixed, washed, and dried as usual. The mount to be tested is just moistened with distilled water, and over one half of it is laid a sheet of any material that is impervious to water, such as talc, celluloid, or two or three thicknesses of paraffined paper. The print is now laid on face downward, and over that is placed a piece of plain Saxe or Rives or other pure paper. The whole is then fastened together with a paper-fastener or a few stitches of cotton. It is then backed up with several sheets of moistened blotting-paper, and the whole placed between a couple of glass plates under pressure. The object of the glass plates is to prevent evaporation, and so retain the print and mount continually damp. As moisture conduces to fading, particularly at a warm temperature, the print should be kept in a warm place, as our purpose now is to hasten its fading as much as possible.

The print should be examined from day to day. If it fades uniformly all over, the mount may be considered innocuous; but, if that portion of the print which has been kept in contact with it shows spots or signs of fading before that part which is protected from it by the impervious material, it proves that the mount has had a pernicious action. In some bad cases we have seen a marked difference between the two tables of a print, so treated, at the end of a couple of days, or even sooner.

If the mounts are of the dark kind, it is quite possible that the print may become stained by soluble colouring matter diffusing out. But this does not prove that the mount is unfit for its purpose. By long contact with a damp print a mount may produce a stain, yet have no otherwise ill effect on the silver image, as proved by examining it by transmitted light. Instead of employing a light print from a negative, a piece of sensitised paper, exposed to diffused light until it is about as dark as the half-tones of a light print, then toned, fixed, and washed, is preferable, as the change, if any, is more quickly detected on the uniform surface than it is on an image. If photographers who suspect the mounts as being the cause of their prints fading in a brief period were to submit them to the above simple yet reliable test, they would frequently find their suspicions quite unfounded, and that the source of the evil must be sought elsewhere.

The mountant is frequently a fertile cause of fading. The most general mountant is starch, and an excellent one it is, provided the starch is of good quality and the paste is used freshly prepared; but samples of starch, as they are met with in the oil shops, vary much as to their suitability for our present purpose, although they may all be equally good for laundry uses. Some kinds have had a blue colour added to them in the manufacture to give them a fictitious whiteness by disguising their yellowness; others are strongly coloured blue. We are informed that the blue, sometimes used for the purpose, is artificial, ultramarine, which is composed largely of sulphur, and is readily decomposed by acid with an evolution of sulphuretted hydrogen. Gelatine and glue are favourite mountants, but many samples are strongly acid or rapidly become so if kept in dilute solutions. Dextrine is sometimes used, and that, as found in commerce, is almost invariably acid. The various liquid gums and ready-prepared cements, sold by stationers for general adhesive purposes, are sometimes used for mounting purposes; most of them contain an antiseptic, and sometimes that is bichloride of mercury. If cements, such as those enumerated, be employed, the delicately constituted silver image will be jeopardised, particularly if the mount be impure.

The effect of a mountant can be tested in a similar manner to that of mounts, namely, by coating one half of a print with it, and mounting it face downwards on a piece of clean glass, leaving the other portions free, and allowing it to dry. It is then kept damp in a warm place, as in the case of testing mounts, and examined daily. This, it may be mentioned, can scarcely be considered so conclusive a test as in the case with the mounts, as the moisture and warmth favour fermentation and mildew, conditions that do not pertain in a state of dryness. But a deleterious mountant will generally make itself manifest before that sets in—sometimes, even, in a few hours.

BUBBLES.

NOT the bubbles of the Millais picture with which the advertisement hoardings have made the public familiar, or those appearing in some charming photographs to which we have referred several times lately, but such as are formed on gelatine films during development. As more than one correspondent has recently written us complaining of this unwelcome visitation, and its equally undesirable after-effect in the shape of transparent circular spots in the negative, and as, moreover, we have ourselves had some experiences in this direction, it may be worth while to devote a little consideration to the causes of the defect and the remedies for obviating it.

Setting aside for the moment defects in the emulsion which may tend to produce transparent markings in the negatives of the minute form known as pinholes, as well as the larger and more symmetrically defined variety analogous to those produced in development, let us enumerate the commoner causes which produce them. Particles of dust on the film during development not only cause pinholes, but occasionally act as nuclei for air bells, and thus produce large circular transparent spots, due to the retention of the developer from the spaces covered by them. Again, if a quantity of developer insufficient to well cover the plate be employed, or the wetted film be left exposed for a considerable time to the air, air bells appear, with a like subsequent result.

A developer that has been used again and again, especially in hot weather, such as that of the departing summer, rapidly becomes frothy and bubbly, and is therefore a prolific source of failure if means be not employed to stop the growth of air bells. Some operators allege that a preliminary soaking of the plate in water is also favourable to their formation, while others affirm that the action of flowing the developer over the plate should be avoided in preference for the immersion of the plate in the developer.

The nature of the gelatine of the plate is, perhaps, as much responsible for the formation of air-bells as any other cause. If it be of a repellent character, and the developer is above the normal temperature and at all frothy, the conditions are very favourable. On the other hand, we have observed that plates of which the gelatine is of a soft kind, even under such circumstances as those just described, do not prevent the access of the developer to all parts of the film alike.

Such a degree of skill is required for the successful touching-out of transparent holes in negatives, that it is worth while to take a little extra precaution to prevent them. We have not

confirmed the suggestion that preliminary soaking of the plate, its immersion in the developer, or the flowing over of the latter upon it, have anything to do with either fostering or obviating the growth of air bells on the surface; but it is quite certain that the quantity of solution used is of considerable importance. Sufficient of it should always be taken to well flood the plate, which should be left uncovered for as little time as possible. So soon as the solution is in contact with the plate, a broad, clean camel's-hair brush, or a pledget of cotton-wool should be evenly, and not too forcibly, drawn over its surface, so as to disperse any bubbles that may have formed, and to prevent their occurrence by ensuring that the film is uniformly wetted. As a rule it is next to impossible, in the dark room, to see when the bells have formed, so that it is well not to trust to one's eyesight in the matter, but to keep a brush or some cotton-wool handy for constant use. Where an old developer (for which many workers have a fondness) acquires perceptible frothiness, it is worth while running it through a filter paper, which will render it temporarily clear.

These are some of the commoner causes of an aggravating complaint which happens in the course of every-day practice, and a little attention to which will ensure its prevention. We have not spoken of splashes of water, before or after exposure, and other obvious sources of danger, as we take it that due care is always exercised in every well-regulated studio, professional or amateur, so that such are guarded against as a matter of course. We have also assumed that the causes of these transparent markings are not inherent in the plates, which are too often unjustly blamed for them.

"A Sign of the Times."—Among the causes that contributed to their failure, the members of a large firm of printers, wood-engravers, &c., recently "gazetted," are reported to have included the influence of process work, which had operated to oust wood-engraving from its former pride of place.

The New Fixing Material.—We have looked into a large number of English priced catalogues of chemicals, to endeavour to learn the probable cost of thiosinnamine in this country, but so far unsuccessfully. We have, however, come across the price in an English agent's list of a foreign manufacturer's chemicals, and in this (a wholesale list) it was priced at three shillings and sixpence an ounce. But, then, we must remember there are photographers now alive who can remember hypo at a guinea a pound.

A New Thermometer Liquid.—M. P. Chappuis, of the International Bureau of Weights and Measures, has, since 1889, been experimenting with regard to a substitute for alcohol in thermometers for low temperatures, which is found to be very unsatisfactory in many respects and irregular in its action according to the various sources of its supply. So far M. Chappuis has fixed upon toluene which has a much higher boiling point (about 111°), and is of greater fluidity. Its indications are much more trustworthy than those of alcohol.

To Blacken Zinc.—Mr. J. A. Moss, writing in the *Electrical Review*, while stating that Brunswick black (a solution of asphalt) is the best for the purpose, as it forms a resistant varnish, at the same time points out that, when a metallic blackened surface is needed, it may be obtained by pouring a weak solution of copper sulphate over the object, which thereupon becomes coated with a dense deposit of black oxide of copper. This is pulverulent, and requires lacquering to ensure its permanency. For lantern work, diaphragms, &c., it is not possible to imagine a less costly process than the latter.

Developer Stains on Negatives.—There is, we believe, a growing desire with many photographers to revert to the kind of negative having the slight stain producible by pyro development either without sulphite or with a very small portion of that agent, such as was frequent a few years back. We have heard it stated by many operators that the "pretty" negatives yielded by the newer developers are so deceptive in their printing qualities that they are tempted to go back to negatives of pyro-like quality on that very account. This implies that, after all, a slight yellow stain is no disadvantage, but rather the reverse in some cases.

The Meeting of the British Association offers very few themes of interest to photographers; but, in one respect, the lecturers have borrowed a page from photographic experience, in that the optical lantern and photographic representations are being made use of to some considerable extent. We wonder if *Convention* authorities could in return take a leaf out of the Association book? We read that "the local committee has engaged the Theatre Royal for Wednesday night next, when Mr. Wilson Barrett's company will give the new play, *Pharaoh*. It is hoped that members will avail themselves of the invitation extended to them for this entertainment, and that it will induce them to remain in Nottingham and take advantage of the excursions arranged for the following day."

Economical Manufacture of Oxygen.—This subject continues, in chemical circles, to excite much interest, and in the *Chemiker Zeitung* has quite lately been treated by one expert—Kassner, the inventor of a process before described in these pages, and by Le Chatelier in another place. Kassner's improved process makes use of furnace gases; a new process has been patented by Peitz in which, instead of furnace gases, pure carbonic acid is employed. Le Chatelier concludes that calcium plumbate gives up its available oxygen by merely heating at a temperature of 200° higher than that employed in Brin's process in the case of barium peroxide, and that the heated residue absorbs oxygen from the air much more rapidly than the latter substance. He seems not to have read Kassner's explanations of the latter's process, who points out that he has already explained this, but now asserts that his indirect method possesses two great advantages over Le Chatelier's direct method, in that a lower temperature is required, and a consequent saving of fuel and wear of retorts is effected, and that a valuable bye-product, pure carbon dioxide, is also obtained.

M. Kassner's Indirect Method.—The inventor claims a distinct superiority over Brin's process. He first exposes calcium plumbate to the action of moist furnace gases, previously well washed, at a temperature not exceeding 100°. Under these conditions the plumbate rapidly absorbs the carbon dioxide of the furnace gases, with the resulting formation of calcium carbonate—free peroxide of lead. This decomposition is not accompanied by any change of form, the spongy masses preserving their original appearance. They are next transferred to a strongly constructed retort heated to redness, oxygen being then strongly evolved This evolution is facilitated by leading superheated steam over the mass. When most of the available oxygen is given up from the peroxide, carbon dioxide begins to come off, which after a while is collected separately, the gas being perfectly pure. The first outburst of this gas, which is not quite pure, is carried over a further quantity of calcium plumbate, which absorbs it entirely and allows pure oxygen to escape, and so the process is made to continue indefinitely. It seems abundantly evident that the barium process is by no means the only one available, and we can only hail with satisfaction any improvements in the direction of reducing cost, as it must ultimately reduce the already low price of this valuable agent.

AN IMPROVED MICRO-CAMERA.

Now that the microscope is becoming such an adjunct to the camera, we hail with pleasure every appliance that is calculated to develop this union. Hence we have pleasure in giving a brief description of

a micro-camera which appears to us to combine several advantages. We have called it an "Improved" micro-camera. So it is, in respect both of its simplicity of design and construction. The manufacturers are Messrs. Perken, Son, & Rayment, and we incline to the opinion that, of their various productions which warrant them in adopting the trade term "Optimus," this will not be found to be the least worthy.

The one we examined is constructed for micro enlargements on plates $3\frac{1}{4} \times 3\frac{1}{4}$, which, it will be observed, is the English standard for lantern plates, for which adaptation it is intended, in order to exhibit the subjects by projection on a screen. This at once imparts an idea as to the dimensions of the camera proper, which is erected on a baseboard fifty inches in length. The bellows-body is twenty-four inches long, and is attached by one end to a strong wooden front erected a little over two feet from the rear end of the camera, and pierced in the centre with a hole of such dimensions as to permit of the insertion of the eyepiece end of the microscope. But the microscope itself is erected upon an movable baseboard outside the wooden front mentioned, that is to say, it is adjustable as regards its motion to and from the camera, and, when the microscope has once been adjusted to the proper height, it is in accurate centre for ever after. On a second and similar sliding sub-baseboard, made, like the former, to slide axially, is erected any of the various microscopic sub-stage appliances common to the microscope, such as the condenser, which, after being fitted, is, like the optical system, ever afterwards in centre, requiring no further attention than the sliding backwards or forwards. A third sliding platform, similar to the two just spoken of, is intended for the lamp.

A rack extends the whole length of the principal baseboard, and each of the movable platforms mentioned is operated by a pinion ready of access to the photographer, who thus can control the various movements necessary.

The rough adjustment for degree of enlargement is made by sliding in or out the bellows-body, which is under control of one of this firm's patent pinions, capable of being thrown out of gear with the rack for rapid adjustment, and of being geared again when it becomes necessary to focus. This we consider a very handy arrangement, as it saves the long and tedious racking out when extending the bellows to any considerable extent. The fine adjustment of the microscope is done by means of a hand and pulley at the rear end.

The various sliding pieces work smoothly within brass guides at either side of the baseboard. It is made of mahogany, and is finely finished. Although the one we examined is made of dimensions suitable for lantern slides, there is no limit to the size to which it can be made. A great charm lies in the readiness with which work can be resumed at a moment's notice after the instrument has been packed away on the shelf.

CONTINENTAL NOTES AND NEWS.

Monument to Daguerre.—A monument to Daguerre is to be erected in the village of Bry-sur-Marne. The municipality has charge of the matter, and M. G. Rolland, of 2, Rue de Sfax, will receive subscriptions.

Imitation Ground Glass.—The following plan is advocated by Herr Toch, in the *Rundschau* for imparting a very fine grain to glass for focussing purposes. Fix an unexposed gelatine plate, wash, and immerse in a solution of chloride of barium. Then, without washing, treat with a very dilute solution of sulphuric acid, keeping the latter in motion over the plate. A fine precipitate will be formed in the film.

The International Union of Photography.—The second session of the International Union of Photography opened at Geneva on August 21. A large number of members and delegates from photographic societies were present. At the opening *séance*, M. Joseph Macs, president of the Union, took the chair, being supported by Messrs. Janssen, Batault, Pricam, Demole, Luckhardt (Vienna), Warnerke (London), Liesegang (Düsseldorf), Davanne, Audra, Gravier, and Berthaud (Paris), Bucquet, Boisard, Lumière, Puttemans, &c. The second sitting was remarkable for an account, by M. Janssen, of the photographic work of the recent Eclipse Expedition. At another meeting, pictures in "natural colours," according to Lippmann's method, were exhibited by M. Lumière. On the Thursday an animated discussion took place over an attempt to obtain a clear and precise definition of what constituted an amateur. Several excursions and receptions took place during the week, and the proceedings concluded—not with a "werse," as Sam Weller has it, but with a banquet. On the whole, the Union appears to have had an enjoyable time, its doings much resembling those of our own Convention.

Iodine and Glycerine in the Developer.—Professor Lainer states that a drop of tincture of iodine to about each ten c.c. of eikonogen developer imparts excellent softness and gradation to the negative. The addition of glycerine 5: 100 prevents fog, and adds to the keeping properties of the solutions.

Relative Quantities of Silver Haloid and Gelatine in Commercial Gelatine Dry Plates.—MM. Frutiger & Perrot have ascertained the respective weights of silver and gelatine in a dozen kinds of plates. Their method consisted in the elimination of the silver haloids with cyanide, washing the films in running water and then removing them. After being washed in alcohol for two hours the films were allowed to dry spontaneously at the ordinary temperature, placed in a drying stove at 105°, and weighed. When incinerated the gelatine leaves a trifling weight of phosphate and carbonate of lime behind completely free of silver salts. The resulting figures show proportions of silver to gelatine varying from about 1: 2 to 1: 5. The authors, however, are inclined to think that the proportions of silver and gelatine contained in a plate afford no guide as to its qualities.

SOME USEFUL PHOTOGRAPHIC STANDARDS.

[Brixton and Clapham Camera Club.]

Do not think that in this memoir much in the way of novelty will be brought forward in relation to photographic standards. For years English photographers have been, like pelicans, crying in the wilderness for simple standards of measurement, and to their bitter cry dealers have responded but in homœopathic doses, with the loss of years of time between each driblet. One object of the paper is to emphasise old-established demands as to what scientific photographers want, but, so far, have not been successful in obtaining.

A demand constantly exists, and that demand is sometimes expressed at the meetings of photographic societies, for a standard light for common use in photography. Herr von Hefner-Alteneck once read a paper before the Electro-Technical Society of Berlin, describing his amyl-acetate lamp as a photometric standard. His invention next came before the Congress of Electrical Engineers in Paris, soon after that city had been partly lighted by electricity, where the simplicity of the lamp riveted the attention of the late Sir William Siemens, who made it widely known among electrical engineers in London; and, when it subsequently came under the notice of Captain Abney, he read a paper about it before the Photographic Society, setting forth that it was exactly what photographers required. Then it was forgotten for a course of years, until the holding of the International Photographic Congress in Paris at the Exhibition there in 1889, when the amyl-acetate lamp was again recommended for general photographic use.

Still, the mass of photographers have no amyl-acetate lamp. What, then, is this lamp which commercial men are so long in supplying? If you gaze in certain oil shops and ironmongers' shops, little brass lamps will sometimes be seen piled a yard high, and selling at threepence or fourpence each, under the trade name of "benzolene" lamps. They are made for burning light petroleum. These lamps are practically amyl-acetate lamps unstandardised. If good double screws be put to them to raise the wick, if the tube be made to standard size, and some minor conditions receive attention, you have an amyl-acetate lamp. It is largely a question of exactitude in manufacture, and in screening the flame with a diaphragm having a standard aperture. If these modifications were made, and the standard wick used, they might be sold to the photographic public at, say, eighteenpence each, with say, fifty per cent. profit; but, from the experience of the past,

we may have to wait for years before such lamps are readily obtainable. A horizontal piece of platinum wire, supported by a brass rod, indicates the height to which the flame should be adjusted.

Amyl-acetate is burnt in these lamps because of the uniformity of its composition. This liquid is better known, especially to manufacturing confectioners, by the name of pear oil. When the outside of the lamp is not kept clean, or when the wick is turned too high, an overpowering smell of pears prevails. With the best management of the lamp, a faint odour of this kind diffuses, and, after a time, becomes unpleasant. This simple little lamp is exceedingly trustworthy as a standard of light, and would probably have been recommended by scientific experts as the legal standard for testing the illuminating power of coal gas were not its flame a little too yellow. Its tube gets corroded unless made of silver, and Mr. Bothamley has introduced a special method of screening the flame from draughts.

Should this standard ever be used in photography, it is probable that some other hydro-carbon than amyl-acetate will be burnt in the lamp. I think that a more useful standard in photography would be a lamp of the Argand type, giving a light of about ten candles, such, for instance, as Dibdin's Pentane Argand standard lamp. Printing by artificial light could then be done with it, and we should no longer hear the remark at photographic societies, "The exposure should be thirty seconds at one foot distance from the flame of batswing burner," a barbarously vague definition of the amount of light to be employed.

We come now to a standard of light to which small attention has been paid in this country but much in France, namely, Giroud's jet photometer, one of the class of rat-tail photometers. Giroud tests the illuminating power of gas by its own combustion, which, at first sight, seems a strange thing to be able to do. The main principles on which all jet photometers depend are:—1. For the same gas with the same consumption, the height of the flame with the same aperture of the burner is almost directly proportional to the lighting power of the gas. 2. On comparing gases of different qualities burned as a jet, the heights of the flame are in proportion to the illuminating power. Giroud uses a flame 105 millimetres high, which is kept up by thirty-eight litres per hour of the normal gas of Paris, subject to regulation by an excellent rheometer.

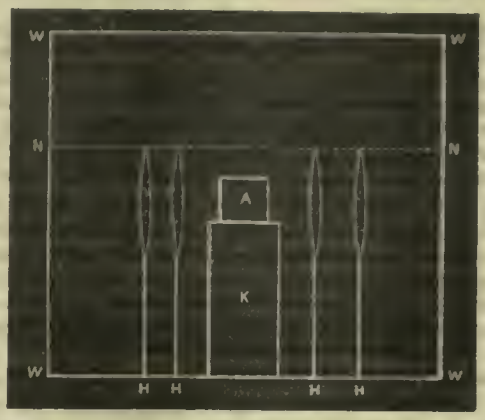
Photographers have all heard of, although few have seen, the sensitometer invented by Mr. J. B. Spurge, one of which is now on the table before you. This instrument has never been on sale in the market, the few that have been made having been constructed by Mr. Spurge's own hands. In calibrating his sensitometer he found the standard candle established by law to be too uncertain to be of any use for the purpose, therefore he employed for the purpose four of Giroud's rat-tail jets.

First, as to the sensitometer itself. It consists, as you see, of a number of holes of different diameters in a plate of hard brass; behind each hole is a little cell, and at the back of the cells is placed the plate to be tested. A standard light is made to shine through the holes for a given time, and the larger the hole the more light does the plate behind it receive. The apertures have to be made with the most scrupulous exactitude, and they have been so well made in the past as to bear with credit measurement under the microscope. In making these sensitometers in large numbers, the holes would have to be made to fit a series of specially constructed Whitworth's gauges, and the construction of these gauges in the first instance, is the only outlay of importance in the way of the commercial introduction of these instruments. The diameters of the apertures were calculated mathematically, so as to be specially useful in scientific research, by Mr. Spurge and by the late C. F. Varley, the Atlantic telegraph electrician.

A few days ago I wrote to Mr. Spurge, telling him that I was going to bring these matters before you to-night, and inviting him to attend. I am glad to say that he is here, and has brought with him his modification of Giroud's photometer.

The following rough diagram will help to show how the appliances are used:—A is the back of the sensitometer, standing upon the wooden platform K. Alongside it are four jets, H H H H, with rat-tail flames, all turned to the height N N, which level is indicated in the instrument by guide wires. Twelve or eighteen inches in front of the flames and the sensitometer is the rectangular board, W W W W, covered with a sheet of pure white Rive paper, which paper is evenly illuminated by the flames, and the light from this extended illuminated surface is that which acts upon the sensitive plate through the circular holes of different sizes in the sensitometer. The whole apparatus is made to fold up neatly into a narrow flat box form, for carriage.

Mr. Spurge adopted the jet photometer as the source of light because he found the standard candle to be so inaccurate and variable that he could not use it for the calibration of his sensitometer. Rat-tail photometers, for their simplicity and accuracy, are in use in nearly all gasworks in this country, but the flame used is long, and more influenced by draughts than the form employed by Giroud. Mr. Spurge gets additional steadiness by using four of the



short flames at once. In Paris it has been found that the maximum error of Giroud's photometer does not exceed one per cent.

Mr. Spurge's sensitometer, because of its accuracy, is much used by Captain Abney, Mr. H. M. Elder, and others in photographic research, and I am glad to have drawn that man of modest merit, Mr. Spurge, out of his too great retirement, to give us some information on sensitometry to-night.

We had to wait many years before opticians began to give us standard diaphragms and standard screws to lens mounts; but at last some opticians at home and abroad moved in the matter, and in time uniformity will be the rule. How long shall we have to wait until the same screws are put upon the fronts of lens mounts, to take flanges put for the purpose upon some of those instantaneous shutters in the market, which are used in front of lens, and at present have to be made to stick on by means of india-rubber bands or other unsatisfactory devices? Then, again, when will all camera screws be made to one gauge, instead of presenting that lack of uniformity of which Mr. Traill Taylor complained at the Camera Club Conference? Captain Abney then hit the right nail on the head by stating that it might be well to form a sort of unofficial trades union among photographers. By common consent, purchasing photographers might do much to direct the channels into which the trade shall flow, and to support those particular dealers who show a desire to meet their requirements.

When standards are wanted, it is obviously necessary that some disinterested public body should specify what the standards are to be, otherwise commercial men have nothing authoritative to guide them. For this reason the photographic Society may well add to the debt of public gratitude by forthwith specifying some more standards, especially a standard Argand lamp of ten or twenty candle power for use in transparency printing and other work, as well as for use as a photographic unit of light. Although I was a foreign member of the Paris Photographic Conference Committee, I do not now agree with the decision of the Conference about the amyl-acetate lamp, except on the ground that any standard of light is better than none. It would be better to have a larger luminous source, useful also for some kinds of practical photographic work. The Photographic Society some time back began to affiliate other Societies, apparently with somewhat vague ideas of what was to come out of that line of action, but directly the united societies begin some work in which the public are strongly interested, plenty of life and energy will cluster about the affiliation movement, and the two representatives of this Club will then tell us whether the affiliation movement is still in existence, what it is doing, and what they are doing on our behalf. W. H. Harrison.

THE EVOLUTION OF ARTISTIC PHOTOGRAPHY.

The art of photography, dissociated from its purely mechanical connexions, has been written about by many able exponents of art subjects, the greater number of whom regret the intractability or limitations of a process that, on the face of it, promised so much and performed so little. This was the keynote of most writers in the earlier days of photography, and has, no doubt, continued its influence to the present time. The dictum of skilled men will always, right or wrong, shape the public mind, and an opinion once established in a

matter of this kind is very difficult to upset, with even the most conclusive proofs to the contrary. I firmly believe scores of pictures now made are equal, and very often superior, to drawings in monochrome by acknowledged artists, and quite as dependent on personal skill as any pencil or brush work can be. It is simply absurd nonsense to limit the production of artistic pictures to any special *materials*, a clever man, or woman either, for the matter of that, will make a picture with *anything that will make a mark*. It is not the manner of producing, but the production itself that has to be judged, and to claim on its own intrinsic merits the position it is to occupy. I am convinced photography is an art in the fullest significance of the term, and not only that, but one that puts to shame a vast amount of hand work to which is arrogated the right of being the only true and legitimate method of representing nature literally and ideally on a plane surface.

"More twaddle about art," I fancy the reader ejaculating; but, twaddle or no twaddle, it is plain to see that a process mechanically perfect, almost from its first inception, and which goes on improving by leaps and bounds in its purely *artistic* character, to which no limit can be put, has considerable claims to the title of art—a claim audacious and wrong, as many declare it to be. Thirty years ago—but it is really longer—quite as perfectly manipulated negatives were produced as at the present time, just as good definition, almost as much softness, and more brilliancy, in fact, as *chemical* productions, just as good in every respect as now. Their number was, however, somewhat limited, and their art qualities, with few exceptions, left much to be desired. Great things were expected, art was to be revolutionised, nothing was too difficult for its comprehensive grasp; sentiment, passion, everything could be represented, in the twinkling of an eye, true to nature and of unimpeachable correctness. Painter-artists would have to take a back seat in the future, to make way for the new procesa. It was soon found that too much was expected, as is generally the case with a new and sensational thing, and from the pinnacle of expectation it fell to be a butt for the gibes and sneers of artists of all degrees. As I write, I have before me a few early photographic portraits, and, most assuredly, as candidates for *artistic* recognition, they deserve the disparagement meted out to the class of which they are specimens. There is no fault to be found with their manipulative qualities, that is as good as the present average, in spite of the difficulties of the process as then carried on; but as pictures, artistic treatment, and so forth, compared with modern work, are as much behind as is the four-year-olds pencilling, with the legend, "Thia is a man," to one of Millais' or Sant's society portraits. Certainly, in the early days, the light of art was hidden under a bushel, and it is assuredly, but gradually, shining forth as the means of production becomes less and less evident and the shadow of mechanism passes away. "Like a photograph" was a term of reproach; "Like a photograph" will be the criticism of approbation. Let time work its magic influence, and, if we remember that lenses, cameras, and plates are but tools; in evidence, *only* to take the place of brushes and pencils, we shall then get on; in fact, we have got on, the thing is accomplished, and only wilful blindness or obstinate partiality can find anything to say disparaging to many photographs now produced. Look at the designs and sketches of dozens of pictures hung at our leading Exhibitions, Royal Academy included; take away the colour, and what could be weaker, poorer, or show less inventive capacity for design than many of them? Thousands of photographs are a long way ahead. There is not much doubt that, if any one of our *best* photographs was copied line for line in chalk, sepia, or any other monochromatic colour, it would stand an excellent chance of being hung at any representative exhibition, *so long as it remained a secret that it was a copy* of a photograph; that damning information being afforded, it would, metaphorically, be pitched into the waste-paper basket as a thing of no account. So much for the influence of process and unfair *prejudice*, for it cannot be called anything else. There is no denying that artists had good reasons for their restrictions *long ago* on the generality of photographs claiming kindred with art. As soon as the process became well known and popular, it was taken up by all classes, educated and uneducated alike, as an easy means of money-making, which it undoubtedly was, and the most awful things were perpetrated in the name of art.

One class, and that was a large one, invariably introduced a curtain, pillar, high-backed chair, and carpet, no matter whether it was an indoor or outdoor background. A wild, stormy sky, with waves beating on a rock-bound shore, a ship foundering, and a lighthouse flashing was considered suitable for a lady in evening dress, sitting on a drawing-room chair, with an elaborate ottoman and Brussels carpet. Thousands of such incongruities were made, and liked—think of it, positively looked on as works of art by the million! Most of the poses (and there was not much variety) were stiff and formal. This style of thing continued until ridicule had its effect, and we then arrived at the second stage of severe simplicity, plain backgrounds, and few or no accessories, an improvement no one can deny. The dress of the time was rather difficult to deal with. Then vignetted heads and busts were introduced, which swept away a lot of trouble and introduced a very pleasing and artistic style of picture, which has continued its popularity to the present time. Vignettes, in some form or another, will in all probability remain with us, whatever changes take place. Then came double printing—the figures and surroundings on separate negatives; but, although some splendid work was done in this way, there was much coarse, incongruous stuff made up by people who borrowed the idea, but had not either the taste or skill to carry it out artistically till this kind of picture was practically smothered.

It really required more art training than that then possessed by the majority of photographers to do it properly, but at the present time I should think it (double printing) might be revived with advantage, for the results are exceedingly attractive when well done. Almost all styles have been produced, and well, too, in isolated instances; but in these remarks I allude to the *general run* of any speciality. It is only seldom now that we see modern work spoiled by the incongruity of indoor foregrounds with outdoor backgrounds, which used to be so common. The chief fault of composition in the present day is crowding a lot of accessories into the picture close round the sitter. A lady, for instance, may be well posed and lighted, seated on an ottoman, with her feet placed amongst a number of flower-pots containing ferns, palms, or other green stuff, suggesting the idea of their being overturned if she changed her position. Whoever saw any in ordinary life so crowded up with greenery in a fashion that would require an acrobatic performance to clear them without damage? Art will never be advanced by such attempts, that is very certain. This going out of the way for the sake of displaying the covering power of the lens—or, in the usual studio slang, breaking up the straight lines—will have to be modified or eliminated for more reasonable means, less ostentation, and more of the character of those associated with every-day home life. Even the expression of the face is frequently assumed for the benefit of the photographer, and seldom or never seen at other times. This, however, is not altogether the fault of the photographer.

Then we get all sorts of eccentricities in lighting, under the impression they are Rembrandtesque—a streak of light down the profile and the top of the head like a fall of snow, whilst the face generally is buried in deep shadow, sometimes in positive blackness, which is neither Rembrandt-like nor anything else but absurd. Vagaries of this description are happily toning down at the present time, although they were plentiful enough not long since. It is curious how the public will take a fancy to some particular kind of lighting, some special effect on an exceptional subject, and forthwith conclude it will suit them individually. The photographer sees £. *s. d.* in it, tries to please the public and outrage common sense at the same time; for, when we have said and done all, we must admit that it is mainly £. *s. d.* that rules the roast. But it is when the inartistic mind attempts to do something startling in the way of picture-making that we are brought face to face with the depths of degradation to which photography is exposed.

Human emotions are not successfully treated by photography, and, except in rare instances, are not likely to be truthfully rendered; the poetical extracts we find attached to many such attempts provide the only poetry of the exhibit. Perfect models are unattainable, and photographers, unlike painters, cannot select the beautiful from many and blend them together in one, whatever their skill may be; and, despite of all this, the advance of artistic photography has been very great of late years, and promises to be greater still in the future. It is by comparison of the best pictures of different decades that the improvement is so marked, is realisable. Adam Salomon was the first to set English photographers thinking. Luckhardt and Angerer showed us what could be done with ordinary dress, as Salomon did with lighting and posing, and from that time dates the artistic revolution of the art. It was soon evident that the most skilful manipulation would not make up for lack of artistic knowledge—a fact that was not so soon realised as one would have expected—but gradually the pictures turned out by different men effectually proved that those who possessed the most artistic knowledge made the most popular work; and at the present time, unless a man can supplement good manipulative skill with artistic treatment, he had better by far give up photography as a source of income. The business of good houses now depends for popularity on the work of the artist rather than that of the photographer pure and simple, for with dry gelatine plates, and the ease with which a perfect chemical image can be produced by almost any one, a merely good photographer is absolutely of no account. But in lighting, and in the treatment of the sitter generally,

is centered the test of competence—a fact of itself that proves the extraordinary improvement that the last few years have made in the practice of photography from an artistic point of view.

EDWARD DUNMORE.

To be continued.)

PHOTOGRAPHIC METASTASIS.—II.

THE sources of error which we must take into account, and against which we must guard in estimating the density-value corresponding to a given exposure-value in a finished normal image—to set aside for the moment all consideration of "neutral," "reversal," and intermediate forms,—are chiefly due to the following causes, enumerating them in the order in which they occur:—

1. *Unequal Coating.*—(*a*) Of one plate as compared to another from the same batch or box, the thinly coated plate being more rapid and giving less density than that which is more thickly coated. (*b*) Of the margin as compared to the centre. Here the preceding observations also apply; the margin being the thinner portion is the most sensitive, but usually receives the least light, when a lens is used. (*c*) From the viscosity of the emulsion. Few plates have the film of uniform thickness even in the centre. I have found commercial plates by the best makers to show inequalities of relief when viewed by the light of the dark-room lamp, reflected from the surface of the film when held at very obtuse angles. In every-day picture-making this defect like many others does not, when present, detract appreciably from the quality of the result; but in the quantitative estimation of the density-value of one flat tint as compared to another the variation is distinctly perceptible. (*d*) Owing to the surface of the (glass) support not being truly plane. Hollows in the glass sufficient to form Newton's rings might, even when superadded to other sources, be inconsiderable, and be left out of account save where such a delicate estimation is claimed that the analysis is expressed to the thousandth of less than the thousandth of an inch.

2. *Unequal Development.*—(*a*) Due to insufficient precision in measuring out the ingredients. (*b*) Caused by inaccuracy in timing the period of immersion. (*c*) Resulting from inequality of temperature, which makes the effect of a minute's immersion at one time different from a minute's immersion at another. (*d*) Arising through the impurity or unequal strength of the chemicals employed, and also from the unequal rate at which some of them volatilise and lose their efficiency.

3. *Unequal Fixing.*—(*a*) Owing to the diversity in the resisting power of different brands of plates. (*b*) Brought about through employing inconstant proportion of the ingredients of the developers. (*c*) Produced by variation in the rapidity with which the density has been developed, little matter from what cause. (*d*) By using a fixing bath of unknown strength, or for uncertain periods.

4. To these causes we may add, while treating of the production of the finished plate—(*a*) Inequality of colour. (*b*) Inequality in washing between development and fixing, some plates and some exposures acquiring more density than others during this interval. (*c*) The very marked inequality in density between equal wet densities when dried at unequal rates.

5. The inaccuracy and untrustworthiness, where minute variations are concerned, of most photometric methods.

To all these sources of error we must add, when dealing with abnormal exposures—(*a*) The printed-out increment in density. (*b*) The greater activity of the fixing reagent.

Nor must we forget when working with the unbacked plates—for backing, though it does not cure, mitigates the evil of halation—that there is in most subjects a certain amount of unequally distributed density, excessive or deficient, which is not directly due to the incident light, but is mainly attributable to the localised reflection of that which has already passed through the film.

Taking, as I have been forced to take, all these considerations into account, I have preferred, in my work of the past five or six years, to make my experiments as exact as possible, but never to trust to the accuracy of any single observation, nor to any reasoned-out estimation of the amount of the error of observation, choosing, under the circumstances, rather to multiply results and take the average of repeated testing, of single, and stripped, and superposed films, by eye, by the time taken to print through, and by photometer. I hold, and I consider myself abundantly justified in my belief, that without the check afforded by the previous determination of the arithmetical series of density-values $0+\cdot5$, $0+1$, $\cdot5+\cdot5$, and $1+0$, corresponding to the geometrical series of exposures, no set of analyses of fractional densities can, *se ipse*, furnish sufficient or sufficiently reliable data to how what is the actual relationship existing for the time being between exposure-value, and density-value, nor to suggest that the connexion is that of common ratio to common difference.

A working hypothesis is, I feel certain, an absolute necessity, because, where unstinted experiment might amply suffice to rebut or confirm the position taken up, the life of man is far too short to admit of the creation of a *luculus ordo* from the chaotic jumble of *disjecta membra*, which must infallibly accrue when a complicated analysis and synthesis are undertaken unadvisedly and without premeditated intent.

Finding that all experimental essays to connect the shorter exposures with their developed densities were utterly untrustworthy, I relinquished the task, and devoted my energies to the graphical representation of both semi-constituents of density, which, commencing with the normal image, I found to be reciprocals one of the other, not only during one complete cycle of revolution (cycle of phases), but for more than one repetition of the same. Whilst in this determination of the connexion between exposure and density-values I chiefly employed the method of superposing the complementary densities—stripped, or on the glass, and allowing for it—and comparing them in a photometer, I took care to check my figures by printing opaque spots through them, and by giving very short exposures, and submitting the action produced to the test of a constant developer.

Accepting the leading statement in my paper of 1888 as correct, the following may fairly be advanced as the line of reasoning naturally suggested to any mathematician cognisant of the elements of photography.

In order to express the density at any instant in terms of the time which has elapsed since the exposure of the film commenced, let e denote the time of exposure requisite to produce the first normal image, and a^4e that required to produce the second normal image; a^4 is chosen for the ratio, in preference to a single letter, merely to simplify the subsequent formulæ; a thus depends upon the accelerator employed. If d represent numerically the maximum density of the image, we can tabulate the corresponding values of t and D (time from commencement of exposure and density) as follows, adding for convenience a third column giving log t.

t	D	log t
e	d	log e
ae	$\frac{d}{2}$	log e + log a
a^2e	o	log e + 2 log a
a^3e	$\frac{d}{2}$	log e + 3 log a
a^4e	d	log e + 4 log a
a^5e	$\frac{d}{2}$	log e + 5 log a
a^6e	o	log e + 6 log a
a^7e	$\frac{d}{2}$	log e + 7 log a

Comparing the second and third columns of this table, we see that log t increases uniformly as the density of either semi-constituent varies from normal to neutral, from neutral to reversal, from reversal to second neutral, from second neutral to second normal, and so on. The density is a continuous function of the time. Hence we must come to some decision as to its mode of variation at intermediate points. As the density rises and falls, always repeating the same cycle of changes, the simplest hypothesis we can make is that of simple harmonic variation. This clearly coincides with the known results of observation at the four points in each cycle which are of greatest importance, and it is the law obeyed by almost all periodic phenomena in nature, *e.g.*, the rise and fall of the tides, the vibration of elastic bodies, the motion of the particles of every medium that transmits waves, whether air, or water, or ether, and the swing of the pendulum. Its sufficiency can only be demonstrated by experimentally determining the density at points intermediate to those given in the table. This, as stated in THE BRITISH JOURNAL OF PHOTOGRAPHY for January 13 and November 16, 1888, in the paragraph preceding my leading conclusions, I did for several points after the first normal image and intermediate to the four critical points of each cycle, as also for a series of points between the first mean and greatest densities. The values given by these experiments coincide with those required by the law to the closest degree of accuracy which we can reliably measure. But, even in default of such experimental verification, we still know that this hypothesis satisfies all the known facts, is the simplest assumption

which will do so, and has been found to be the law of multitudes of similar natural phenomena.

Owing to the periodicity of the circular function, the table can now be written thus:—

t	D	log t
e	$\frac{d}{2}(1+\sin\frac{\pi}{2})$	log e
e a	$\frac{d}{2}(1+\sin 2\frac{\pi}{2})$	log e + log a
e a^2	$\frac{d}{2}(1+\sin 3\frac{\pi}{2})$	log e + log a
e a^3	$\frac{d}{2}(1+\sin 4\frac{\pi}{2})$	log e + log a
e a^4	$\frac{d}{2}(1+\sin 5\frac{\pi}{2})$	log e + log a
e a^5	$\frac{d}{2}(1+\sin 6\frac{\pi}{2})$	log e + log a
e a^6	$\frac{d}{2}(1+\sin 7\frac{\pi}{2})$	log e + log a
e a^7	$\frac{d}{2}(1+\sin 8\frac{\pi}{2})$	log e + log a
e a^n	$\frac{d}{2}(1+\sin\overline{n+1}\frac{\pi}{2})$	log e × n log a

Hence we have D and t expressed in terms of a variable parameter, n, the elimination of which will at once give the relation between them.

Taking the general entries in columns 2 and 3, we have:—

$$D=\frac{d}{2}(1+\sin\overline{n+1}\frac{\pi}{2}) \quad (1)$$

$$\log t = \log e + n \log a \quad (2)$$

From (2)

$$n=\frac{\log\frac{t}{e}}{\log a} \quad (3)$$

Substituting from (3) in (1) we get:

$$D=\frac{d}{2}\left\{1+\sin\frac{\log\frac{at}{e}}{\log a}\frac{\pi}{2}\right\} \quad (4)$$

This formula gives the density, D, at any instant in terms of the time, t, which has elapsed since the beginning of the exposure.

The data from which the foregoing formula has been deduced are as follows:—

I. The laws expressed in 'C' and 'D' of my original paper.

II. The successive maximum densities (or contrasts between zero and unity) are equally intense. *This applies with the same force to either semi-constituent.*

III. No account is taken of the continuous degradation or fogging of the film.

The provisional law based on these data, and applicable under the limitations stated, is, in brief:—

"The density is a simple harmonic function of the logarithm of the time from the instant of exposure."

Although resulting from a consideration of densities brought out by immersions of considerable duration, the foregoing law is put forward as specially applying, not so much to the density actually produced as to the total conjoint energy or power to produce density of light of a given intensity when superadded to a developer of known potency acting upon a film of silver bromide suspended in gelatine, the contact of the exposed plate with the chemical multiplier or divisor being assumed to be instantaneous. The primary object of all the experiments from which the law was deduced was the obtaining, in the first place, such information regarding the qualitative and quantitative individual influence of the separate ingredients of a standard developer as would admit of the assigning to each an absolute and comparative value, with the ultimate view of arriving at some definite conclusion as to the precise nature of those physical and chemical properties of the silver salt in question which constitute its sensitiveness, properties to which Messrs. Hurter & Driffield have assigned the symbols "*k*," "*a*," and "*e*" in their mathematical formula:—

$$\text{"}D=\gamma\log_e\left[O-O-(O1)\beta^k(1-a)\frac{It}{e}\right],\text{"}$$

a formula which, with our present knowledge of "*k*," "*a*," and "*e*," I consider to be pathetically simple. It is, nevertheless, extremely mathematical and scientific in appearance, and to mathematicians who know little of photography, and to photographers who know little of mathematics, it is most satisfactory. Only it won't work out, because it means *nothing* as yet. When it means *anything*, it will be found to be wrong.

HUGH BREBNER.

THE PHOTOGRAPHIC CONGRESS AUXILIARY OF THE WORLD'S COLUMBIAN EXPOSITION.

THE following additional papers were read:—

PHOTOGRAPHY AS APPLIED TO SURGERY.

THE service which photography is capable of rendering the surgeon covers a wide and important field. By this means minutely accurate delineations of the work in progress can be secured in a few seconds' time, which will subsequently reproduce all the surface features of a case at a glance, and that, too, more perfectly than an elaborate description.

In surgical cases intended for publication the photograph is an invaluable adjuvant, either for direct processes of reproduction or as an accurate basis for a careful drawing, which will in this way be enabled to preserve the life and individuality of the subject, often lost in drawings hurriedly made and then finished from memory.

A further and possibly a still more important field for photography in surgical operating room is one which has been for the first time brought into use in the gynecological room of the John Hopkins Hospital of Baltimore, Maryland. That is, an effort by this means to crystallise a sufficient number of important steps during an operation from the commencement to completion, so that, by producing the photographs in the same order, a fairly accurate conception of the operative procedure may be obtained, and in any event the pictures will afford a basis for a vivid lecture, when given before students for instruction.

The effect of the photograph is much enhanced when the negative is converted into a positive on glass in the shape of a lantern slide, and the operation reproduced upon a screen of sufficient size, in lifelike proportions, by the aid of calcium or electric light, as an illuminant. The contrast of lights and shadows and the stereoscopic appearance in this field are superior to the best prints, and leave nothing to be desired in the realistic effect. While photography possesses these manifold advantages and holds for itself a wide field of utility never before occupied, it does not supplant the more painstaking drawing direct from the specimen or subject. By means of the drawing, always more or less diagrammatic, those features are emphasised to which the surgeon wishes to draw the attention, and the drawing is for this reason more quickly self-explanatory. In addition to this, photography becomes difficult, if not impossible, as soon as the field of operation lies deep in the body, either in the abdomen or vagina. The lack of actinic power in red blood also often interferes with the success of a negative taken during the progress of an operation, the deep red spots showing as unsightly black blotches in the positive. Moving objects, to be sure, cannot well be photographed, unless the illumination is great enough to allow an instantaneous exposure to be made.

In this way the movements of respiration transmitted to the abdomen and pelvic floor may be a serious disadvantage. Sometimes, however, it is advantageous to photograph the motion of a part. Motion may, for example, be registered in this way: If a patient's chest is heaving during an exposure of several seconds, the outline will be a blurred one, while the other parts are sharp, thus demonstrating the motion. A photograph of the contour of the abdomen from sternum to pubis shows a hazy outline due to the transmitted respiratory movements. If, however, the lower abdomen is filled with a myoma large enough to reach the anterior wall, this part is splinted and remains quiescent on the tumour, showing a sharp outline in the picture, while the rest of the abdomen above has a faint, hazy outline, thus demonstrating the presence of the tumour to the eye.

The conditions necessary for making a good photograph are but few: A good illumination of the subject and the employment of prepared plates of a sufficient degree of sensitiveness, so as to make an impression quickly, without delaying the operator in his work. None of the pictures thus made in the gynecological operating room (and we have made about eight hundred and fifty in the past year) delay the work longer than three seconds, and generally less time is consumed.

A good instrument, lens, and shutter are necessities. The camera proper must be arranged with considerable movement or adjustment of the front carrying the lens, so as to bring properly into the centre of the plate that particular part which is the principal object of interest in the picture. A vertical swing back is also a *desideratum*. The camera should be strong and well made, and equipped with an abundance of plate-

holders. The use of lenses of different focal length is of assistance to the photographic operator, but two lengths are all that are made use of in our work.

The best size of plate is that known as 5 × 7 in the list of photographic sizes, which is a convenient one for those prints to mount in our reference albums. Should a larger size be desired, they can readily be enlarged. With this size a good rectilinear lens of ten inches back focus, classed in the price-lists to cover the next larger size of plate, say, 6½ × 8½.

This will enable the photographic operator to use his lens without small diaphragms, as the object on the ground glass will be of sufficient size without moving too near to the subject, thus avoiding distortion and irregularity in the sharpness of the field. The use of small apertures to secure uniformly sharp focus of the image considerably lengthens the time for necessary exposure of the plate. For photographing specimens a lens of shorter focal length is necessary, as it will be found that to get an image of the desired size, when the foregoing described lens is employed, the length of the bellows of the standard cameras is insufficient; so I would suggest that one of about five or even four and one half inches back focus be added to the photographic outfit.

As a stand or support for the camera, I urge that the conventional tripod be altogether discarded, because of its liability to slide and slip about in a very erratic way, and a table, with such suitable attachments as I will hereafter describe, be substituted. This table had better be one rather high in proportion to its size, square on the top, but made strongly, so that there may be no vibration. It should be about four feet high, and on the top about thirty by twenty-four inches square, with a shelf placed about midway between the top and the floor; this will make the same more rigid, and, besides, give an opportunity of a greater range of adjustment for the attachments as you may want to place them. As a general support for the camera, have made two pieces, or rather angles, made of boards about eight inches wide and one inch thick, the shape of a letter L; these two are placed one against the other, one having a slot about two-thirds its length, and in the other a nut to work on a thumb-screw, to enable you to slide one on the other, and secure them in any position in which they may be adjusted. You now have the two angles fastened together something in the shape of a very straight up-and-down letter Z. On the upper horizontal part of this you have placed a second board, same width and length, and hinged to it at one end, while at the other you place a long wooden screw, so by this means you can elevate and depress that end. On this part the camera is now placed, and it can be tipped to a great angle from a horizontal line, depending upon the length of the screw. The lower part of this is then placed on the table and secured by a screw on which it can revolve. The great advantage of this arrangement is that the camera, when desired, can be placed in a position of being plumb, level, and square.

We find very often that we wish to place the camera in vertical position—that of pointing down upon a subject. To enable this to be done, have two pieces of board, one about two feet six inches long and the other about eighteen inches, fastened together so as to form a right angle, as before mentioned, only that the shorter part is fastened to the table at its edge, and the other longer part is to have a long slot running almost from the top to the bottom, through which the tripod screw will pass and allow you to slide the camera up and down in a vertical position, and secure it at any point. Have now a frame of such suitable size, and capable of holding a sheet of plate glass, supported by slender legs, so as not to obstruct the light, about ten inches high. On this table we place the specimens to be photographed.

The advantages of this method of photographing specimens are apparent. In the first place, they will lie in any position in which they are placed. Again, the background being at a distance from the plane of support gives the specimen the appearance in the picture of hanging in space without visible support, and securing thus a stereoscopic effect not otherwise obtainable. In some cases the specimens are placed in a dish of a shallow nature, and floated or submerged in water, then the dish placed on the plate-glass stand, and so the photograph is made, the floating out of all the delicate velamentous adhesions. When the flow of blood is such as to interfere with the photographic work, a generous flow of water from the "irrigator" will not oppose the work of the camera.

A record of all negatives made during the operations and the nature of the subject is kept in a book in the operating room, with date and the patient's hospital number. By referring to the album, in which all the prints are mounted in the order taken, the cases are recalled with definiteness which descriptions and drawing cannot attain.

A. S. Murray.

POSING AND ILLUMINATION.

The subject of posing and illumination in the photographic studio is more nearly related to the artistic than to the scientific part of photography, and therefore there will naturally be a wider diversity of thought and opinion on this subject than might be expected concerning the more scientific, and therefore more exact, branches of our profession, such as are practised more particularly by the dark-room worker or the printer, although there can be no doubt that each of these is successful in accordance with his knowledge of art principles and his ability to apply them in his work.

The successful photographer may well claim to be an artist, for the highest product of his genius must be the exquisite flower of the combination of the purest and most cultivated taste and the highest skill.

The artist, however, they say, is born, not made. Nature must first have endowed him with gifts that would have constituted him an authoritative connoiseur in all art matters without having studied either line or rule. The endowment of artistic taste, however, does not carry with it the ability of mechanical expression; taste is of the intellect, inward; mechanical expression is of study and practice, outward.

Taste is God-given; it may be improved by cultivation, but cannot be acquired by study.

Manual skill is only acquired by long and generally painful exertion, and only retained by constant practice.

The artist, therefore, in whatever line (whether as the musician who charms and enraptures us with heavenly sounds, or the painter who enchants us with harmonious colours, or the photographer who delights us with beautiful effects of light and shade), is one who has been impelled to acquire the manual dexterity or skill to give outward expression to the beautiful in sound, or colour, or light, whose origin is from within.

All photographers may not be artists in the highest sense, because art is inherent, not acquired; but that which a man has may be improved by study and observation of the works of artists who have made for themselves a name and reputation as such.

All photographers may and should be students, eager to find out for themselves every means that may enhance the beauty or value of their work.

At no time in the history of art has the study of art principles in the beauty of form, colour, and shade been so easy or the opportunities so numerous as at the present time, the near ending of the century.

Posing and illumination under the photographer's skylight or in the painter's studio must be governed by the same rules, and these rules or laws have so frequently been published in photographers' journals, and have been so frequently commented on by eminent photographers for the instruction of their fellow-workers, that it appears unnecessary on this occasion to occupy time by any detailed discussion thereof. I would, however, remind you that you have the works of H. P. Robinson, of Edward L. Wilson, and many other eminent authorities, equally accessible, and I would strongly recommend the study of the same and the application of their ideas in your daily work in your studios.

The time is now past when any photographer poses and illuminates any subject without study and consideration.

It is not the rule now to seat your subject carelessly before the camera and fire away, considering that any outcome must be a likeness, and therefore good enough. The light now furnishes the modelling, and the lens cuts it in; therefore the handling of the light and the use of the lens must receive the study and practice that are necessary to the skilful use of the pencil and the brush.

If the artist photographer has any appreciation of the line of beauty, he will easily understand that, in posing his subject under the skylight, he should develop, or bring into prominence, the curve, rather than the angle, and that the centre of gravity should fall within the base.

He should understand that symmetry and proportion must characterise his work, whether of the one or of the many—the single figure or the group.

He must understand that, in composition, lines must have supporting lines when not perpendicular, and that a picture is unsatisfactory that carries no idea of firmness and support.

The artist, having these elementary principles constantly in mind, will practically make a study of each face and form that comes under his studio light; viewing the subject or model from every direction, and by every method of illumination; studying the face by front, three-quarters, or profile view, both toward and from the light; and also by the various arrangements of the light, such as broad Rembrandt or shadow lighting, or by any recognised method of lighting that the studio will admit of, that may impart character, form, or piquancy to a face or figure that may, perhaps, lack one or all of these graces when in repose, while

abundantly interesting when animated by conversation or engaged in the common affairs of life.

Every face will present some one view that will be more pleasing or interesting than any other. The long, thin face may, perhaps, be more pleasing from the front; the broad face may look better at the three-quarter view; one view may suppress an angle and develop a colour, while an inconsidered pose might bring out the reverse.

The tilting of the head to one side or the other, the raising of the chin or the reverse, may give piquancy to this one, and picturesque effect to the other.

In this manner he will decide on that view that gives the most pleasing outline, and that method of illumination that gives boldness and brilliancy where features are small or insipid, or that tones down the harshness of a too rugged face without losing altogether its characteristic quality, for it is well to keep in mind that an indication of character adds as much to a portrait as does action or life to a pose, avoiding always the commonplace. Tameness in expression, pose, or lighting, is contemptible, and will rob even the finest execution of every charm; at the same time an evident straining for effect in pose or lighting is objectionable to any refined taste, and should be avoided as strenuously as the other extreme, however true it may be, that the daring innovator may sometimes produce charming effects that may not come strictly within the approval of a too-cultivated taste.

In my opinion, a resort to ultra effects is only justifiable in cases where the face and form of the subject are not amenable to ordinary methods, and when it may be desirable or profitable to experiment.

When posing a single figure, in either full or three-quarters, certain accessories may be used with good effect, but care should be exercised in making the model the central point of attention; everything should be subservient to the portrait.

The three-quarter length will always be better without accessories, unless in a sitting or leaning position, in which case the proper support will necessarily be provided.

Groups of two or more require the exercise of common sense, and a knowledge of the capabilities of light and lenses. In form, the group should be as symmetrical as may be, with dark complexions and dresses placed next the light; and, in large groups, more attention should be given to the general than to individual effect.

The best photographic light is received from two windows—a top window or skylight joined to a side window, which shall reach to within three feet of the floor of the studio.

The dimension of the skylight should not be less than ten feet square, if space permits, but preferably larger if convenient, the pitch of the upper light only enough to easily and safely carry the snow and ice of winter, and shed the rain of summer without leakage.

The quality of the top light is softness and delicacy of detail, but with two heavy shadows beneath projection.

The quality of the side light is vigorous harshness, with abrupt lateral shadows.

The one corrects the other to any extent desired, so that, having a top and side light properly shaded with movable curtains, every description of face may be so lighted as to make prominent all the good points, and to lessen, or entirely suppress, all that is not desirable.

By a proper arrangement of the top and side light we can give boldness and prominence to small or weak features. We can by similar means soften and refine coarse and rugged faces.

By seating the model facing the light, and at a suitable distance therefrom, it is possible to remove, to a great extent, the appearances of age; the wrinkles and crow's-feet are lighted up, but cast no shadows.

In fact, it is possible to change the shape of the face of any subject to a great extent by judicious management of the light.

Having a good light, use all of it that may be used with advantage, according to the method of lighting adopted for that particular subject.

Many photographers shade their lights down closely and give long exposures; but the preponderance of opinion among artists of recognised ability is in favour of using all the light the model will bear, and make shorter exposures comparatively, thus obtaining bolder modelling, finer gradations, and more brilliant effects, while not losing the softness that is characteristic of all really first-class work.

I have stated that time of exposure has much to do with the quality of the negative; it is also very true that the character of the dry plate has an important bearing on the resulting negative. I have always found that thinly coated plates invariably had a tendency to make negatives whose printing quality tended to contrast because of the fact that the shadows were always thinner than they looked. Such plates require longer exposure, and the subjects should be more evenly lighted than when plates of a thicker coating, although of even sensitiveness, are used.

The effect of the lighting of the subject will not be the same on the sensitive plate as it is on the retina of the operator's eye; therefore the photographer by closely observing the action of the lens will learn to see photographically, or to understand the precise effect on the sensitive plate of any method of illumination he may employ for his subject.

Also, he must understand that the time of exposure will greatly modify the effect he may be desirous of obtaining.

The subject should be posed well out under the light, and generally at a proper distance from the background to get what is called atmospheric effect. Then, if the whole figure or head is well lighted, a proper exposure will give the effect of daylight illumination, while a short exposure will produce the effect of artificial lighting.

By daylight illumination I mean that the figure or head will be fully lighted with soft modellings and easy gradations from high light to transparent shadows, while by artificial illumination the lights are chalky or flatted, and the gradations are abrupt to heavy shadows. I therefore consider that it is safer to err on the side of over-exposure than to under-expose, although I have known eminent photographers to lean constantly to the short exposure for picturesque effects.

Picturesque effect of pose and light should be aimed for in all photographic portraiture, and a thorough knowledge of the peculiarities of light and lens should be acquired by the artist, so that his judgment may ever readily arrive at the proper methods of arrangement of the light and the exposure for lens to produce the effects desired for any face or figure with as little delay and hesitation as possible.

This promptness of decision will secure the confidence of the sitter and facilitate matters in a large measure, the natural result being more patrons, enlarged business, and increased profits. That such may be the good fortune of all who have listened to my views on the subject under discussion is the sincere wish of your friend and fellow-labourer.

E. M. Estabrooke.

Our Editorial Table.

Messrs. York & Son, 87, Lancaster-road, Notting Hill, London, have issued their 24th Annual Supplemental Catalogue of lantern slides and lecture sets, which contains many valuable additions. Amongst these we find fifty and sixty views respectively of Chicago city and the Exposition; similar numbers of Athens and the Piræus, cities of North Italy, the Canary Islands and Madeira, Ceylon and tea-culture, with many others of both an instructive and amusing character.

Accompanying this is a twelve-page Catalogue of the titles of the sets issued by this firm. Some idea can be formed of the enormous numbers kept in stock when we say that one line alone in this double-column index frequently represents several hundred slides.

The New Roller-slide Films of the Eastman Company.

Some time since, the Eastman Photographic Materials Company (Limited), having discovered that there were imperfections in their original rollable films which militated against their keeping, reconstructed their formulæ and method of manufacture, recalling what had been previously issued. We have recently made trial of their new and improved film, and are much pleased with it. While so sensitive as to permit of snap-shots being made with it even under unfavourable conditions, it develops with great brilliance and cleanness, giving negatives of excellent printing quality, with entire freedom from imperfections. The Company is to be congratulated upon now turning out films of such excellent quality. We have also received samples of this Company's new "Nikko" paper, upon which we expect to be in a position soon to report.

STANLEY SHOW, 1893.

Stanley Photographic Competitions will take place in connexion with the Seventeenth Annual Exhibition of Cycles, their accessories, machinery and tools, photographic apparatus and pictures, held by the above Club, at the Royal Agricultural Hall, Islington, London, N., from November 17 to 25 inclusive. Twenty medals (five gold) are offered for competition under certain rules and conditions in the following classes:—(*a*) Champion; (*b*) Landscape; (*c*) Lantern slides; (*d*) Portraiture; (*e*) Hand-camera work; (*f*) Beginners; (*g*) cycling, and (*h*) Special society prize. Address all communications respecting this exhibition to Walter D. Welford, Manager Photographic Section, Stanley Show Office, 57 and 58, Chancery-lane, London, W.C.

News and Notes.

MANCHESTER PHOTOGRAPHIC SOCIETY.—September 16, Worsley (Ramble).

NORTHERN PHOTOGRAPHIC AND SCIENTIFIC ASSOCIATION.—September 16, Hadley Wood.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—September 18, Demonstration. Lantern-slide making by Mr. H. E. Farmer.

PHOTOGRAPHIC CLUB.—September 20, *Dark-room Appliances.* The annual wind-up outing to Hampstead Heath will take place on Saturday, September 30.

HACKNEY PHOTOGRAPHIC SOCIETY.—September 16, Excursion to Kew (by Boat). Hand Camera Day. Meet at Old Swan Pier at two o'clock; tea at Richmond, and return by train. 19, Members' Lantern Night.

THE Newcastle-on-Tyne and Northern Counties' Photographic Association and Hexham Photographic Society's joint outdoor meeting will take place on Thursday, September 21, 1893, to Bardon Mill and Staward, under the leadership of Mr. J. P. Gibson. Train leaves Newcastle for Bardon Mill Station at twenty minutes past ten.

LEYTONSTONE CAMERA CLUB.—September 16, Radlett and Aldenham. Leader, Mr. A. E. Bailey. The Club will proceed by the train leaving Moorgate-street, Midland Railway, at nineteen minutes past two p.m., arriving at Radlett at twelve minutes past three (take single tickets, return from Watford, L. & N. W. R.). Open Social Evening at Head-quarters at eight o'clock.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—September 14, Members' Night. 21, *Paget Lantern Plates*, demonstration by Mr. S. H. Fry. 28, *Film Working*, by Mr. W. H. Barnes. 30, Outing, "Bull and Bush," Hampstead; tea at six o'clock. October 5, *Unconventional Printing Methods*, by Mr. S. H. Fry. 12, Affiliated Societies' Meeting, 5A, Pall Mall. 19, Lantern Night, by Mr. T. C. Hepworth, on *A Recent Trip to the Lake District.* 26, *Aluminium Flash Light*, by Mr. T. Bolas.

AT the recently opened Bristol Industrial Exhibition, Messrs. Epstein & Co., of 33, Broad-street, have a large exhibit of picture mouldings in great variety. Some 1200 patterns of German moulding are shown; also a large collection of chromos, oleos, etchings, and many specialities for photographers. Messrs. Epstein's business was established in 1878, and its growth has been such that it has necessitated enlargements of the premises more than once. Other sections of the business are devoted to the restoration of engravings, paintings, mount cutting, &c. From the illustrated sample sheet we observe that great taste is displayed in the choice of mouldings, &c., while the price-list includes particulars of all requisites in framing and mounting.

THE Capetown Photographic Society opened a very successful exhibition on August 17. Amongst the principal exhibits were a number of beautiful carbon enlargements, as well as some fine large direct prints of views taken in Italy, shown by Mr. T. E. Fuller, M.L.A. Mr. G. Lindup lent some valuable oil paintings. The Cape Royal Observatory, through the president of the club, lent amongst other exhibits a Dallmeyer's rapid rectilinear lens to cover a 34×34 inch plate. This cost no less than 100*l.*, and has been in use a number of years at the Observatory, no less than 3000 stellar photographs having been taken with it. Some interesting spectroscopic apparatus was also contributed from the same source. Amongst the loan photographs were also specimens of the series of "Artists at Home," being platinotype portraits of most prominent English Academicians taken in their own studies. These were the work of Mr. Ralph W. Robinson (of the firm of H. P. Robinson & Son), besides English rural scenes by the same photographer, and a set of views of Windsor Castle during Jubilee year, principally interiors, taken by special permission by Mr. William Brooks. A number of microscopes, graphoscopes, magazine stereoscopes, lanternscopes, and other scientific instruments were also exhibited; as well as a swarm of bees lent by Mr. Gracie, the structure of the bees being illustrated by a number of micro-photo lantern slides, the work of Mr. A. J. Fuller.

CONGRESS OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN AND AFFILIATED SOCIETIES, 1893.—This Congress is arranged to take place on October 10, 11, and 12. All who are interested in the progress of photography are invited to be present, and take part in the discussions. It is expected that, by the kindness of M. L. Lumière, some of M. Lippmann's latest specimens of photography in colours will be on view at one of the meetings. It is necessary that, for the lantern display, admission shall be by ticket only, and a limited number of tickets will be sent to every member of the Society for themselves and their friends. Members of affiliated Societies should apply to their respective Secretaries for these tickets, or for any further information. Programme:—Tuesday, October 10, at eight p.m., at the Gallery, 5A, Pall Mall East: The presentation of the medals awarded at the Exhibition; the President's annual address; a paper on *The Action of Light on Bacteria and Fungi*, by Professor H. Marshall Ward, M.A., F.R.S. Wednesday, October 11, at three p.m., at the Theatre of the Society of Arts, John-street, Adelphi, the following papers will be read: *The Present Position of Photomicrography*, by Andrew Pringle, F.R.M.S.; *On a Process of Photo-mechanical Printing in Natural Colours*, by W. Weissenberger, of St. Petersburg; a paper by Mr. Emil von Höegh, of Berlin; *Photography in Compartments*, by Hector Maclean, F.G.S. At eight p.m., at the Theatre of the Society of Arts, John-street, Adelphi, the following papers will be read: *On Exposure and Chemical Action*, by Captain W. de W. Abney, C.B., F.R.S.; *The Recent Solar Eclipse*, by Captain Hills, R.E.; a paper by Dr. A. Miethe. Thursday, October 12, at three p.m., at the Theatre of the Society of Arts, John-street, Adelphi, a demonstration of collotype printing will be given by Messrs. T. Bolas and W. E. Debenham; the following papers will be read: *The Measure and Numeration of the Stops of Photographic Lenses*, by Dr. P. Rudolph; a paper by Mr. Arthur W. Clayden, M.A. At eight p.m., at the Gallery, 5A, Pall Mall East, a special lantern display.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 16,579.—"Improvements in Magazine Cameras for Photographic Purposes." B. J. YOUNG.—*Dated September 4, 1883.*

No. 16,826.—"Improvements in Cameras for Copying, Reducing," &c. A. S. NEWMAN and J. GUARDIA.—*Dated September 7, 1893.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 18 ...	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 18 ...	Fillebrook Athenæum	Fillebrook Lecture Hall.
,, 18 ...	Hastings and St. Leonards	
,, 18 ...	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 18 ...	Richmond	Greyhound Hotel, Richmond.
,, 18 ...	South London	Hanover Hall, Hanover-park, S.E.
,, 19 ...	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 19 ...	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 19 ...	Hackney	206, Mare-street, Hackney.
,, 19 ...	North London	Canonbury Tower, Islington, N.
,, 19 ...	Paisley	9, Ganze-street, Paisley.
,, 20 ...	Brechin (Annual)	14, St. Mary-street, Brechin.
,, 20 ...	Bury	Club Rooms, 13, Agar-street, Bury.
,, 20 ...	Leytonstone	The Assembly Rooms, High-road.
,, 20 ...	Manchester Camera Club	Victoria Hotel, Manchester.
,, 20 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 20 ...	Southport	The Studio, 15, Cambridge-arcade.
,, 20 ...	Southsea	3, King's-road, Southsea.
,, 21 ...	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 21 ...	Glossop Dale	
,, 21 ...	Greenock	Museum, Kelly-street, Greenock.
,, 21 ...	Hull	71, Prospect-street, Hull.
,, 21 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 21 ...	Oldham	The Lyceum, Union-street, Oldham.
,, 21 ...	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 22 ...	Cardiff	
,, 22 ...	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 22 ...	Holborn	
,, 22 ...	Maidstone	"The Palace," Maidstone.
,, 22 ...	West London	Chiswick School of Art, Chiswick.
,, 23 ...	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 7,—Mr. A. Haddon in the chair.

The greater part of the evening was occupied in discussion of matters arising out of the recent alteration of the rules.

VITRIFIABLE POWDER FOR ENAMELLING.

The CHAIRMAN asked if gelatine, loaded with vitrifiable powders, could be obtained?

Mr. T. BOLAS thought not, but the loading was easily done. Tissue prepared with the vitrifiable colour did not keep well, the fluxes making the tissue insoluble, so that it was better to prepare it, the bichromate being added to the mixture.

The CHAIRMAN said it had been recommended to have as much powder as gelatine.

Mr. T. BOLAS said the brown and purple colours were very cheap.

Mr. R. Beckett exhibited a plate which had been exposed on a copy of a group, put away, and forgotten, and then exposed on a portrait. On development the original exposure came out as a positive.

In reply to a request for an explanation, several were made attempting to account for the phenomena on the ground of over-exposure, reversal, &c.; but, as no particulars of the exposure were forthcoming, nothing definite was arrived at.

Mr. Beckett also exhibited several negatives fogged in the same place, and also the slide on which they were taken.

The fog was variously suggested to be due to emanations from the slide, the paper wrappings, &c.

North Middlesex Photographic Society.—On Monday, September 11, Mr. BIRT ACRES treated the members to what he called a "talk" on *Halation, its Cause and Cure.* In opening his subject he said that the halation caused by the reflection of light from the back of the plate was only a small part of that with which photographers had to contend, the greater portion being caused either by (1) the actual spreading of the light rays beyond the edge of, say, the window in an interior view; (2) the luminosity of the air, which was much more manifest to the lens and plate than to the human eye; or (3) the photographing of the atoms of dust floating in the air. Halation of this kind could never be wholly avoided, and, in fact, it would not be proper that it should be, for some of this luminosity was necessary to give a natural result; but this effect was much exaggerated in the negative, and the most successful way he knew of overcoming it in the print was to first take a somewhat faint print on silver paper and fix it, then wax it, or in some way render it translucent, and fix this transparent print on to the back of the negative in the printing frame, and print through it far enough to correct the excessive opacity of the halation-stricken negative. To avoid that halation caused by reflection from

the glass, Mr. Acres recommended backing the plate with Bates's black, which was very effective, was easily applied, and could be easily removed by a sponge dipped in benzine. He thought this method of backing was more free from objectionable features than any other he had seen recommended. A most interesting discussion followed, or rather was sandwiched in with the lecture, which was much appreciated. The voting on the pictures taken at the Strand-on-the-Green outing resulted in Mr. Gregory's being declared best, Messrs. Pither and Spencer tying for the Hatfield competition. The next meeting will be held on the 25th inst., when Mr. Thomas Bedding will read a paper on *Stereoscopic Photography*. Visitors are welcome.

Hackney Photographic Society.—September 5, Mr. Robert Beckett presiding.—The Hon. Secretary presented the Society with Cassell's Academy books. Some of Mr. Powell's plate-backing was distributed, Messrs. Beckett and Smith promising to give in report on same. The negative shown last meeting by Mr. Barnes was explained to have been caused by light, the plate being not to blame. A question was asked by Mr. ROBERTS, how to remedy a film which had been put wrong way in developer? The CHAIRMAN said, if this had been discovered soon, by turning right way and giving prolonged development it might have been cured. In answer to question as to how many gelatino-chloride prints could be toned at once, the HON. SECRETARY advised just enough to cover dish, about two in half-plate. Mr. T. H. SMITH thought six or eight in whole-plate dish. A question of weight and measures was then debated on. The CHAIRMAN said doubt was in many minds at present, so they preferred to say "parts," as avoirdupois and apothecaries' weights seemed to be a rock on which opinions were divided. Mr. PUTTOCK asked what is best amount of developer to use for half-plate? The HON. SECRETARY said he would use at least three ounces; it was a great mistake to be economical. Mr. Gosling showed some stereoscopic work done with his home-made contrivance. Mr. Barnes showed some Isle of Wight views. Mr. Puttock showed a much over-exposed plate. Mr. S. BECKETT advised intensifying. Mr. Avent showed a print executed by the Automatic Printing Machine Company on bromide rapid paper. Prints were automatically exposed and cut off at rate of sixty per minute. The print shown of Captain Abney was very good.

South London Photographic Society.—September 4, Mr. Mark Boxall in the chair.—By the courtesy of Mr. Powell, samples of his caramel and sienna anti-halation backing were distributed among the members for trial. Mr. L. E. MORGAN then gave a demonstration of the working of the new developers—amidol, metol, and glycin. The latter, he said, did not, by reason of the slowness of its action, lend itself to demonstration. It was strongly recommended for reproductions, photo-micrography, &c. Negatives of varying exposures were passed round to show its capabilities in that respect. Amidol, he stated, he was partial to on account of its simplicity. He used a single solution, the formula of which was given by the manufacturers, and proceeeded to develop some negatives, bromide paper, and lantern slides with it. Some plates were also developed with metol. At the next meeting, on the 18th inst., Mr. H. E. Farmer will give a demonstration of the making of lantern slides.

Brixton and Clapham Camera Club.—September 6, Dr. J. Reynolds, F.R.G.S. (President), in the chair.—A member of the Committee of Instruction was present for the purpose of affording assistance to members requiring it. At the conclusion of the formal business, Mr. W. H. HARRISON read a paper on *Some Useful Photographic Standards*. The substance of this paper appears in another column. Mr. SPURGE, who was present as a visitor, then gave a very full description of the theory and practical use of his sensitometer and standard light for use in connexion therewith. Next meeting, September 19, Mr. F. W. Levett on *Carbon Printing*.

Leeds Camera Club.—A satisfactory inaugural meeting of the above Club was held in the Central Market Auction Rooms, 34, New Market-street, Leeds, on Wednesday last, September 6, 1893, at eight o'clock. After a resolution being made that a club be formed, the above title was adopted. It was agreed that for the present the subscription be 2*s.* 6*d.* per annum, with a further call of 1*s.* per member if necessary. A committee of five members was formed to draw up a code of rules to be submitted at the next general meeting to be held at the same address on Thursday, September 14, at eight o'clock. It is urgent that all intending members will be present at this meeting, as the business to be brought forward will be the election of officers for the year and the adoption of rules.

Leeds Photographic Society.—September 7, Mr. J. H. Walker (President) in the chair.—Major Darwin's paper on *Lens-testing at Kew*, kindly lent by the Photographic Society of Great Britain, was read by Mr. WASHINGTON TEASDALE, F.R.A.S., one of the respected founders of this Society, who made many useful remarks and explanations, rendering some of the technicalities simpler and more interesting and instructive. A discussion followed, in which the following gentlemen took part:—Messrs. J. H. Walker, A. A. Pearson, S. A. Warburton, G. H. Rodwell, and others. A number of very fine slides were afterwards thrown on the screen, contributed by Messrs. Washington Teasdale, Godfrey Bingley, and J. H. Walker.

Lewes Photographic Society.—Annual General Meeting. The President (Mr. J. Tunks) occupied the chair.—The Council presented a report in which they regretted that the year just ended had not been altogether satisfactory with regard to the number of members. Several new societies had been formed in the neighbourhood, and this had had the effect of taking some of their outlying members, who had taken advantage of the facilitie soffered nearer home. During the year two new members had joined, four had resigned, two had left the town, and two had been struck off on account of the treasurer being unable to obtain their subscription. There were now thirty-one members on the books. The meetings had been fairly well attended. The exhibition of lantern slides and members' work, which was held in March, though not successful financially, brought together a good selection of pictures and slides, and two enjoyable evenings were spent. The committee trusted that the meetings which would be arranged for the coming season would attract better attendances than in the past, and also that all working members would endeavour to send in slides for the competition which had been announced, and for which a prize would be given. They desired to thank the press, local, and photographic, for their kind notices, and those who had sent free copies of their journals for the use of the Society. The Hon. Secretary and Treasurer reported that the total receipts for the year had been 8*l.* 12*s.* 5*d.*, including the balance of 1*l.* 3*s.* 5*d.* from last year; and that the expenditure had been 6*l.* 12*s.* 2*d.*, leaving a balance in hand of 2*l.* 0*s.* 3*d.* Mr. Curtis proposed the adoption of the accounts, and expressed the opinion that they were very satisfactory. He did not think they could consider the loss on the exhibition unsatisfactory, when they took into account the fact that they had two very pleasant evenings. Mr. Carpenter seconded, and the motion was carried. The following officers were then elected for the ensuing year:—*President:* Councillor Wightman.—*Vice-President:* Mr. J. Tunks.—*Committee:* Mr. E. J. Bedford, Mr. W. J. Young, Mr. G. Carpenter, Mr. T. H. Lyell, and Mr. C. A. Wells.—*Hon. Secretary and Treasurer:* Mr. H. B. Constable. A vote of thanks was accorded to Mr. Curtis for auditing the accounts. Mr. Constable announced that it was intended to hold a special lantern-slide competition, in which it was hoped all working members would take part. A Watkins' exposure meter would be given for the best set of four slides from negatives taken at any time, but which had never received an award in any competition.

Sheffield Photographic Society.—September 5, Mr. J. W. Charlesworth in the chair.—Messrs. Brooks and Loxley were elected as auditors, after which the photographic exchange was effected, and the prints of the last exchange criticised in the usual manner.

FORTHCOMING EXHIBITIONS.

1893.	
September 20–21.....	*Hove Camera Club. Hon. Secretary, H. Emery, 142, Church-road, Hove, Brighton.
,, 25–Nov. 15	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1–31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 2–14	Midland Camera Club, Botanical Gardens, Moseley, Birmingham. Hon. Secretary, C. J. Fowler, 4, Woodstock-road, Moseley, Birmingham.
,, 9–Nov. ...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
,, 17–19	*Hackney Photographic Society, Morley Hall. Hon. Secretary, W. Fenton Jones, 12, King Edward-road, Hackney, N.E.
,, 30, 31	*East London Photographic Society, New Tabernacle, Old-street, E.C. Hon. Secretary, W. R. Gould, 61, Gibraltar-walk, Bethnal Green, E.
November 7–11	*South London Photographic Society. Hon. Secretary, C. H. Oakden, 53, Melbourne-grove, Dulwich, S.E.
,, 20–25.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18–Jan. 22, 1893	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

PROFESSIONAL *VERSUS* AMATEUR.

To the EDITOR.

SIR,—I have heen much interested in reading the correspondence between amateurs and professionals in the late numbers of your JOURNAL, as well as the great amount being written on the amateur and the professional in all classes of journals and newspapers. If the amateurs have so greatly injured the business of the professional as it is claimed they have, I shonld be a just target for the ire of this injured class in America, for it has been my aim for the last ten years to create as many amateurs as possible, and, in America at least, directly and indirectly, I must stand answerable to professionals for influencing several thousands at least of the innocent public to amuse themselves in this luring pastime, unaware that they were acting the part of the boy who was amused at seeing the stones which he threw in the pond create waves, until begged by an injured frog to desist from the amusement in the language of the adage, "for what is fun to you is death to us." And I feel satisfied from quite an extensive acquaintance with the public who have taken up with photography as a pastime, that, while the amateur amusement does not mean (financial) death to the professional, the stones have

hit hard in many cases. Amateurs, and manufacturers of and dealers in the apparatus and materials used by them, should not feel surprised to find the professionals resent this encroachment, and attempt to prohibit, if such was possible; but this cannot be done, and it is unfortunate that at least some of each side will indulge in writing letters that can only tend to do harm.

I felt much regret at seeing Mr. W. J. Stillman's letter of July 4, for, from what I have known of Mr. Stillman and his work, it does not do justice to his temperament and intelligence; and, as he practically accuses the professional of having done nothing worthy of mention either in Europe or America towards that which has "made outdoor photography a practical affair," I feel an answer should be made. I shall, however, only speak for America, yet I have confidence that much could be said for Europe with equal truth.

By making "outdoor photography a practical affair," I presume Mr. Stillman means adapting it to be used by the masses; for photography as practised by some of the best workers is not the result of the apparatus, plate, or paper-maker. Nor do I understand Mr. Stillman to mean the men who first conceived the idea of a sensitive plate without the silver bath. The knowledge of making a dry plate lay unused too many years to give to its discovers (if such gradual gathering of knowledge could be called a discovery) the credit of the dry plate of to-day.

I hardly think I would be accused of immodesty in America if I should lay claim to having contributed a fair share, for one individual, towards making "outdoor photography a practical affair," not only in cameras and apparatus, but in other branches as well, and I have the honour of having once been in the rank and file as a professional. I entered this "rank and file" not as an amateur, but in the studio, and my first experience was in preparing the plates for tintypes.

During my six years' service as a professional I managed to keep myself poor experimenting; in fact, the apparatus which the present Company bearing my name was organized to manufacture in 1880 was invented in the spare hours I found after using the "baby-charmer," or beseeching my adult sitter to "look naturally about here, and think of something pleasant." I make bold, Mr. Editor, to ask you to allow the use of sufficient of your valuable space to copy one of my early visions. I do so hesitatingly, for the quantity of what is termed in America as youthful "gush" in this article has always made a colour approaching the "non-actinic" to hover around my cheeks even when I read it to myself alone.

Photography—What is its Limit?

Did you ever stop, brother photographer, to think of the unspeakable joy and astonishment the present position of photography would cause Daguerre and his co-workers, were they, like Rip Van Winkle, to suddenly awake from their long sleep and behold, with wondering eyes, into what the results of their humble toil had so rapidly developed? Hardly can we mention any branch of industry, art, or science, in which this, their offspring, does not play a part, and, in some, a most useful and important one.

As an assistant to the artist, it is of unlimited value, giving him, if properly handled, a "bit" or landscape which would require hours to sketch. It is a silent detective to the counterfeiter's skilful hand, and leaves with us an undeniable copy of the face of the outlawed criminal, who, having once visited the precincts of the photographic official, cannot say, on his compulsory return, "I now receive my initiation to the walls of justice."

The great discoverers could now cross their legs, peruse the pages of at least a dozen different photographic journals, in almost every language on the globe, all ("well, mostly all") devoted to the advancement of our fascinating art. Surprised, most undoubtedly, would all be who witnessed the birth of this child, born of genius, and with the most promising traits of character, but, alas, under circumstances so unfavourable and enemies so plentiful.

So much worth was not to be crushed by its foes, nor destroyed by the unfertile surroundings; but, like the hardy acorn, it sent its vigorous shoot up, up, until it now stands like a noble tree, swaying its numerous branches, thrusting aside its tottering enemies, and demanding its rights and freedom. Not yet has it attained the ponderous dimensions of the full grown oak; but each year it sinks deeper its roots, adds and extends its branches, until every interested watcher is ready to exclaim, "Where, oh, where are thy boundaries?"

Again, my brother, did you ever pause to think of the marvellous changes which are destined to be wrought in a much shorter time than that which has elapsed since the death of our photographic forefathers? Ah, yes! how surprised, indeed, would we be upon waking, should any of us be so unfortunate as to make an acquaintance with that hunchback, partake of the mysterious draught, and, as did Rip, succumb to the unnatural sleep. Methinks, should the hale old sleeper inquire for "my hobby," the wet-plate picture, all would be wrapped in mystery, except, perhaps, some old veteran might make answer, "It has been dead these twenty years a most."

Dry plate would then run riot. The tourist, the artist, or the solace-seeking maiden would, instead of the *now* popular sketch-book and pencil, have the *then* popular camera and dry plate (or some more modern and convenient device), all, doubtless, of the *ever* "popular" American Optical Company's best. These, with the perfect, the simple, the rapid, the reliable plates, would form an important part of the personal property of all lovers of Dame Nature.

Readers, do I not hear you say, "What over-enthusiastic disciple is this? Should he live to be as old as Methuselah, he will never see his prophecies fulfilled." Why not, I pray thee? In reply, I can most seriously say that, even at the present day, no very difficult obstacles present themselves which would prevent all my predictions being carried out to the letter. Dry plates and emulsions can now be obtained which certainly are nearly all we could ask for. The greatest difficulty lies in getting practical photographers to carefully test what the manufacturers claim for them.

One year ago I was a most bitter and obstinate enemy to the dry plate in any form, fully believing it to be on a par with "perpetual motion," &c.; but, happily, one leisure day, I determined to give it another and a more thorough trial. Carefully I set about it, and so satisfactory were the results that I feel as though too much cannot be said in favour of the cause.

I believe there is an excellent chance for those who would make themselves familiar with dry-plate work, to do a good and legitimate business in developing and printing negatives for amateurs, if they would do it at a reasonable rate and strive to give the finest results. There are hundreds of ladies and gentlemen in every city in the United States who, upon starting for a week's ramble among the mountains or at the seashore, would be delighted at the idea of taking with them a camera and plates were there not so much experience and work required before the pictures are completed. Any one familiar with the development of a dry plate knows how much more it is under his control than the wet, and a list of exposures under different lights could easily be given, so that even the inexperienced could proceed with comparative surety of success.

But, says the landscape photographer, should all this come to pass, our business is gone, for then "every man would be his own photographer."

In my humble opinion such would not be the case. It would no more injure your trade, or lower your profession, than does the fact that almost every schoolboy or girl sketches and paints make "every man his own artist," or decreases the sales of the professional artist, but instead thereof it cultivates a taste and creates a desire for his works.

And yet has all this writing shown the limits of photography? No. And the answer to the question heading this article no man can give, at least not in the year 1880.

In conclusion, let me add an urgent request to all my finger-stained brethren of this dusky art, to give this "future" process an early and careful trial. Follow strictly in the smallest detail the directions, for often a very slight variation makes a marvellous difference in the results. T. H. Blair.

The above article was written in 1879 for the *Photographic Mosaics*, but received too late for publication, and was published in the *Philadelphia Photographer*, 1880.

When we consider how near this prophecy has been fulfilled in every way, and how much further the art has advanced than what was considered a very sanguine prediction, one does not feel that much risk of being called visionary is assumed by saying that Leon Vidal's able article on "Present and Future Possibilities of Photography," in the July 25th issue of your Journal, and read before the world's Congress at Chicago, puts the subject "mildly."

Enough of myself, except to acknowledge that professionals have given me valuable assistance many times in various branches of my work, and there are improvements which, by being brought out by a corporation bearing my name, are credited as the result of my brain exclusively, which emanated from suggestions made by professional friends, and I no doubt present a very ungrateful picture, engaged as I am in the business of creating amateurs whom some would stigmatise as the intentional enemies of these benefactors; but I feel sure they bear me no ill will, and I rely on the good sense of human nature generally to take the right view of my position. I could formulate a lengthy list of professionals in America who have contributed much to the present state of things in photography, and in mentioning those that I do it is possible that I may go beyond what Mr. Stillman intended to cover, as it is difficult to realise where the advantages of modern photography to the masses ceases.

Were not the greater part of the early dry-plate makers professionals? What was the occupation of John Carbutt or G. Cramer? D. W. C. Hoover, the manufacturer of glossy bromide paper since 1889, and the first to make it at least practically and commercially, was a professional and constant experimentalist; he also is the inventor and designer of the Hoover patent printing machine, which, by using the glossy bromide paper, will print from one negative 300 prints per hour, which can scarcely be detected from amongst albumen prints. But why name individuals, for I am sure to leave out many? I must not, however, pass the name of Mr. Frank Rowell, of Boston, large in stature and heart, and always ready to lend a hand or impart knowledge to any and every one if only to help on the art which he so much loved.

As far as my knowledge extends, and circumstances have made it necessary for me to make exhaustive research in this direction, Mr. Rowell, was the first to practically coat celluloid, and thus make a flexible celluloid film. This article, as cut sheet film, he has been selling since 1887. He was the first to introduce and work in America successfully the beautiful carbon process, for which a gold medal was granted to his firm at the Centennial Philadelphia, 1876, and many of the processes which are constantly being brought out at the present time as new discoveries are old to this indefatigable experimentalist, and his portfolio of samples and dates show the results.

He is, and has been for acores of years, a professional. Like many others of the real inventors and discoverers of the world's most useful appliances of the day, he did not possess the capital or the business ability to secure or use others' capital to put his discoveries before the world in the most energetic manner, and thus get the credit for their efforts; but the desire for improvement existed, and the hard work to discover it was done nevertheless, which is the question at issue at present. The willingness of these workers to fully impart to others the results of their efforts, tells whether they were interested for the sake of their art or science or not.

I trust I will not be misunderstood as having any small regard for the great benefit the amateur has rendered, or the long list of scientific men who have done so much for photography. Far from it—and I have them, and my amateur friends also, to thank for many suggestions and much assistance. Neither do I fear that my business interests will suffer on account of my arguments in favour of the professional. I rely on the desire of human nature generally to see fair play for my security in this direction.

Regarding the discussion, there is, as a matter of course, no way in a modern civilised nation to stop such a tendency as the public now have to photograph; but remedies for such abuses as exist will appear, and their appearance can be much hastened by the professionals themselves. It is only fair for the amateur—and I believe but few would object—to pay reasonably for any bother or expense either in time or money he may cause the professional; but the great army of amateurs know nothing about the grievances of the professionals, which exist, at least in print, and it is only rational to suppose it would have no influence on them if they did know.

Human nature remains about the same after it has become the possessor of a camera, and it will accept information free, and use free dark rooms when no charge is asked, the same as it (professional photographers included) would accept free advice or privileges in other amusements or pursuits.

My advice to professionals, if any care to accept it, is, make yourself as useful to the amateur as possible, and charge him as much for this service as conscience tells you is fair, or, I might say, as much as he will pay and feel content; but, above all things, be good-natured.

Injustices are doubtless practised by both sides in cases, but illogical letter-writing will not right the wrongs. If an injured class exists, the professionals are doubtless the class. The amateur should therefore be the more willing to bear with the outbursts of those who at least feel that their pockets are the emptier for the universal desire to photograph.
—I am, yours, &c., T. H. Blair.

September 9, 1893.

"PHOTOGRAPHICAL SOPHISTICATION."

To the Editor.

Sir,—I am permitted to send you the accompanying letter, received some time ago, and which I have no doubt will be read with great interest during the present controversy, in your columns, on "Photographic Sophistication."—I am, yours, &c., Henry Van der Weyde.

182, *Regent-street, W., September* 9, 1893.

"*Lauriston, Bromley, Kent, May* 8, 1893.

"Dear Mr. Van der Weyde,—I have to thank you for sending me a copy of the *Journal of the Society of Arts* containing a report of your lecture. I have read it with much interest. Your invention opens up afresh the often-debated question whether it is permissible to alter a photograph with a view to its improvement in a pictorial or artistic sense. The question has, at least, two aspects—one scientific, the other commercial. Regarded from the scientific standpoint, no one will deny that a photograph, as ordinarily taken, is true, or nearly so, in an optical sense, and that in very many instances it is vigorous optical truth that is wanted, and that gives a photograph its greatest value.

"But it seems to me that while, as a rule, it would be intolerable to tamper with the optical truth or approximate truth of a normal photograph, yet there are cases, and it is these you doubtless have in view, in which an alteration such as will bring the photographic representation more in accord with the mental impression of rightness is not merely permissible, but necessary, in order to satisfy the just requirements of pictorial art.

"The mental impression, as distinguished from the optical impression, is a compromise between the image imprinted on the retina and the ideal image imprinted on the memory and derived from knowledge of the actual form of the thing seen, and every familiar object is regarded under the influence of these dual impressions, which go to make, so to say, a composite image. Pictorial art recognises this complication, and makes due concession to the preconceived ideal.

"'Retouching' exists; it is a step in this direction. You ask that a further step should be taken. I cannot see why it may not, provided it be taken, as you distinctly say you intend it should be, with judgment, both as to the occasion and to the extent.

"From the other point of view much more may be said in favour of your proposals, because there can be no question that they provide means at once simple and effective for, in a large measure, satisfying the almost universal desire for a little harmless flattery in the matter of 'fine little hands, fine little feet.' I am, yours, &c.,

"J. W. Swan."

To the Editor.

Sir,—I am pleased to find that Mr. H. Dennis Taylor's communication in your last issue so much reduces the difference between us, and that, for the most part, we are agreed. Mr. Taylor's condemnation of photographic flattery is, indeed, couched in stronger terms than those I have employed. He calls the diminution of heads, waists, &c. (otherwise than as they may have been enlarged by perspective) a "most illegitimate use" of the apparatus. Mr. Van der Weyde, on the other hand, puts forth the proposition that sitters were right in complaining of waists, &c., coming out too large, and shows how he diminishes them in accordance with the sitters' ideal. If Mr. Taylor, in his first article, had made it clear that this was the kind of flattery by which the method might, as he said, "in some hands, be prostituted," I should not have thought it necessary to reply.

It is not, however, the sophistication itself that I object to so much, as to the proposition that the sitter who desires it is to be told that this sophistication is in accordance with truth—visual, optical, or truth of any other kind—if truth, indeed, itself, is capable of such variations. For verbal flattery of this sort I don't think Mr. Taylor's language at all too strong.

Mr. Taylor says that I assume that diminution of the head could not take place without lengthening the neck. I did not intend to assume anything more than that that was what was done in the examples shown. I am curious, nevertheless, to see how Mr. Taylor could practically overcome the objection in the way he says, by lowering the head, without introducing some other distortion.

With regard to the reduction of near portions by as much as they may have been enlarged by perspective, I have said that, in view of the circumstance that painters have accustomed the public eye to representations of this kind, there is something to be said in its favour; but how is the photographer to recognise the exact amount, and be supplied with sophisticators of various powers for every change of pose? The probability is that he would employ one powerful enough, and, perhaps, twice or three times as powerful, as would give hand and figure in the proportion actually existing at an equal distance. So that the hand was small enough, a little or a good deal of flattery in the direction of the conventional ideal would easily be accepted.

The actual amount of enlargement due to perspective is much less than is, I believe, popularly supposed. If a single figure is taken at a distance of over twenty feet, the enlargement of any part due to perspective is very slight; and, as for heads, I have photographed the same sitter at distances of four and a half feet, twelve feet, and eighteen feet, using lenses of such foci as to make the images all of one size, and when all three were projected by the lantern on to a screen the only one in a large audience who ventured to say which was the near pose chose the wrong one. It is quite possible that the convention among painters for disregarding the rules of perspective when rendering single figures—rules which they would not disregard in other subjects—may die out, and then, when the public has become accustomed to see the facts as they really present themselves, complaints of photographic perspective will cease.—I am, yours, &c., W. E. Debenham.

September 11, 1893.

PHOTO-MICROGRAPHY.

To the Editor.

Sir,—The fact that ordinary microscope objectives work to focus on yellow sensitive plates exposed through the yellow screen was not to me a "discovery" in the popular sense of the term. Having occasion to make some photo-micrographs, and knowing that my objectives were not corrected for photography, I concluded that, in order to use them to the best advantage, I must make the photographs with those light rays for which the objectives were corrected, and at once proceeded to do so by employing yellow-sensitive plates and yellow light. I feel that it would have been stupid of me to do otherwise, especially after having had twelve years' practical experience with colour-sensitive plates and selective colour screens.

I did afterwards *discover* that even the apochromatic objectives gave better results with yellow-sensitive plates and a colour screen than without, and proved this to be due in part to the fact that they are not corrected to give perfect definition with the ultra-violet rays, to which ordinary gelatine-bromide plates are still very sensitive.

It is not a question with me whether an objective is "apochromatic" or only "achromatic," but how good an image will it give to the eye? In low-power objectives I know that there are some achromatics that have a flatter field and greater resolving power than the Zeiss apochromatics of the same focal length, that, with moderate amplifications (say, ×30 with a one-inch objective), they define details so minute that it is only just possible to see them with the naked eye in the photographs, and that such objectives are, therefore, everything considered, *better* for high-class photo-micrography in low powers than any apochromatics

now on the market. In high powers, I have it on good authority, that an achromatic objective has been made that resolves amphipleura pellucida with ordinary white cloud and mirror illumination, which is certainly more than some of the apochromatic objectives of the same angular aperture will do; and it seems to me to follow that one achromatic objective may be *better* for high-class photo-micrography than another apochromatic objective, even in high powers, if properly used. I venture to think that even the "real authorities" may be able to see the force of this argument.

Mr. Pringle says I have overlooked a dozen statements made by him, besides disputing what he never asserted. If so, I have made a mistake of a kind which I do not know that I ever made before. Unfortunately, most of my references are locked up at my home some thousands of miles away. Perhaps Mr. Pringle did make such a statement in one of his contributions to the photographic or microscopical journals, if not in his book?

My photographs and negatives are also locked up in Philadelphia, but, if Mr. Pringle has access to back volumes of some of the American photographic and microscopical journals, he may find some references to them as follows:—*Photographic Times*, New York, April 25, 1890, page 206; the *Beacon*, Chicago, May, 1890, page 117; the *Microscopical Bulletin*, Philadelphia, April, 1890, page 11; the *Microscope*, New Jersey, August, 1890, page 251. Other notices appeared in Philadelphia newspapers and in other microscopical and photographic journals, and in subsequent issues of some of the same journals, but I have not got the references with me. It is, perhaps, significant that the definition and brilliancy of the photographs was such as to lead an old expert like Dr. Nicol to mistake them for aristotypes, although in reality only ordinary albumen silver prints. My subjects ranged from the proboscis, ×30, to various bacteria and the secondary structure of diatoms, ×1000. I have seen nothing better of any similar subjects, but did not attempt anything requiring a higher resolving power than 1 : 30 N. A. With such a power I obtained brilliant and crisp photographs of the "beads" on surirella gemma, and photographs of bacteria that were, and I believe are still, used to advertise the merits of the objectives. One of the latter was reproduced as a frontispiece in the *Microscopical Bulletin*, and three Philadelphia bacteriologists, who had already done something in high-power photo-micrography, soon after applied to me for practical instructions in this work. I also received many letters asking for advice, and it is really quite possible that my recommendation of Mr. Pringle's book may have increased its sale in America, although I suspect Mr. Pringle of sarcasm in his reference to the subject.

Nobody knows better than I do that a very few subjects may be found in which colour value plays such an important part that an apochromatic objective, other things being equal, would give a perceptibly better representation of the object than is possible in a photograph made with an achromatic objective, provided that the photograph with the achromatic was made by the joint action of all the visible spectrum rays, in proportion to their power to excite vision. Such subjects are so extremely rare in microscopical preparations that I do not remember ever to have seen one among the many examples of "high-class photo-micrography" that have come under my notice. I am not even sure that any of the "real authorities" have ever realised the conditions which I have specified in making the photographs.

I have no doubt that the most remarkable photo-micrographs of difficult subjects that have yet been made with apochromatic objectives can be equalled in quality with achromatic objectives of equal angular aperture, and I fear that, if Mr. Pringle is going to insist upon his distinction between "high-class" and "highest-class" photo-micrography, he may have to admit that none of the latter kind has yet been produced.

I am sorry that my letter has been taken as a "complaint." It was not so intended. I am not at all sure that my observation was properly recorded in the proceedings of the Philadelphia Photographic Society, and it is not a surprising fact that Mr. Pringle overlooked a note published in an American microscopical journal. I know of far more important original observations recorded in scientific and technical journals of considerable importance which have escaped fruitful notice for a much longer time.—I am, yours, &c., F. E. Ives.

116, *Charing Cross-road, W.C., London, September* 11, 1893.

To the Editor.

Sir,—I do not think, after all, there is very much difference of opinion between my friend Mr. Pringle and myself, that a light from the paraffin lamp without yellow screen is about equivalent to the limelight transmitted through a yellow screen. I took it for granted, however, that microscopists who could afford to work with limelight would also supply themselves with apochromatic lenses, as there can be no question, outside that of expense, on which side the advantage lies, and operators who have once accustomed themselves to the beauty of image produced by the apochromatics will never be content to work with anything less perfect except as a matter of experiment.

Of course we often read of ordinary achromatics being made better in every way than the apochromatics; but, as these wonders never take place at any distance nearer than America, we on this side are not able to compare results.

Mr. Pringle says: "My experiments showed that the worst result was got with white light and an ordinary plate. A colour-correct plate greatly improved matters, while a colour-correct plate and yellow light gave the best results of all." Now, what I want to know is (not at present having the appliances to perform the experiment myself), does the inferior result produced by limelight without screen and colour-correct plates refer to the quality of the photographic image or to the focus only? for, as I understand it, the question does not so much turn on the former as on the latter. My own experience when working with achromatic lenses and ordinary plates has been that the image formed by the violet end of the spectrum is just as sharp—if you can only catch it—as the visual, and the question I ask is this: When working with white light and colour-correct plates, is the image formed on the visual plane, on the actinic plane, on an intermediate plane, or is it only a wishy-washy image formed on the visual plane? An answer to this by Mr. Pringle (for which I am sure we shall all feel indebted) will greatly narrow the grounds of dispute.

Lest I should be considered captious in taking certain objections to the experiments made by Dr. Pifford, I would say it was not so much to the use of the yellow screen I took exception as to the assertion that the results were even then unsatisfactory, and that certain further corrections of the lenses were necessary to produce the desired result. Having myself worked out the matter somewhat exhaustively by experimenting with lenses of all sorts of corrections, my experience was entirely different, and I see no reason yet for altering my opinion. The conclusion I have come to is that any lens, no matter what the correction, will produce as good an image on colour-correct plates photographically as it can produce visually. I do not deny that a certain yellowness of the light may be necessary; but that does not vitiate my argument.—I am, yours, &c., T. F. Smith.

185, *Brecknock-road.*

RETOUCHERS' TROUBLES.

To the Editor.

Sir,—The primary cause of this particular trouble *may* lie in the use of pyro-*sulphite* developer; any radical change in the developing agent may, however, considerably alter the general character of the negatives; therefore I would suggest after development, which should be full and carried, if anything, to excess, a bath of—

Potassium ferridcyanide	10 to 20 grains.
Hypo	1 ounce.
Water	20 ounces.

The first-named being usually kept in saturated solution and added to the hypo bath. The above acts, of course, as a reducer and *cleanser*, and leaves the film in as perfect a state as can be desired, ample washing, carefully going over the film with wet wool, should follow the application of the above, and, when dry, the negative *should not* be faulty in the respect your correspondent complains of; but, if still obstinate, I would, before drying the negatives, immerse for five minutes in a weak bath of glycerine and water, say, one to fifty.—I am, yours, &c. J. Pike.

September 9, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange a stereoscopic camera and pair of lenses and three slides for decent half-plate camera and slides without lens.—Address, Charles Harris, 3, Pentyre-terrace, Plymouth.

Will exchange 8 <5 rapid rectilinear lens by Taylor & Hobson, and quarter-plate portrait lens by Lerebour & Secretan, for enlarging apparatus to 12×10. Address, J. H. Newman, 41, Truro-road, Wood Green, N.

Will exchange Watson & Sons' ten-guinea biunial lantern and blow-through jets (only used eight times) for good detective or hand camera carrying twelve plates, or half-plate camera and outfit (double extension bellows).—Address, Alfred H. Saunders Mount Pleasant, Brierley Hill.

The following are the classes at the Hackney Photographic Society's Exhibition next month:—Members' work: Class A, for any picture not previously exhibited for competition; Class B, for best picture taken in hand-camera (enlargement permitted); Class C, for any picture taken at a club outing since the last Exhibition; Class D, for set of six slides (not previously exhibited), still life excluded. In Classes A, B, and C, a Gold Championship Medal will be given for the best picture, by the *President*, Mr. F. Houghton. Open classes—entries in these classes may be priced for sale at the option of the exhibitor: Class E, for any picture not previously having received an award; Class F, for portraiture and genre (professional class—no restriction); Class G, for pictures which have previously received awards; Class H, for six lantern slides not having previously received award.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

PHOTOGRAPHS REGISTERED:

John Horsburgh & Son, Edinburgh.—*Photograph of Right Hon. Sir Stuart Knill.*

Henry John Cherrington, Swinton.—*Two photographs of the Fitzwilliam Family.*

ASK.—Make the silver bath stronger.

G. J. P.—We do not know of such an ink.

SPOTTY, Wasp, Operator, and others. In our next.

A. A. CARNELL.—We do not think the pictures are of any commercial value.

H. H. CROUCHER.—We will try the lens towards the close of the present week

DENSE.—Bleach the negative with bichloride of copper, and dissolve off with hyposulphite.

A. LASCELLES (Napier).—Thanks for the cutting; we shall be pleased to see the photographs.

FRANCIS.—It is possible that oxgall on the surface of the prints may have the effect yon name.

PENCILLER.—Your communication is in the nature of an advertisement, and therefore cannot be published in the text columns.

J. REYNOLDS.—We believe that Messrs. Negretti & Zambra, Holborn-viaduct, can supply you with silvered plates for Daguerreotype.

SUBSCRIBER.—Burton's book, published by Messrs. Marion & Co., Soho-square, may meet your wishes, but you do not specify the process.

G. COWELL.—Bromide enlargements turning yellow at the end of a few months is not the fault of the process but of the one who did the work.

PYRO says: "Can you give me the address of the English agency for the Edison Phonograph?"—Write to Colonel Gouraud, Menlo Park, Norwood, S.E.

H. H. B.—You seem to have proceeded quite accurately; but we cannot suggest any better means for ascertaining the precise adjustment as regards the chemical and visual foci than by making a few trials.

W. SIMS.—Unless the ancient print can be got quite flat—say by pressure between glass plates—there is no way of preventing the creases showing in the reproduction. Can you not have it mounted on cardboard, or strained on linen?

LENS.—Suppose the lens be nine inches equivalent focus, to copy the same size with it the camera must extend eighteen inches. It matters not whether the original be *carte*, cabinet, or any other size, the conditions are the same.

J. TILFOR says:—"Can you inform me where I can obtain a suitable gas stove for warming a dark room? Hitherto I have not required one, but shall be shortly moving into a house where I think one will be wanted."—Perhaps some of our professional readers can supply the desired information.

C. R. B.—The Continental firm named, we know, will supply their apparatus without their name upon it; but, if you were afterwards to put your name on it, and sell it as purporting to be of your own manufacture, you would infringe the Trade Marks Act, and consequently become liable to a penalty. However, the thing is done daily.

AGENT.—We do not know the "longest discount" the two houses referred to allow to the trade. If, as you say, you are a shipping agent, why not write to the firms direct, as in the ordinary course of business? Writing to us as you do rather inclines us to doubt your *bona fides* as a shipping agent or being connected with the trade at all.

D. MCANDREW.—In protecting the proposed studio from lightning, the conductor should not be connected with the gas or water pipes, but taken direct to the earth, into which it should enter three or four feet. Connect it with the building as described in the second proposition. The thick electric-light cable will answer very well for the conductor.

J. K. TULLOCH.—Our opinion is that the object-glass of a cheap French achromatic telescope of twelve inches focus will serve your special purpose. Such can be purchased unmounted for about half-a-crown. Being small in diameter, it will scarcely require a diaphragm to cover such a size as that mentioned, although such may be employed with advantage.

GRAVER.—What is known as the steel facing of copper plates is iron deposited on the plate in a very hard form. It is not, as you seem to imagine, a separate steel plate. When renewal of the steel is spoken of, it simply means dissolving off the iron coating when it has become worn through with dilute sulphuric acid, and then depositing a fresh one, as in the first instance.

W. T.—As the canvasser only worked on commission, we do not think you can proceed criminally against him for the defalcations; he can be sued in the County Court. Had he been a paid servant, or paid by commission and salary, the case would have been different. As, however, there is an attested and stamped agreement, a solicitor had better be consulted before any action is taken.

B. JOSLIN complains that some plates he recently bought in a country town, while away on his holiday, all show a blue metallic-like appearance round the edges after development. He says that he has used the same brand of plates for some months now and has not seen the like before? The plates were old—evidently been in stock for a long time. The appearance is very common with plates that have been made for a long time. However, some plates keep much better than others.

CLARENCE asks where he can obtain a copy of the "new Copyright Act," which was recently passed?—No new Copyright Bill has been recently passed, or, indeed, has one been promoted. Several different Bills on the subject have been introduced during the past few years, but they have all suffered in the slaughter of the innocents at the end of the session. Unfortunately there is very little prospect of copyright law receiving attention in Parliament for a long time to come.

SNAP-SHOT.—Although you may be working the camera, shutter, and lens under precisely the same conditions, so far as they are concerned, and with the same brand of plates, there is yet one factor that has not been taken into account, namely, the light. It should be borne in mind that the light at Brighton a month ago is very different from what it is in London at the present time. The difference is quite sufficient to fully account for the under-exposure, even if all the other conditions are identical.

S. J. writes: "I have a Doulton's stoneware sink, but am continually breaking measures, dishes, and plates with it. Is there any other material that I can use instead of these sinks, as I am going to fit up a new dark room?"—Sinks lined with lead answer very well; so do wooden ones, provided there is always some water kept in them. A wooden frame at the bottom of the stoneware sink will prevent a great deal of breakage. A piece of "expanding" lattice work, which may be purchased at most timber yards, answers the purpose well, and it is very inexpensive.

E. J. DAVISON.—We do not attribute any fault to the mounts themselves, but it is well known that all bronze printing on mounts produces such tiny spots as we observe in one of them, and, if in mounting the bronze card were laid on the top of the others, it would convey the same defect. What mountant is used? This may be the source of the trouble as regards the yellowness in certain parts. The lubricant also may have acted on the cracked parts. We confess to not being able to give any definite information that can help you to any great extent. We have shown the prints to several persons of experience, and fail to glean anything definite.

RAPHAEL.—From the sketch the studio appears to be very ill constructed for photographic purposes, except, perhaps, for copying. But this may be due to the space at command at the time it was built. All the light appears to come from the front as it is now arranged, and what has to be done is to convert the front light into a side one. This can easily be done by altering the position of the background, and working across the room instead of lengthwise. Although by this modification the length will be curtailed, twenty-five feet will be long enough for general purposes. With this single alteration, a studio, except for length, will be obtained that will be admirable for portraiture.

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, 1894.

EDITED BY J. TRAILL TAYLOR.

We have commenced the preparation of the ALMANAC *for* 1894, *and shall be happy to include amongst its contributors all those valued friends who, in former years, have made it the vehicle of their experiences in the progress of practical photography. We shall also be pleased to receive contributions from more recent recruits to the art.*

We should be glad if intending contributors would favour us with their articles as soon as possible, in order that any possibility of their having to be excluded on account of late arrival may be averted.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1742. Vol. XL.—SEPTEMBER 22, 1893.

FINDERS AND COGNATE SUBJECTS.

We have heard complaints of some of the cheaper classes of hand cameras that the finders attached to them are only so in name, that they do not afford an adequate idea of the amount of subject that is actually impressed upon the sensitive plate; and, what is worse, that the centre of the one does not coincide with that of the other. Photographs have been seen by us in which all their bad qualities have been attributed to the finder.

The most pronounced of these defects has been the convergence of the perpendiculars, owing to the camera having been pointed upwards in order to get in the desired amount of subject. The finder does not always afford an opportunity of detecting this imperfect levelling of the camera. It is of minor consequence that the camera is not held level as from side to side, as the imperfection arising therefrom is remedied in trimming the print at the expense of a slight diminution of its size when cutting it square; but no trimming can rectify the effect of longitudinal mal-levelling when buildings are included in the view. In this case the operator should not trust to his finder, but rather to his own ability to hold the camera level, or, better still, to a small spirit level which may be placed alongside of the finder.

We have seen many photographs of otherwise real excellence obtained by hand cameras, their beauty being marred only by the defect spoken of, viz., convergence of their perpendiculars, and to those who uttered lamentations over this we have invariably recommended the adoption of the remedy we pointed out, with some fulness, in a chapter in our Almanac for 1890, which treats on the curing of distortion already existing in negatives, and which no one has ever known to fail. At the risk of repeating what many already know, but which, unfortunately, many seem *not* to know, we repeat in a few words the directions given, which are to make a transparency from the offending negative by superposition in a printing frame, and, having erected it in front of a plate of opal glass, make a copy of it by means of a camera having a swing back, and in doing so focus as sharply as possible with the largest aperture of the lens, and swing back the ground glass until the convergence of the building is seen to be neutralised, and the vertical lines rendered parallel. Now insert the smallest stop, so as to ensure top and bottom being equally sharp, and expose. The negative which results from this treatment will be rectilinear, and in every respect perfect, so far as drawing is concerned.

We have long thought that there is very much room for improvement in the lenses of finders. The great majority of these is formed of a double convex lens of short focus, with a stop or diaphragm outside. Now, if this lens is used without a stop, in order to secure the maximum of illumination on the small ground-glass pane usually left exposed to light from above and around, the image is exceedingly hazy owing to the imperfection of construction and use of the lens; while, if it be stopped so as to obtain a greater degree of sharpness, a shade of one kind or other must be erected around the screen to shield it from the light.

With a view to ascertain the best form of lenses for finders, we got a plano-convex of short focus (one of a class employed in the eyepieces of telescopes and microscopes), and tried it, convex side out, without any diaphragm. The image given was very bright in the centre, but fell off rapidly towards the margin. This, we may state, is not a *very* bad fault, for, if the centre be sharp and luminous, the object of a finder in a non-focussing hand camera has been attained. Still, and aiming at a greater degree of perfection, it was desirable that equal sharpness as that in the centre should extend to the sides; so we had the system entirely reconstructed, by adapting a powerful plano-convex front, convex side out, as before, with a double convex, having an immense excess of negative aberration mounted a little behind. This flattened the field, and gave an image on the finder screen which we have never seen even approached for luminousness. In optical parlance, it gives an intensity little over *f*-1. The whole combination may, from this description, be designated a Petzval; but the principle is carried to an extent far beyond what this philosopher aimed at, for here a visible image only is aimed at, and further, although from the large aperture there is a residuum of aberration, yet is such not appreciated, on account of the smallness of the image and the fact of its being viewed by the unaided eye, and not through a magnifier. Further, there need be no nicety aimed at in securing perfect achromatism, although, by the way, the front of ours happens to be an achromatic, because the coincidence of the visual with the actinic foci is not of the slightest consequence in this case, and even slight fringes of colour do not interfere materially in the image shown by a finder. The question of cost of construction need not, therefore, be an interfering element in the substitution of a finder possessing immeasurable advantages over that now so generally employed.

We are not, in these remarks, losing sight of the still superior advantages of hand cameras of a double nature in which two lenses identical in every respect are employed, one for focussing and the other for photographing with, now being supplied by several firms; or those of an ingenious American inventor shown at the Derby Convention, in which the ground glass was on the top, *à la* Sutton, the sensitive plate at the back, and the lens and diagonal mirror so adapted to each other, as by pressing a button at the supreme moment

to ensure the light being instantly deflected from the focussing screen above to the sensitive plate at the back, a form of focussing finder camera we now very seldom see, but to the resuscitation of which it might be worth while to devote attention.

CAMERA STUDIES.

It will be interesting, in view of the immediate approach of the annual Exhibition of the Photographic Society, to watch what effect has been produced upon the character and quality of camera productions by an exceptionally favourable season for outdoor work. Never within recollection, we should think, has there been such an almost uninterrupted spell of "photographic weather," reaching from the late winter right through the spring and summer, and still promising to extend well into the autumn.

It goes without saying that there will be, at any rate, an abundance of "snap-shot" or hand-camera pictures of small size, for these form the majority of the total work executed; but there will also be a higher class of the same kind of work of larger size—studies, in fact, in contradistinction to mere landscape—that promises to be the fashionable style of the near future.

This is not to be wondered at when we consider the peculiar advantages that modern dry plates offer for this class of work in the first place, and also, except in a few favoured districts, the scarcity of really good landscape subjects. It is not every amateur who can afford either the time or the money, except for a few brief days in the summer, to travel far afield in the practice of his hobby, and the majority of such, pent up in our large centres, have to look entirely to occasional half-day excursions, or shorter rambles nearer home, for their pictorial studies. Under such circumstances, it is not to be expected that scenery of the grandly picturesque type falls to the lot of the average amateur, though in some favoured localities it may be so, while in others there is no lack within reasonable distance of subjects of a milder type of beauty, which to many perhaps yield equal or even greater pleasure. In this respect, perhaps, London, much as it is decried by some, stands unsurpassed by any other town or city in the extent or variety of the work to be found within easy reach; but the case is very different with some of the great northern and midland centres.

Objects of antiquarian and archæological interest are plentiful everywhere, and suffice to engage the attention of one class of workers, but to the majority they are as "*caviare* to the general." Such subjects are seldom beautiful, and consequently fail to satisfy any but those who make a special study of the subjects. Architecture, on the other hand, may be both interesting and beautiful, and forms a favourite branch of work with almost every class of photographer, amateur or professional; but it is only a branch, and scarcely suffices to form the staple. We have known individuals who have laid themselves out to make collections of the cathedrals, abbeys, castles, or ancestral halls of England, and suchlike; but these are almost invariably found to be individuals who make a special study of architecture, archæology, or take an historical interest in the class of subjects depicted. We are acquainted with another amateur who, *faut de mieux*, devoted his spare time to photographing the churches and chapels in his town, independent of any beauty or interest they might possess, simply that he might have them complete. We can only consider him, as the Americans would say, a "crank" in search of an object in life.

The picturesque in either landscape or architecture is, in fact, very thinly and unevenly scattered about the country, but the class of subjects which we have termed camera studies may be found almost anywhere in our streets, at our very doors, on the river, in the country lanes and fields, anywhere, in fact, where life, human or animal, exists coincidently with the camera and the capacity for using it. But it is upon the capacity for properly using the camera that everything hinges. The idea that all that is required to make a picture is to point the camera at a life scene, and "press the button," has been responsible for the production of an inestimable amount of rubbish in the past few years. Too many of the users, or "abusers," of the hand camera labour under the impression that what is "true to nature" must be right—that, in fact, *realism* constitutes *art*. Rather should they endeavour to convince themselves that the real *ars celare artem* consists in softening down that realism, and depriving it of the excessive truth that renders it vulgar or even repulsive. To illustrate what we mean, let us try and imagine what would be the effect produced if such a picture, say, as Luke Fildes' *The Casuals* had been rendered from nature by means of photography.

This is merely one view of the question, but we may refer to another, namely, the utter disregard in so many instances of the capabilities and requirements of photography, both optically and chemically; or, to put it in another way, the ignorance displayed by the users of the tools they are handling. Thus we have seen an amateur snap-shottist calmly "potting away" in a crowded railway station, where the only light came through the smoke-begrimed glass roof, and where several seconds' exposure with the quickest lens and plate would at least have been necessary. Then, again, how often do we see such curiosities in a group as, perhaps, a toddling infant in the foreground appearing a giant in comparison with a full-grown man a few feet further away. But such things are too common to need pointing out to those who are willing to guard against them.

But, after all, it is not only the "artist" that is to blame for the lack of proper subject. We fear, in a great many cases, the subjects themselves have greatly changed for the worse, and, in fact, do not present themselves to the true artist in the manner he would like to render them. How seldom, in fact, do we see any really satisfactory renderings of rural scenes, such as hay-making, harvesting, gleaning, and a hundred others. As a matter of fact, the introduction of machinery has practically done away with such scenes as we are wont to see them depicted, and, in place of the half-dozen mowers in picturesque *déshabillé*, and the bevy of country lasses in broad straw hats or sun bonnets, and many-coloured gowns and kerchiefs, tossing the hay, one man, with horse and machine, does pretty well all the work. The same may be said of harvest operations generally, and it is only when the gleaners have taken possession of the field that much chance arises for pictorial rendering. But here even the Arcadian simplicity of dress and manners that we naturally associate with gleaning seems to have almost disappeared, for the majority of the women and girls engaged are got up in the fashions of Paris of three or four seasons back, while, instead of listening to the pipes of some shepherd swain, they fill the air with their invocations to "Daisy"—a nice enough name if properly pronounced—to give her answer at once.

Things are fortunately not so bad all the country over, but

it is only too true that within range of the larger agricultural towns rusticity is rapidly disappearing, and the fashions and manners of the East End and St. Giles taking its place. Therefore, when we come across any camera renderings of such subjects as we have suggested, let us give them all the credit that is their due as artistic productions.

VARNISHING AND RETOUCHING.

The interest taken, by courteous correspondents, in the query of a brother photographer in retouching difficulties, leads us to suppose that some further hints on the points at issue will not be deemed superfluous. The particular difficulty first mentioned — inability to get the pencil to bite upon a film treated in the usual manner with medium—does not appear to be solved yet; but, from the data given, the most probable solution would be that some accident had happened to the retouching medium, or that it had been tampered with.

The first point that attracts attention in the correspondence is the perpetuation of the common error as to the function of a "medium" applied to a varnished, in speaking of it as "abrading" the surface. The action of abrasion does not come into play with the usual mode of applying medium, but the term is justly applied when powdered pumice-stone and chalk is used, and partially so when powdered resin is employed. There is a growing tendency to use medium as against abrading substances, and perhaps equally good results may be obtained with either method. But there is one disadvantage of the medium plan that seems to be quite ignored in any retouching discussion, and that is, the great liability it has to cause the collection of dust and dirt, not only upon the retouched surface, but upon the space covered with medium outside the worked-upon surface. When a negative is in constant use for printing, it may not be noticed for a while, but if it be left in the frame for a few days—often if only for a single day—it has a tendency to collect particles of fluff or dust from frame or pad that, eventually, seriously interferes with the delicacy of the work. With abraded surfaces, this tendency to collect, by adhesion, does not exist, and the negatives are the better in consequence after long usage. The tendency of the method of the roughened surface to gather fine particles does not appear to be nearly so great.

All these difficulties are, however, completely avoided by varnishing the negative after being worked upon, and all that are held in estimation should be so varnished. When this is done upon retouching, executed upon the medium-treated film, little difficulty arises. When the work has been done upon the varnish itself, treated of course by medium or abrader, very considerable difficulty will be experienced. Unless great care be exercised the operator will be astonished on looking at his negative after varnishing to find a bare negative without a trace of retouching, the second varnishing has softened the first, the surface of which, with the work upon it, has been floated away by the hot liquid. To avoid this trouble several points have to be considered. The varnish when applied the second time must on no account be too hot or too thick; and it is necessary to choose a suitable one, as there is considerable difference in the resisting powers of varnish surfaces in this respect. It does not seem to make much difference to the dissolving power of the second coating whether the first be a day or a month old; and what forms the most troublous feature in the case is the fact that a dozen retouched negatives may be revarnished without the slightest sign of mishap, while the very next may be hopelessly lost so far as the retouching is concerned.

As regards the surfaces of the unvarnished negatives, they vary considerably according to the make of plate; some give a surface almost like glass, others a beautifully matt surface, well described by one correspondent a rose-leaf surface. The latter will take delicate retouching without any preparation, while the pencil will glide from the former as though greasy.

A negative which has been passed through a reducing solution likewise exhibits a glossy surface, while one that has been intensified with mercury presents just the opposite effect—perfectly matt, and capable of receiving and retaining heavy pencil strokes.

We will conclude our remarks by referring to another point which we do not remember having ever seen referred to. The power of the pencil to bite or grip is not governed wholly by the medium made use of, it depends to a considerable extent upon the surface to which it is applied. For example, a case was brought before our notice which ran parallel to that of our correspondent, except that the difficulty was experienced upon a film varnished before retouching. Good work could not be done, though the same pencil and the same medium were made use of by the same hand. Nothing appeared to enable the retoucher to get enough of lead on his surface, though many different "mediums" were tried, and the pencils were also varied. Ultimately it was discovered that the varnish in use had been thinned down with spirits far too severely, the coating it gave being very slight. There was, consequently, no bed, as it were, for the pencil to grip into, and it would slide along instead of parting with sufficient of its surface to make a defined mark. The varnish was changed, and all went right at once. It is just possible that this may explain the difficulty that first led to the correspondence, though the letter inferentially leads to the supposition that the film, and not the varnish, formed the medium substratum.

Preparing Plaques for Enamels.—At the meeting of the London and Provincial Photographic Association on September 28, Mr. A. Haddon will demonstate the preparation of plaques for vitro-enamel work. We understand that the process is both a simple and an inexpensive one. As visitors to the Association will be welcome, we trust a goodly attendance will result, as the subject, which will, no doubt, be treated in Mr. Haddon's usual lucid style, is one that should be instrumental in reviving interest in enamel work.

The Photographic Society's Exhibition.—We understand that, for the Exhibition of the Photographic Society of Great Britain, which opens on Monday next, more pictures have been sent in than was the case last year. Moreover, the roll of exhibitors will be found to contain the names of all the prominent photographers then represented. In view of the strenuous opposition since organized, this is a very gratifying circumstance. The Exhibition will be preceded by the customary *conversazione* at the Gallery, Pall Mall, on Saturday evening next, when the President will receive the Society's guests. The Exhibition will remain open a week longer than last year.

Studio Roofs.—The roofs of most studios have had an unusually trying time of it during the past exceptionally hot summer. If examined now, it will be found in many cases that the putty has cracked

badly or otherwise left the glass, and, as a consequence, the autumnal rains may, and often will, cause inconvenience and damage within. Therefore now, while the roof is still dry, is the best time to have it seen to and repainted. But is ordinary lead paint the best for the purpose? We ask this question, as we were recently told by an old hand that the outside of his studio had not a coat of paint for years, and was still perfectly watertight. At the close of each summer he had the sash bars carefully "painted" with ordinary gas tar, to which a little tallow had been added, remarking that with paint the heat frequently caused it to blister, and also the putty to crack. With tar, however, he told us the case was different, the heat caused the tar to soften, and, if excessive, to run slightly, and thus fill up any cracks, if any occurred, in the putty, and also bond it tightly to the glass. There is a certain degree of novelty in this system of treating the outside of photographic studios which may prove useful with those—and they are not a few—with leaky roofs in a chronic form.

Enamelled Ironware in Photography.—With the exception, perhaps, of dishes for the developing solution of platinotypes, and occasionally for washing prints, this ware seems to be but little employed by or known to photographers. But many articles are made in it which will answer their purpose better than any other, because, while totally unaffected by the majority of the substances employed in the art, they will stand almost any amount of heat. Funnels, jugs, mugs, and ladles, to say nothing of the handy little saucepans to be seen everywhere, will all find a handy use in the photographic laboratory. Most are aware of the result usually met with in dealing with glass funnels and measures with hot solutions, but with enamelled ware any of the vessels can, of course, be put direct on the gas or other stove whenever necessary, a very great convenience in making solutions where heat is necessary. We were recently shown some enamelled iron spouted-measures of a variety of sizes, graduated in black figures on the inside, and we do not remember having seen anything like them in any of the photographic warehouses. As they were all graduated according to the metric system, we assume they were of foreign manufacture. These measures should be specially useful in compounding percentage solutions. It is quite possible that they may also be had according to the English system. The subject may be worth the attention of some of our enterprising dealers.

A Secession Exhibition.—There are open just now in Munich two fine-art Exhibitions. For several years past the Artists' Society there (we are not quite sure of its exact title) have held an annual Exhibition, and the reason that a second one is being held this year is very similar to that which has brought about two photographic exhibitions in the metropolis at the same time. For some time past, it appears, there has been a certain amount of friction between what may be termed the old school of artists and the new school, the impressionists, and that culminated last year in the latter seceding from the general body of the Society, and forming themselves into a new one. They are now possessed of a fine permanent building, and have their first Exhibition open under the title of the Secession Exhibition. We are informed that the Original Society's Exhibition at the Glass Palace numbers between two and three thousand works, and the new one, though not numbering anything like that, yet makes a very good show, so far as numbers are concerned; but the attendance is limited, and the remarks by many of the visitors on some of the pictures is anything but complimentary. Evidently, although Munich may be considered a hotbed of art, a large proportion of its inhabitants are not yet educated up to the "impressionist" school, for we are told but very few of the works are sold, while at the other Exhibition a very large proportion of them are. It is also said that the impressionist style of painting has been there extolled by the newspapers, precisely as has been impressionist photography in England.

The Influence of Light on Silver Prints. — There seems to be a very common opinion with the lay public that the more photographs are exposed to the light the more rapidly they will fade. The same opinion is also shared by some photographers. Only a few days ago we were in the company of several photographers, when the fugitiveness of photographs was under consideration. One said he had had some ordinary silver prints that had been in a shop window fully exposed to the light for over two years, and they showed no signs of fading as yet. Another remarked that his showcase contained some prints that had been in it for a very similar period, and, although exposed to a direct south aspect, they too showed no signs of deterioration. Now, does light *per se* conduce to the fading of the silver image. It is tolerably well known that, when some silver prints are exposed for a lengthened period to a strong light, they become changed, turning much darker, not only in the shadows but in the lights as well. Such prints are frequently to be seen at railway stations where they have been long exposed. But the action of light in this case is not a fading one, but a general darkening one all over the paper, so that the image, instead of becoming weaker, is actually strengthened. Exposure of silver prints to the ordinary condition of a showcase is a trying ordeal, but is it not climatic influence that works the mischief and not the light? Moisture and heat combined have a most destructive action on the silver image conditions always found in the usual showcase. The subject is an interesting one.

A Photographic Spy Scare.—Reference was made in a recent issue to the spy scare, in which photography figures conspicuously, on the Continent. There appears to be also, if we are correctly informed, a photographic spy scare here in England on our seacoast, particularly at fashionable watering-places. The terror is the hand camera, or, at least, as such it is looked upon by many ladies, who cannot feel at their ease either when taking their morning bathe, or in returning from the machine, or, indeed, in several other enjoyable pastimes, for fear of being, as they often are, waylaid by the hand-camera man, or, as we heard him characterised, "cad." Of course, every one is now quite familiar with the hand camera, and it is exceedingly unpleasant, under any circumstances, for ladies to be aware that they have been "snap-shotted," and know not to what purpose the picture may be hereafter applied. Especially is this the case when their portraits are obtained under such conditions as those referred to. Only a few days ago we were told by three young ladies that, while they were sitting, and being in a *négligé* way, reading an amusing book in a secluded spot on the sea-coast, with no idea that any one else was in the neighbourhood, they were startled by a couple of sharp clicks, and, "on looking up, saw two fellows with hand cameras, who then went away laughing." The ladies were naturally very annoyed, and were in a state of some anxiety as to what purpose the photographs would be put. This sort of behaviour will certainly tend to bring photography into disrepute, and amateurs to be considered a disreputable class. However, if ladies knew much of this class of work by these individuals, they would take comfort from the fact that all but a very small percentage of the plates exposed are abject failures.

VARIATIONS IN THE METOL DEVELOPER.

I NOTICED a remark a week or two back in the JOURNAL to the effect that many of those who have adopted metol are tiring of the "pretty" negatives obtained by its means, and are beginning to yearn for the printing quality formerly associated with the slightly yellow colour of a pyro-developed film. While I can fully sympathise with such a feeling where it exists, and I have at times had a touch of it myself during the past few months, I must urge in fairness that I scarcely think that metol is itself to blame.

It is a good many years since the fallacy of "pretty" negatives, as distinguished from good printers, was pointed out; but it must be borne in mind that the former are not necessarily bad or unsatisfactory printers, though too frequently, especially in the early days of the pyro-sulphite developer, they have proved to be so. A negative may possess clearness of shadow and delicacy of gradation together with freedom from stain, and these qualities may certainly establish for it a claim to the title of pretty; but, in the absence of the necessary vigour, it will never make a good print. On the other hand, vigour, accompanied

by correct gradation, softness, absence of colour, and just the faintest signs of really clear glass in the deepest shadows, combine to constitute a perfect printing negative, and such a one will, at the same time, be beautiful to look upon to a far greater degree than the other. In fact, there is prettiness *and* prettiness.

A considerable outcry was raised against the use of sulphite on its first introduction, on the ground that, by preventing or removing the yellow tint of the image, the latter was robbed of its printing qualities. That many of the earlier negatives produced with the aid of sulphite, and also many of those obtained at the present day with metol, and others of the new developers, were, and are, inferior in printing value to many of those developed with pyro cannot, perhaps, be denied; but that that result is due to the mere absence of yellow or other stain is an absurd contention. If such were true, it would only be necessary to stain the over-clear or pretty image, or to print it through tinted glass or other medium in order to give it the printing strength it lacked. That such is not the case any practical printer is aware, for though, under some circumstances, such treatment may *slightly* improve the print, the difference is so very slight that many experienced workers deny its existence at all.

As a practical test, I would ask any one who pins his faith to the coloured pyro image to take such a negative, of good printing quality, and to remove from a portion of it, by means of an acid clearing solution, the stain to which it is supposed to owe its quality; or, better, perhaps, to cut the negative into halves, and treat one with the clearing solution. If the two portions are then printed so as to get the best possible result from each, I venture to predict that the cleared half will certainly not prove *inferior* to the other, though, in point of rapidity in printing, and very likely in other respects, it will prove superior. Again, if a good negative of the colourless kind—that is to say, one of perfect printing quality—whether developed with pyro and sulphite or any of the newer developers, be stained with a decoction of coffee or other suitable solution, or be printed through a coloured medium, the only difference in result will be that the stained portion will take a longer time to print. I have carefully tried this experiment in a variety of ways, and, except in the matter of rapidity, have failed to find any advantage in a coloured film over one of the perfectly black and white kind.

But here, I think, is the point. We hear the objectors to sulphite and metol, &c., complain that they do not like the blue-coloured image. Nor do I; but it is not necessary to get a blue image, at least with metol; I have had less experience with amidol, so refrain from speaking of that. If the image is of a blue or "steely" tint, it is pretty certain that something is wrong, and also that the negative will not print satisfactorily. When all is right, the image should be a rich neutral black or grey, whether metol or pyro-sulphite is used, and I dare say the result is the same with any of the others properly used. With an image of that colour it is possible to combine perfectly "prettiness," quality, and rapidity in printing.

Why, then, do we hear complaints against metol? The explanation is, I think, to be found in under-exposure and a want of acquaintance with the peculiarities of the developer, and some of the more enthusiastic of the earlier workers with, as well as the introducers of, amidol and metol, are partly to blame for this result. Thus we have been told that with these substances the exposure can be reduced to one-half or one-third; I can only say that I have worked constantly—almost every day—with metol for several months now, and, so far as comparative exposure is concerned, I find I can get as good a printing negative out of a given exposure with pyro as with either amidol or metol.

Metol without restrainer is, as all know, a very rapid developer; but this rapidity of action has been miscalled energy of another kind, and it has been assumed that, because the development is rapid, the exposure may be curtailed, which, so far as my experience is concerned and that of others I am acquainted with, is not the case. Metol seems to have a marvellous power not only of rapid development, but of searching out faint detail and developing it almost as rapidly as the more powerfully illuminated portion of the picture; but it has no power of building up or intensifying the image first produced. It exhausts itself in one supreme effort, and further prolongation of its action can only result in fog.

Then on applying an unrestrained solution of metol, with sulphite and alkali, to a nominally exposed plate, the image will flash up in a few seconds, the faintest details being little behind the highest lights, and, if the plate be of good quality and the developer of suitable strength, probably a good printing negative may result. The operator concludes from this behaviour that either a shorter exposure will suffice or that a weaker developer can be used, and then the trouble commences. The action of the unrestrained solution is so utterly different from that of pyro that he goes on reducing his exposure and weakening his solution, with a constantly increasing poverty of result, although there is still almost the same rapidity of action and the same marvellous searching out of detail. As a consequence of this latter power, it follows that any "light-fog" that may be inherent in the film, or any excessive action of light during development, are brought out with greater facility and shew with greater prominence than if pyro were used, and any continuation of development in the attempt to get density only leads to deeper and stronger veiling of the shadows.

But if, instead of reducing exposures or diluting the solution, a proper portion of bromide be added to the developer, an entirely different result is obtained. The development becomes much slower, not only in starting, but also in its progress—becomes, in fact, very similar to pyro development. The abnormal searching out of detail is less apparent, since the bromide necessarily acts more powerfully upon the most feebly illuminated portions of the image, and these are consequently held back while the rest of the image is gaining in density; but, if the action of the restrained developer be continued long enough, the feeblest details obtainable with an unrestrained solution and a similar exposure will also be produced, though the general character of the image will be altogether different. Vigour and density will be obtained in abundance; indeed, if the action be continued long enough to get out the last details, the danger will be lest too much density be obtained.

It is not that the addition of bromide confers any intensifying power upon the solution, for, if a plate be exposed for what I must again call a "normal" time, that is sufficiently, cut in halves, and the two portions developed respectively in restrained and unrestrained solutions until no further action seems to go on in the high lights, there will not be much difference in their density at the finish, although the two images generally will be widely different. Even if the action of the restrained solution be continued until the shadows contain as much detail as in the other half of the plate, the general effect will only be one of increasing softness without any greater density in the lights. The unrestrained solution will, in fact, if of sufficient strength, and with sufficient exposure, give all the density required, but there will be a strong tendency to veil the shadows with fog.

Those who have failed to apply metol satisfactorily through attempting to achieve the great increase of rapidity claimed for it in some quarters, should try again, and content themselves with securing its other good qualities. Among these I have no doubt many will reckon its wonderful rapidity of action; but this, as I have shown, must be at least partially relinquished, though, if bromide be used in the proportions given in the first formula published by the manufacturers, it is still a rapidly acting developer. But it must be always borne in mind that under-exposure is fatal to density, as is also the too great dilution of the solution. The last formula published, containing only about one and a quarter grain of metol to the ounce of developer, is only applicable to subjects in which there are no heavy contrasts. I prefer to keep up the quantity to at least four, and preferably five, grains of metol to each ounce of mixed solution, to which quantity I add one grain of bromide and three minims of strong ammonia. In this form it is comparatively slow in its action, though not slower than pyro, but beautifully regular, and gives an image that for printing quality can scarcely be surpassed.

The proportion of sulphite, I had almost forgotten to say, is a point of the greatest importance in conjunction with density, as, if this is at all curtailed, the action is slow and incomplete, however much alkali may be added. The quantities given by the manufacturers—namely, ten of sulphite to one of metol—are what I use, and nothing is gained by either increasing or reducing the sulphite.

It may be urged that, at present prices, metol is an expensive developer, but I do not think it will be found so in practice. I have never hitherto been an advocate for the repeated use of the same solution, nor have I been a believer in the principle of an automatic developer. But I am constrained to confess that latterly I have come to regard metol as a near approach to automatism, and to rather like it in consequence. The same solution may be used over and over again—at any rate, to the extent of six or eight times—with the only result that it gets a little slower in action, but not much. Should it get too slow, an occasional addition of a little more alkali, or, if it fail in giving density, a small pinch of metol added will keep it in working order for a long time. A few days since I developed eight $7\frac{1}{2} \times 5$ plates with three ounces of solution, the last being undistinguishable from the first. W. B. Bolton.

ON THINGS IN GENERAL.

I should like to join in a few words of the highest commendation in the laudatory remarks made upon Messrs. Grundy and Haddon's paper, read some little while ago before the London and Provincial Photographic Association, upon the "Amounts of silver and hypo left in albumenised paper at different stages of washing." If such an abstraction as myself can offer thanks, I should desire to tender mine with effusion for one of the most valuable papers connected with practical and theoretical photography that has been presented to us for a long time. Only those conversant with such matters can appreciate the extensive labour involved in making the experiments recorded, and the results given have a very practical bearing upon photographic printing practice. I heartily endorse what these gentlemen say about the chief factor towards ensuring permanency being the use of plenty of hypo.

The singular point in connexion with the yellowing of a silver print on albumenised paper is that it is frequently accompanied by a fading of the dark parts. That unfading prints, or rather, as it would be better to say, unfaded prints, have been produced is undoubted. What we want to make certain of is the cause of the fading where it exists. I hold a strong opinion. Granted a picture well washed after toning, properly fixed with an ample supply of hypo, and sufficiently washed afterwards, I believe it will, when unmounted, not fade when the air is kept from it. I have dozens of unmounted pictures, taken at different periods and more than twenty-five years ago, which are as bright, and as good, and free from fading and yellowness (where air has not had access) as they were the first day they were produced. But it is desirable that this experience be not misunderstood. The pictures are unmounted: the mounts of the present day, or some of them, have much to answer for.

I was much interested in reading Mr. Kidd's letter about the Convention group, and was pleased to note, as would only be expected by those acquainted with that gentleman, that he did not attempt to take the group without first obtaining permission, for I hold that no one whatever ought to take a snap-shot of the Convention group, arranged and composed by the local photographers, without permission granted. It robs the latter of credit justly due to him for his previous preparation and his composition of the figures. We learn that Mr. Kidd's camera was used, but that the local photographers' staff exposed the plate and supplied the developer. Mr. Kidd said, "Hold, enough," when he considered the plate developed, and then the staff came in again and finished the negative. Surely Mr. Kidd is quizzing us in suggesting that the whole credit of the photograph did not practically belong to Messrs. Heath & Co.

Much interest attaches to the discussion between Messrs. Debenham and Dennis Taylor on perspective topics—"optical truth and visual truth." I notice in Mr. Taylor's paper a good *résumé* of optical theories, which might almost be looked upon as a paraphrase of Le Conte's views on the subject, even to the reference to the difficulty of judging the distance of a horizontally stretched rope without putting the head on one side. Le Conte's own example shows the difficulty more clearly, for he speaks of two stretched ropes, one further from the eye than the other. It will be well to point out, with regard to Mr. Debenham's illustration of a block of buildings viewed in perspective and a model, one-tenth scale, viewed at one-tenth the distance, that it is the front surface of this building that is stated to have the same dimensions in each case, not its vanishing lines—two very different matters indeed. Most disputants upon perspective representations of the human figure lose sight of a prime factor of comparison. An artist's life-size painting of a sitter is usually placed and painted so as to be seen from a distance, and from such a distance as few photographers work at. If it be desired to produce a photograph that will resemble such a painting, the plan will be to put the sitter thirty or forty feet away, take a small negative, and then enlarge to life size. No one then will talk of distorted hands and feet.

When perspective or optical matters come into discussion, it is most singular how it most frequently happens that the writer makes some slip or other. Now we are all familiar, for example, with Mr. Chadwick's excellent popular explanations of some optical matters; yet when he begins to deal with subjects of which it is to be presumed, he not being a surgeon, his knowledge is obtained from sources outside his own experience, he makes a slip. He says, describing the eyeball, "We have a nearly globular chamber composed of a thick, strong, white substance—the sclerotic coat—part of which is seen as the white of the eye. The inside of this chamber is interlaced with minute blood vessels, covered again by a thick black pigment called the retina, and the whole is filled with a transparent jelly." Now, it is very probably a slip of the pen in writing, which he will thank me for calling attention to; but, as a matter of fact, the black coating (the choroid) does not cover the retina, it lies behind it, between retina and sclerotic. It is, in fact, the physiological analogue of plate backing, and prevents halation. We have read a good deal about who discovered how to prevent halation, and here the method was before (or in) our eyes all the time.

I often pity platemakers when I hear plates complained of when the fault lies with the user himself, but my imagination never soared to the possibility of such heights of complaint as those given by a correspondent—"S. A. Y."—in a recent issue of this Journal. He wants to know why, as everything foreign is cheap, dry plates are not. Further he says, "It would be a great boon to an amateur if he could buy his plates cheaper." This is really nauseating! Quarter-plates at a penny a piece, and he wants them cheaper! He had better send the hat round at once! Free Lance.

THE PRINCIPLES INVOLVED IN THE CALCULATION OF EXPOSURES FOR CONTACT PRINTS ON BROMIDE PAPER.

[Presidential Address at Inaugural Meeting of the Widnes Photographic Society.]

You are probably aware that Dr. Hurter and I have together devoted a great deal of attention to the scientific aspect of photography, the result of which has been to convince us that all the operations involved are amenable to calculation and predetermination. I was, therefore, influenced in my selection of a subject to-night by a desire to bring forcibly home to you at the outset the practical advantages of the methods we advocate, and I made the selection I did because it seemed the implest for my purpose.

Our subject involves a consideration of the properties of the negative to be used, and of the paper upon which the print is to be made. We will refer to the negative first. A negative image consists of metallic silver deposited over the surface of its support in more or less widely varying quantities, which quantities, of course, determine the varying amounts of light which the negative, in its different parts, allows to pass through it. The quantity of silver on any one spot of the negative is represented by what we term the "density" of that spot. When I say "we," I refer to my friend Dr. Hurter and myself, as we were the first to use the term density in this sense, and I may tell you we found ourselves in very hot water for rightly applying a term which photographers had previously misapplied. However, the term density implies the relative quantity of silver deposited per unit area, and I particularly want you to do your best to grasp the meaning of the definitions I shall give you to-night. This is of the utmost importance, and will be of the greatest assistance later on.

Every point, say, in a landscape we are about to photograph reflects a certain amount of light, and our object is to produce a negative which will yield a print in which the light intensities reflected by the landscape are faithfully reproduced. The negative itself is only a means to an end; but, if it is to be capable of producing a true print, it is clear there must be a definite relationship between its densities and the light intensities which produced them, and it is also clear that a perfect negative must be capable of transmitting amount of light through its varying densities, which are related to each othe

as are the light intensities reflected by the objects which form the picture. This brings us to two other definitions, namely, transparency, and its inverse, opacity. The opacity simply expresses the optical property of a substance (in our case, silver) to impede the passage through it of light. The transparency of a substance is the inverse of this, and is measured by that fraction of the original light which the substance allows to pass through it. A deposit of silver, of which the opacity is two, transmits half the light it receives.

Now, in order to be able to calculate the exposures to be given in the case of printing processes by development, it is clearly necessary to establish the connexion which exists between the light intensity used for printing and the opacity of the negative, which determines the amount of the original light which the negative actually transmits. It is easy to ascertain what the effect will be upon bromide paper of a certain exposure to a naked light of known intensity; but we have to ascertain to what extent this original intensity will be affected by the interposition of the negative. This renders it necessary, in the first place, to measure the opacity of the negative. We do not, however, for very good reasons, measure the opacity of the negative directly, but we measure the density; and, as the relation between the opacity and the density is of a simple character, we can easily arrive at the former when we know the latter.

The connexion between density and opacity is expressed by saying that the density is the logarithm of the opacity. If, therefore, we can, by measurement, ascertain the density, it is easy to calculate the opacity. The photometer which we devised for this purpose renders this operation extremely easy and expeditious. As a simple example which you can easily remember, suppose we have a uniform deposit of silver of which the opacity is two. In this case the plate will allow one-half the light to pass through it, or it will have a transparency of one-half; and, in order to possess this property of transmitting one-half the light it receives, it must have a density of 0·301, this being the common logarithm of two. Now, in talking about logarithms, I am most anxious not to alarm you; they may not be things you are much in the habit of dropping across, but there is nothing very alarming about them; and I venture to think you will soon be as familiar with their use as you are with the use of the multiplication table. They form an absolutely indispensable element in photographic arithmetic, and all the logarithms necessary for photographic work can be placed on a card the size of a quarter-plate.

I must here digress for a few moments, in order to say a word or two about our unit of light and exposure. Our unit of light is that amount emitted by a standard candle acting for one second, at a distance of one metre: this we call one "candle-metre second." As you all know, the intensity of a given light varies inversely as the square of the distance; and it is all the same thing whether the light be allowed to act for one second at one metre distance, for four seconds at two metres distance, or for a quarter of a second at half a metre distance. The candle-metre second is therefore the unit in terms of which we express all our exposures. Whether this source of light be the sun, gas, paraffin, or magnesium, we always refer it back to the standard candle.

We have so far considered the part played by the negative in the production of the print, and we will now turn our attention to the bromide paper upon which the print is to be made. You will easily understand that the various gradations of the finished print must be included within a range, limited, on the one hand, by the natural white of the paper; and, on the other hand, by the extreme black of the deposited silver when examined by reflected light. In order to produce the best possible print upon a given paper, the negative must have a range of densities which coincides with the range of gradation of the paper, otherwise the negative and the paper are not suited to each other, and an inferior print must result.

In order to ascertain the density range of the negative, we submit it to actual measurement; but, as the merits of the finished print will be finally judged by the eye, ocular inspection, instead of measurement, will serve our purpose in deciding the range of our paper. All we have to do is to ascertain what exposures correspond with the gradations of the paper ranging from extreme white to extreme black. At first sight, you would naturally suggest that the way to do this would be to give a series of exposures on different patches of the same strip of bromide paper, beginning, say, with one second, and proceeding with two, three, four, five seconds, and so on. This would be a perfectly correct method of obtaining the information we require; but I am afraid you would be very tired of the operation before you reached the end of it, for, in the case of the paper we shall use to-night, you would have to give a series of about seven hundred exposures, increasing arithmetically from one second to about twelve minutes. Such a formidable operation as this would prohibit the practical application of our principles; but, fortunately, there is a short cut to the attainment of our object. By causing our exposures to increase geometrically, instead of arithmetically, we shall obtain the information we require in nine, instead of 700, exposures; and, further, by means of a simple piece of apparatus, we can make the nine exposures concurrently. By a geometrical progression of exposures, I mean one in which each successive exposure is the same multiple of the previous one—for example, one, two, four, eight, sixteen, and so on. I have brought with me to show you a strip of the bromide paper we are going to use for our experiment to-night. This strip of paper has received nine different exposures, each double the preceding one, and progressing from two and a half to 640 cm. The strip is divided into ten parts, nine for the exposures, and the first, which was protected from the light while the exposures were made, represents the natural white of the paper.

Now, you will notice that the shortest exposure which has produced any deposit at all on this paper is five cm. The first exposure of two and a half cm. has produced absolutely no result. At the other end of the range you will see that the maximum blackness by reflected light is reached by an exposure of 320 cm.; the exposure prolonged to 640 cm. has not produced any increased blackness, though it has, of course, produced an increased deposit of silver, which would be apparent by transmitted light; but, as our print is to be viewed by reflected light, this increased deposit has not the slightest value. We therefore consider that the available range of this paper lies within the limits of exposure of five and 320 cm.

Having obtained this knowledge, we must next consider the paper and the negative in conjunction; and, to make the matter as clear to you as I possibly can, we will first of all consider a negative consisting of one uniform density, such as I hand round. This negative I have measured and marked accordingly. Its density is 1·05, its opacity is 11, and its transparency is $\frac{1}{11}$. Now, imagine this negative in contact with a piece of bromide paper of which we have ascertained the range in the manner described, and let us set ourselves this simple problem, What exposure must we give through this negative in order to produce upon the paper the same amount of deposit as was produced by an exposure of eighty cm. to the naked light? The opacity of our negative is 11, and as it, therefore, only transmits $\frac{1}{11}$ of the light it receives, we must obviously multiply 80 (the direct exposure to which we want the equivalent) by 11. $80 \times 11 = 880$, and this is the exposure in cm. which we must give through this negative in order to produce upon the paper the same result as an exposure of eighty cm. to the naked light.

You will see from this example how simple the principle is which underlies the determination of the exposure; but when we come to deal with an ordinary negative, with its varying ranges of densities, the considerations involved are somewhat more complicated. The calculation is, however, just as simple. We will now, therefore, devote our attention to the particular negative from which we are going to produce a print this evening, and consider its range of densities in relation to the range of gradation of the paper.

I did not elect to bring a negative of my own for our experiment to-night, because it might have suggested a suspicion that I had made a sly preliminary trial; I therefore asked Mr. Warner to provide a negative, and this he has kindly done, and he will vouch for it that I never handled the negative except in his presence, and then only to measure its densities. I had intended to have measured the negative here to-night, but this would have involved explanations as to the photometer, for which we shall have more time upon another occasion. This negative of Mr. Warner's I have measured in two places, corresponding to the highest and lowest densities, and this is all that is required. These densities I found to be:—

Negative.

Density:	max. 2·34	mean 1·80	min. 1·27
Opacity:	„ 218	„ 63	„ 18·6

The densities, you will remember, are logarithms of the opacities, and, knowing the former, we can easily ascertain the latter from a table of logarithms. Having found the opacities corresponding to the maximum and minimum densities of the negative, we learn that these densities transmit respectively one two-hundred-and-eighteenth, and, roughly, one-eighteenth of the light they receive. Let us now refer again for a moment to the bromide paper upon which the light intensities transmitted by this negative are to be brought to bear. We found that the range of this paper extended from an exposure of 5 cm. to one of 320 cm.

Paper.

Exposure:	cm. 5	mean	40	320
Log. of exposure:	„ 0·699	„	1·602	2·505

If our negative were exactly capable of utilising the entire range

of the paper, the exposure would be arrived at by considering either that, through the maximum density of the negative, it must be such as to leave the normal white of the paper untouched, or that the exposure, through the minimum density of the negative, must be such as to allow the paper to acquire maximum blackness; that is to say, all we should have to do would be to multiply $2\frac{1}{2}$ (the exposure which just failed to produce any deposit on the paper) by 218, the maximum opacity of the negative, or to multiply 320 (the exposure corresponding to extreme blackness) by 18 6, the minimum opacity of negative. Either method would lead to the same result if the paper and the negative were absolutely suited to each other. Unfortunately we do not, as a rule, pay that amount of attention which we might do to procuring the exact quality of negative which is calculated to yield the best possible results by any particular printing process. We have therefore had to find a method of procedure for ascertaining that exposure which will yield the best possible results with the particular negative and paper we wish to use in conjunction. We have found it best in practice to regard the range of the paper as extending from the shortest exposure producing the blackest deposit to that exposure which just gave the first evidence of deposit. We then base our calculation upon the *mean* density of the negative, which we refer to the exposure which corresponds with the *mean* gradation of the paper. This adapts the negative, and the paper ranges to each other in the best possible way.

The mean density of the negative is 1·80, and the corresponding opacity is 63. We do not, however, for mathematical reasons, take the arithmetical, but the geometrical, mean of the exposure which produced the paper gradations, and this mean is forty cm. We are now in a position to determine the exposure we are going to give to-night, and to simplify matters by regarding our negative as though it consisted of one uniform density of 1·80, and as uniformly transmitting one sixty-third of the light it receives. Our next consideration is that, through the mean density of the negative, we have to produce a deposit on the paper equal to that produced by an exposure of forty cm. to the naked light.

For optical reasons, which I propose to give you when, on some future occasion, we go into the question of enlargements, it is necessary to somewhat reduce our mean density to the extent of multiplying it by 0·8.* $1{\cdot}80 \times 0{\cdot}8 = 1{\cdot}44$, our modified mean density, to which corresponds an opacity of 27·5, and the following figures must now be taken as our working data:—

Mean density × 0·8	1·44
Mean corresponding opacity	27·5
Mean exposure of paper range	40 cm.

We have only now, as in our first example, to multiply the mean exposure of the paper range by the mean opacity of the negative, $40 \times 27{\cdot}5 = 1100$ cms., which is the exposure we shall give to-night.

In making this calculation I have chosen to work with the opacity of the negative rather than with its logarithm, the density, because I thought the former would appeal to you better than the latter. I should, however, like to show you how, in practice, I prefer to make the calculation myself. We have already been compelled to refer to our logarithm tables in order to derive the opacities of the negative from the densities, so that it would be no more trouble to refer to the tables for the logarithms of the paper range exposures instead. We should then have the following data to work from:—

Mean density × 0·8	1·44
Log. of mean exposure of paper range	1·602.

We simply add these two numbers together, $1{\cdot}44 + 1{\cdot}602 = 3{\cdot}042$, and, by referring again to our tables for the number corresponding to this sum, we should once more find the answer we require, namely, 1100 cm.

We will now proceed to make our exposure, and I have little doubt I shall be able to show you the best possible result which can be obtained upon this particular paper and from this particular negative. As I do not suppose you will care to sit for 1100 seconds, or $18\frac{1}{3}$ minutes while we make our exposure to the light of a standard candle, I am going to show you the means we adopt when we have these long exposures to deal with. We shall make our exposure to the light of a duplex paraffin lamp, and this piece of apparatus enables me, at will, to make the lamp equal to any number of candles I may require. To-night we shall make it equal to twenty candles, and, as our source of light will be equal to that of twenty candles, we divide our required exposure of 1100 cm. by 20, which gives us an actual exposure to the lamp of fifty-five seconds. This apparatus consists of a shadow photometer, and the candle is placed at such a distance from the screen that, when the shadows thrown by the candle and the lamp are of equal intensity, the light of the lamp is equal to that of twenty candles. An appropriate scale provides data upon which to base the calculation necessary if it be desired to make the lamp equal to any other multiple of the candle.

Mr. Warner actually found me *two* negatives for my experiment to-night, and the one of which I have given you the measurements I selected because its density range better suited the range of the paper. The second negative is, however, so different from the first that I thought, while we were about it, you would be interested to see a print from it as well. The requisite data for calculating the exposure for this second negative are as follows:—

Maximum density	1·725
Minimum „	0·880
Mean „	1·302
Mean density × 0·8	1·041
Mean corresponding opacity	11
Mean exposure of paper range	40 cm.

The required exposure is therefore $40 \times 11 = 440$ cm. and, with the lamp at twenty candles, $\frac{440}{20} = 22$ seconds; our two exposures, then, are, to the light of the lamp, fifty-five seconds for the first, and twenty-two seconds for the second negative.

Here are our results, and you must judge for yourselves how nearly I have hit, by calculation, the best exposures for the negatives and paper we have used. One very great advantage of this method is that, having ascertained the range of different papers, and the extreme densities of the negative, it is easy to tell which paper will give the best print from the negative. The more nearly the difference between the extreme densities of the negative agree with the difference between the logarithms of the exposures at the extreme limits of the paper range, the better are negative and paper suited to each other, and the better will be the result. Through no fault of Mr. Warner's, the range of the negatives and the paper we have used to-night do not coincide as well as they might; and, if you will refer again to the strip of bromide paper showing its gradations, you will see that I have marked upon it the extent and position of the range actually utilised in the first print we have just made. You will notice that the print does not nearly utilise the entire range of the paper. If you care to see them, I will pass round a number of bromide prints upon the same paper we have used to-night. You will see that they are produced from negatives considerably varying in density ranges, and the exposures vary consequently from 1200 cm. to 153 cm. I should say that all the negatives from which these prints were made were developed with ferrous oxalate.

In conclusion, I have done my best to make it as clear as I possibly could how to arrive at the best exposure for a bromide print, and, while I can hardly hope that I have enabled you to go home and put the operation into immediate practice, I do hope that I may have led you to see the advantage of working by methods of precalculation. Judged at first sight, you may be inclined to question whether the game is worth the candle; I can only assure you from long experience that it is well worth it. Not only will you, by the adoption of this system, save an enormous quantity of material, but I can assure you you will find the pleasure of working at photography vastly enhanced when you come to substitute calculation and almost absolute certainty of result for rule of thumb and depressing failures. Do not any of you go home with the idea that what I have said is beyond you; take my word for it, it is not. What has taken me a long time to tell you is really only an account of operations which, in practice, occupy but a few minutes to carry out, and with which you may very soon familiarise yourselves.

Of course, I have been obliged to refer to the principles involved, but it is only by understanding these that you can work intelligently, and ever hope to reap full satisfaction from the adoption of scientific methods; and I will tell you in confidence that there is one little spot in my heart wherein dwells the glimmer of a hope that the Widnes Photographic Society may become, from conviction and choice, our warm ally in the promotion of photography by precalculation.

VERO C. DRIFFIELD.

* I will only say that one consideration affecting this factor is the colour of the negative, consequent upon the developer used.

THE EVOLUTION OF ARTISTIC PHOTOGRAPHY.*

RETOUCHING has become a necessity from the public standpoint, and, if it was kept within bounds, it is a very valuable auxiliary to photography proper; but, abused as it is in so many cases. the advantage is very often problematical. Landscape work has also had much attention paid to its artistic bearings, with the most happy results; something more is now expected than a mere representation of nature.

* Concluded from page 591.

Atmosphere and composition are qualities absolutely necessary in any good landscape. Not that this has not always been the case, but much more critical attention has been bestowed on these special qualities than ever before. However we may disagree with Emerson's dicta, it was the chief means of calling attention to these particular qualities, and many who had previously paid but slight attention to the matter were induced to examine it more seriously, from a new standpoint, with results that have undoubtedly added to the improvement of photography from a pictorial point of view. *Sometimes* a fuzzy, out-of-focus picture possesses very many art qualities, and has very great charms for a true artist, whether he is a photographer or not; but the charm does not lie in the fuzziness, but in certain leading beautiful lines which are emphasised by all minor or less important ones being suppressed or indistinct; generally speaking, the success of a fuzzy picture is somewhat of a fluke, and, if any photographer starts an exposure with a predetermined blurr effect, the chances are very much against anything but a dead failure rewarding his exertions. I do not think our art will be much benefited by any *deliberate attempt* to produce out-of-focus pictures, merely *relying on this* for atmosphere, when atmospheric effect can be obtained by other means than imperfect instruments or faulty manipulation, which is implied by the out-of-focus systems.

We have many photographers who are undeniably artists in the best sense of the term, and who impress their individuality on their work in a greater or less degree, accordingly as they work in the ordinary grooves or deviate from them. A man will be successful with one particular style, and, having achieved with it a certain amount of popularity, feels disinclined to adopt any other; at least, whatever his inclination, he, as a rule, keeps to the one by which he gained his reputation. If we analyse any of these styles, we shall find their beauty entirely depends on their strict accordance with art rules, and the clever adaptation of peculiarities of the subject in carrying them out.

With the greater development of purely artistic treatment has grown up that excessively bad or good thing, retouching, without which nothing is saleable in the realms of portraiture. Human nature rarely objects to flattery, and, when that thing that never lies shows you to be younger by many years and better-looking than you are, you accept the soft insinuation, and half believe you must have made a mistake about dates and crow's-feet, for the last new cabinet proves it. There is a good deal to be said in defence of retouching, *very much* more commercially than artistically all the same; but, as we are chatting about the improvements, and not the profits, we will confine ourselves to the estimation of retouching entirely on its merits. That the legitimate use of the process is an immense power in the hands of the photographer there is no shadow of doubt, as photography itself is apt to exaggerate lines and markings on the human face divine: the judicious use of the pencil will balance matters, and make a much more *truthful* presentment than would be possible by unassisted chemistry. Now, this is the legitimate application of retouching; accentuating a light or reducing a shadow is also perfectly legitimate, and, if retouching was confined to these limits, there would be nothing to say against it. But, unfortunately, the possession of the means to do much more makes much more done, and to such an extent, that flesh rivals marble in solidity and egg-shell in texture, and the likeness—well, the less said about that the better. But not only is the texture of the skin misrepresented, but the features themselves are altered and shaped to suit the retoucher's idea of what they should be—crooked noses are straightened, ugly mouths are made to rival Cupid's bow in contour, small eyes are enlarged, fat people are made slim, round shoulders are made straight, and the completed photograph is nothing but a delusion and a snare, and becomes as difficult of identification as a suicide that has been a month in the water. This excess of hand work, reprehensible in itself, has good results indirectly, by causing the photographer to become a better artist in his struggle to represent the beautiful; it improves his correctness of drawing, and indicates those points it is best to avoid or to give least prominence to, as well as to make the most of the good ones with which nature has endowed the sitter. From this point of view retouching has its advantages, and decidedly the artistic qualities of photography are increased; but, when the vanity of the person insists on a remodelling throughout, and many do, the conscientious photographer is in this difficulty, he must please his sitter or lose his customer—it need not be said that the former alternative is generally chosen; but whether even this concession pays in the long run is doubtful. The sitter is undoubtedly gratified at first, but soon—unless for advertising purposes—the most striking *likeness* will be preferred. It must be borne in mind that the most elaborate finish will not secure the approval of friends unless the likeness is good; but, given a good resemblance *and* expression, the portrait will have an enduring reputation, conduce to better business and more general satisfaction, as well as meriting greater praise from a purely artistic standpoint.

Vanity has much to answer for in the propagation of the worked-up monstrosities with which we are, unfortunately, so familiar, and some photographers encourage the public in this wretched taste, on the plea that it gives satisfaction and brings in the money. What can we want more? That is just it—what do we want more? We want a portrait to be a portrait; a similitude to the living person, and a true reminder of those who have passed away; to those who esteem the living, it is a notorious fact that hundreds of pretty enough pictures are no more like the originals than if they had never sat for the negative, but had sent a deputy instead. But with all these faults, which are remediable, there is undoubtedly an immense improvement in the art feeling displayed in ordinary work to that of a few years ago, an improvement we may fairly attribute to the facilities provided in gelatine plates, which do away with any anxiety in regard to the manipulative part, and leave the artist nothing to think of except the lighting, posing, and exposures. In landscape work we seem to improve irregularly, if one can so term it. We have a great number now of exceedingly good pictures made—pictures in every sense of the word—but, with few exceptions, successes are not repeated by the same individual, which suggests that the success was more a matter of chance than design.

Of course, the occurrence of certain atmospheric conditions necessary for some special effect cannot be relied on, or scarcely anticipated, and they often happen when we are in an unprepared state. The same may be said of many necessary items that go to help the composition of the picture; at the same time, by watching and waiting, we may often secure a picture equal to, or better, than the one we had mentally pictured to ourselves, so there is no reason why good pictures should not be the rule, if we only *know what we want* and have the patience to wait for it. "Knowing what we want" is, I think, the key to the position; at any rate, unless we do, success will be only gained by a fluke. This does not imply that a picture should be mentally arranged sometimes *in advance*, but that, given a view with certain accessories, we should be able to *imagine a picture* composed of the material presented to us, and so see how it combines to form the picture we intend to produce; we then select our point of view, to get the composition *as near as we can* to our imaginary picture. In doing this it often happens that we shall have to content ourselves by securing the leading characteristics, as the detail will not come as we had desired: but, in our attempt, we may get a composition equally satisfactory, but one we did not realise at the outset; anyway, our photograph is made with a definite purpose, and, as a picture, it will be much better than one produced by the happy-go-lucky system, without due consideration, so generally adopted. The snap-shot system has a good deal to answer for in this connexion, for it engenders a habit of making exposures the instant things *seem about right*, without taking the necessary deliberation most good compositions require. It is very seldom, indeed, we see a subject to the *best* advantage immediately we look at it; a little study will show us how far from perfect our first impressions were, although they may be tolerably correct on the whole; and, now that the process is divested of any necessity for hurry, the photographer of the future will have to show carefulness of construction, as well as other pictorial qualities, are necessary for all true photographic works of art.

EDWARD DUNMORE.

CENTRAL PHOTOGRAPHIC CLUB.

A LARGELY attended meeting of members of the Central Photographic Club and others interested was held at Coleman's Hotel (late Ashley's) Henrietta-street, Covent Garden, W.C., on Wednesday, September 13. The meeting was called to give members an opportunity of becoming acquainted with the premises the executive had chosen, as well as to elect officers, receive report of progress, and consider certain desirable alterations in the rules. Mr. George Mason occupied the chair, and among those supporting him were Messrs. J. Howson, T. Fall, Birt Acres, A. C. Edwards, R. Beckett, E. J. Wall, H. Snowden Ward, Thomas Bedding, F. P. Cembrano, A. Cowan, W. F. Slater, J. S. Teape, L. E. Morgan, — Turnbull, Child Bayley, G. H. James, W. Fenton Jones and C. H. Oakden (Hon. Secs.), — Jacobs, — Wilkes, H. E. Farmer, F. W. Munro, J. Birtles, and many others.

Mr. Oakden (Hon. Sec.) reported progress, detailing the difficulties the Committee had expeirenced in the selection of suitable premises, and stating that finally it had been decided to take rooms at Coleman's Hotel. Two rooms and a dark room would be permanently at the disposal of members there, and a large meeting room for meeting nights as might be required. The terms were moderate, and there was an advantage in

being able to obtain refreshments and service without difficulty. For country members staying in the hotel there would be a reduced tariff. The report was formally adopted.

The meeting then passed to the consideration of the rules, which, after much discussion, were adopted in the following form:—

Rules of the Central Photographic Club.

1. The title of the Club shall be the Central Photographic Club.
2. The object of the Club is to provide a central meeting-place for those interested in photography where they may enjoy social and technical advantages.
3. All gentlemen interested in photography shall be eligible for membership.
4. The annual subscription for town members shall be 1*l.* 1*s.*, and for country members 10*s.* 6*d.* For life membership a payment of 10*l.* 10*s.* shall be required from town members, and 5*l.* 5*s.* from country members. The first 300 members will be admitted without entrance fee. Those joining after that number has been reached shall pay an entrance fee of 1*l.* 1*s.* for town members, and 10*s.* 6*d.* for country. Gentlemen residing within a radius of twenty miles of Charing Cross shall be deemed town members.
5. The management of the Club shall be vested in a committee of twelve town members, and six country members, four to form a quorum exclusive of officers, to be elected by the members in general meeting annually. The Committee shall have power to fill up vacancies during the current year, and also to make bye-laws as may be found necessary, such bye-laws to be binding on the members after being posted in the Club-rooms.
6. The property of the Club shall be vested in two Trustees.
7. The President, Trustees, Hon. Treasurer, Hon. Secretaries, and an Hon. Librarian shall be elected by the members annually in general meeting, and shall be *ex-officio* members of the Committee.
8. All officers and Committee shall be nominated in writing at the ordinary meeting of the Club fourteen days previous to the annual meeting. The election to be by ballot at the annual meeting, verbally or in writing.
9. Candidates for membership must be proposed and seconded by two members of the Club. The name and address of the candidate, and the names of the proposer and seconder must be sent to the Hon. Secretaries at or before the stated meeting previous to the one at which it is proposed to submit such candidates for election. Such name shall be read by one of the Secretaries to the meeting, and posted on board till the next meeting.
10. The election of members shall be by ballot at any stated meeting of the Club, and a vote of four-fifths of the members present and voting shall be necessary to elect a new member.
11. Every candidate on his election shall be notified in writing with a request for payment of his subscription and entrance fee.
12. No member shall be entitled to use the Club until his subscription for the current year has been paid.
13. The annual subscription shall be payable in advance on the first day of October in each year.
14 Members joining the Club before December 51 shall pay the full subscription. After the end of December and before March 31 the payment shall be two-thirds; after the end of March, and before June 30, one-third; the subscription of any member elected after August 31 shall be considered payment for the following year.
15. Any person who shall by any means cease to be a member of the Club shall, nevertheless, remain liable for and shall pay to the Club all moneys which at the time may be due by him to the Club. Any person ceasing to be a member from any cause shall forfeit all interest and rights in the Club.
16. Any member making himself obnoxious to the members of the Club shall be reported to the Committee, who shall investigate, and, if necessary, call a special meeting of the Club to discuss the matter; then, if the majority so decide, the offending member shall be expelled the Club, and lose all interest and benefit in it, such decision to be taken by ballot.
17. An annual general meeting of the members shall be held in the first week in October to receive the report of the Committee, to pass the accounts, having been audited by two members, not being members of the Committee, chosen at the previous meeting of the Club, to appoint officers for the ensuing twelve months, and to elect members of the Committee to supply to supply the places of those retiring. The newly elected officers and members of the Committee shall come into office at the conclusion of such meeting.
18. Ordinary meetings of the members shall be held weekly.
19. The Committee may, whenever they think fit, and they shall on a requisition made in writing by ten members, convene an extraordinary general meeting. Any such requisition shall specify the object of the meeting required, and shall be signed by the members making the same, and shall be delivered to the Secretaries.
20. The Chairman shall have a casting vote in addition to the vote to which he may be entitled as a member.
21. No alteration of, or addition to, these rules shall be made except at the annual meeting, or at a meeting specially convened for that purpose. Notice of such intended alteration or addition shall be posted on the notice board not less than fourteen days previously.

The Chairman next read the following address:—

"At this, the opening meeting of the Central Photograph Club, I wish it unbounded success, and may it have a big future before it. If the success prove equal to the need for such an institution, it cannot fail to be successful beyond our anticipation. After much trouble and anxiety in looking out for suitable accommodation for us, the executive have done well in securing these premises, where we will find ourselves free from so many conditions and restrictions that clogged up the freedom of arrangements in all previous negotiations for a suitable place.

"Here we have comfortable rooms, refreshments at hand always, lodgings if desired by our country friends, and in a very central position—all these combined should prove no mean factor in inducing all the brotherhood of the Black Art to gather round and claim membership. The fee is so small that it must come easily within reach of all, and not to be considered if the possible advantages are put against it.

"I have said elsewhere that, in the interests of the provincial photographer, such an institution is of incalculable benefit, because it provides for him a place where he can at all times find kindred spirits and special interests there focussed, so to speak, and saving no end of trouble in going in search of friends and information; and as a centre for informal meetings it should be of great value.

"I place a great value on informal meetings, where a few friends, over a pipe, talk out the many experiments (successes and failures) that one and all have experienced in their professional career. This is an education of itself, and that of no mean order. As a place for formal meetings of all professional kinds this Club should hold a very prominent place, and there is no reason why many of the London Societies should not make it their headquarters, and by this means draw the bonds of brotherhood closer.

"Many other points of mutual interest will suggest themselves to you as we proceed on our way; and, wishing the enterprise all the good that can be wished, I launch our bark upon the photographic stream.

And in closing, I would propose a hearty vote of thanks to the executive for all the labours that they have undergone—labours that have so successfully terminated."

Mr. Mason having been cordially thanked for his address, the election of officers was proceeded with, and resulted as follows:—

President: George Mason.—*Trustees:* Thomas Fall and George Mason.—*Hon. Treasurer:* John Howson.—*Committee:* T. Sebastian Davis, Dr. G. Lindsay Johnson, Alexander Cowan, Birt Acres, Robert Beckett, A. Horsley Hinton, F. W. Hindley, J. S. Teape, F. P. Cembrano, jun., Andrew Pringle, H. Van der Weyde, T. E. Freshwater, R. Keene (Derby), Lyddell Sawyer (Newcastle), W. M. Warneuke (Glasgow), J. Stuart (Glasgow), Paul Lange (Liverpool).—*Hon. Secretaries:* W. Fenton-Jones and C. H. Oakden. The election of librarian was left to the committee.

The meeting night was fixed for Friday in each week. The Club premises will be opened on Monday, October 2. A vote of thanks to the chairman concluded the proceedings.

NOVELTIES IN CAMERAS.

The Hawk-Eye of the European Blair Camera Company.

It speaks well for the high reputation of London as the commercial capital of Europe and the East that the great American manufacturing companies are selecting it as a distributing centre.

The Blair Camera Company, of America, constitutes the latest arrival in this great metropolis, their business being constituted under the title of "The European Blair Camera Company, Limited." It is being organized under the personal supervision of Mr. T. H. Blair, the founder of the American firms, for the Company already have premises in New York, Boston, and Chicago. The generic name of their camera, of which they make a speciality, is the Hawk-eye, and of this there are some varieties, of which, by the aid of cuts, we shall endeavour to give a description, feeling assured that English readers will be interested in knowing something about some of the instruments in popular use by their American brethren.

In the first cut (Fig. 1) is shown an exterior view of the Hawk-eye, arranged as a hand camera, this particular one being intended for either 5 × 4 plates in double dark slides, for cut films in double slides of thinner make than the previous ones, or for a roll-holder. It is capable of being focussed, the focal range extending from within a few feet to infinity. This is done by rotating a circular scale shown on the top, and graduated from six feet to 100 feet. There are two finders, adapted respectively for a vertical or horizontal picture. The shutter is set by moving a small lever, and it is so constructed

as to give three different rapidities. The exposure is made for instantaneous impressions by pressing a small button on top; for time exposures, a button of different form from the other is provided, pressure upon which throws the lens open, in which condition it remains until closed by a second pressure upon either of the exposing buttons.

When used as a landscape camera a cover of a square aperture in

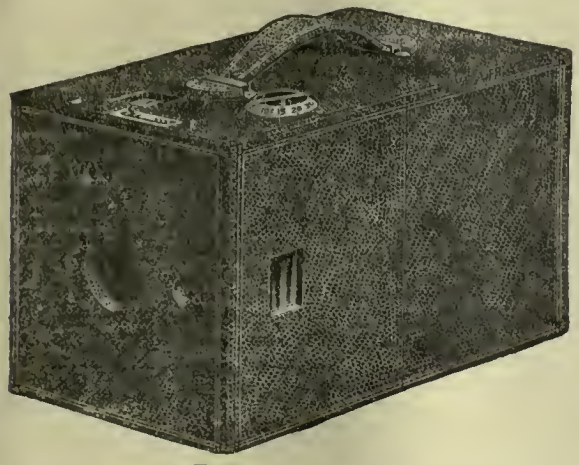


Fig. 1.

the back is removed, revealing a ground-glass focussing screen in the interior, on which the picture may be arranged and focussed if desired, instead of trusting to the scale of distances. This is shown in the cut following (Fig. 2).

In the cut (Fig. 3), we find the side thrown open on its hinges, displaying to view a roll-holder, for which, as already stated, the camera is adapted equally as for slides. The lower or left hand shows the action of bringing a fresh width of film into the line of exposure by the

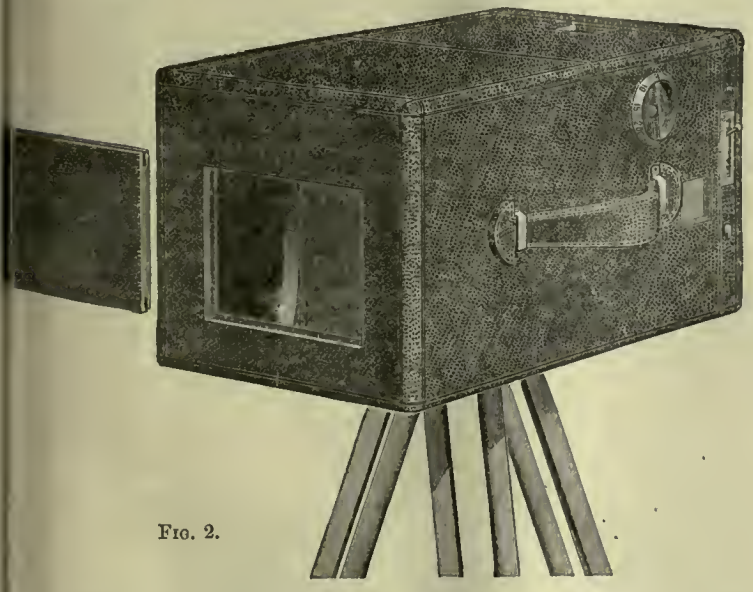


Fig. 2.

action of the finger and thumb. There is an index showing the number of exposures that have been made.

On opening the front of the Hawk-eye (Fig. 4), it is seen that the whole of the exposing appliances are placed, concealed, in that front, that the lens support is fixed, and that it is the back that is actuated by the focussing rack and pinion.

A word as to the lens, which, being, like the Hawk-eye itself, of American manufacture, we examined rather particularly in order to discover how Americans stand in respect of this branch of manufacture compared with their European brethren. In the first place, we are pleased to observe that they have had the good taste and good sense to adopt the standard flange screw of the Photographic Society of Great Britain. The one we specially examined is a rapid rectilinear of six and a half inches equivalent focus, and even with a large aperture covers the 5 × 4 plate brilliantly and well. It has rotating stops, and in finish and other qualities compares favourably with the best European productions.

A modification of the Hawk-eye, known in America as the "Columbus," camera, differs from the preceding one, using roll films only. It is less bulky than the other when packed, but is capable of

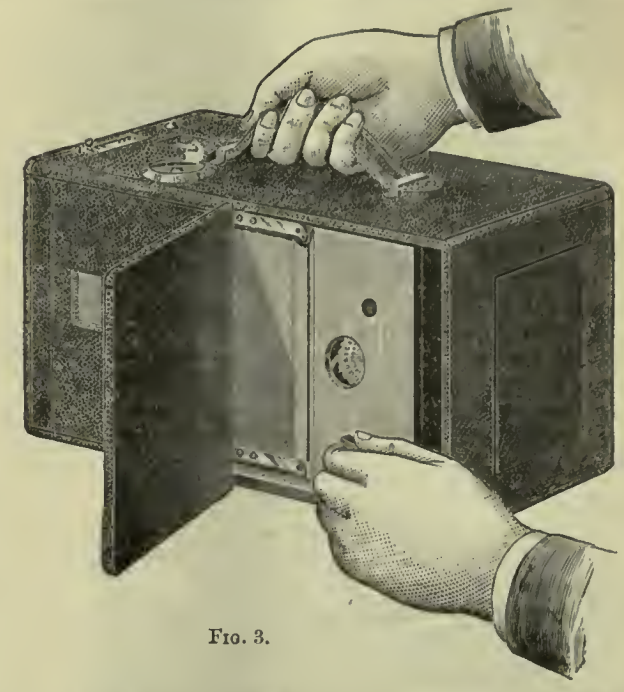


Fig. 3.

being expanded by the pulling out of the front with its lens and finders, as shown in the cut (Fig. 5).

Still another modification is shown in a folding Hawk-eye (Fig. 6), the front of which folds down and forms a baseboard, on which the inner body is supported when drawn out, and on which it is adjusted

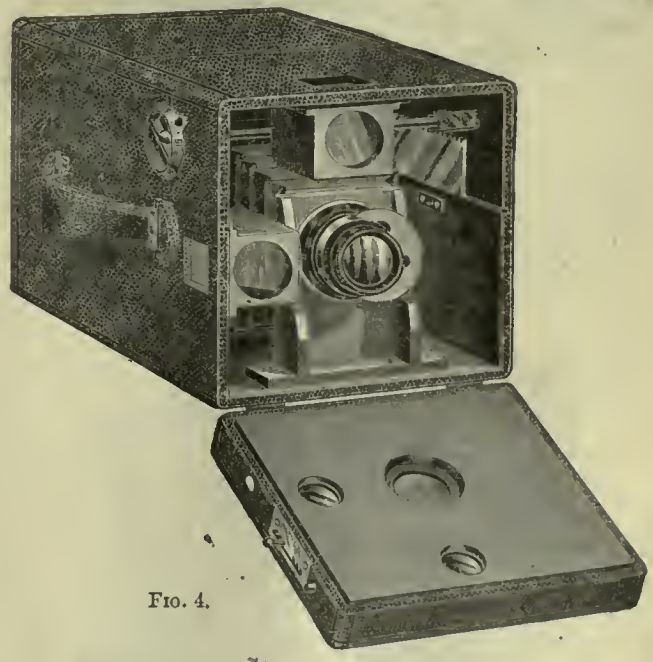


Fig. 4.

by rack and pinion. The one here shown is made for 7 × 5 plates or films. It has a double swing and a double sliding front, is fitted with a Bausch and Lomb iris diaphragm shutter, and a Taylor & Hobson lens. Several of the Hawk-eyes, especially the folding ones, are made for sizes up to 8½ × 6½, and have aluminium fittings.

Probably the neatest, most compact, and elegant of the whole series is the one we now show (Fig. 7).

When folded up, it is thin—somewhat like a moderately thick book—but, when unfolded, presents the appearance shown. It is fitted

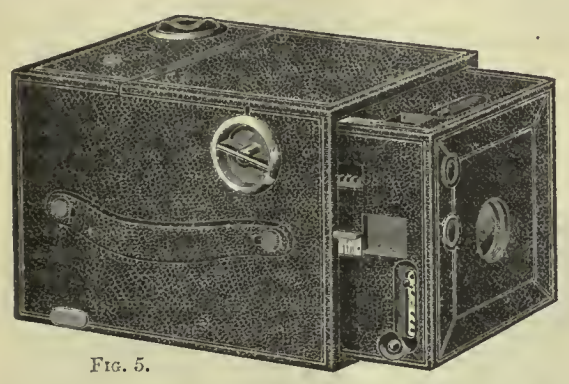


Fig. 5.

with a roll-holder, with a capacity of fifty 5×4 exposures. It is designated "The 400," doubtless out of deference to the *élite*, or west-enders of New York and Boston, to whom this numerical term is

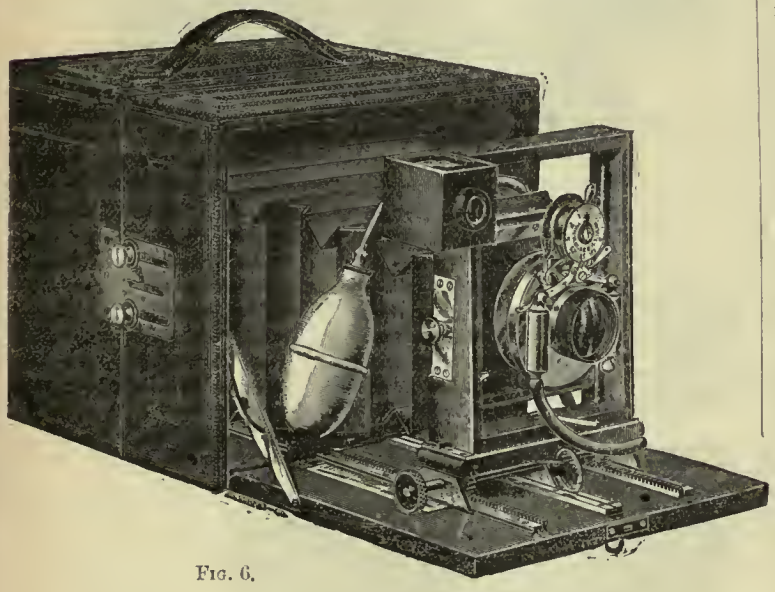


Fig. 6.

applied, and who allow no considerations of expense to stand in their way of obtaining a high-toned instrument.

The cameras now described and illustrated will enable our readers

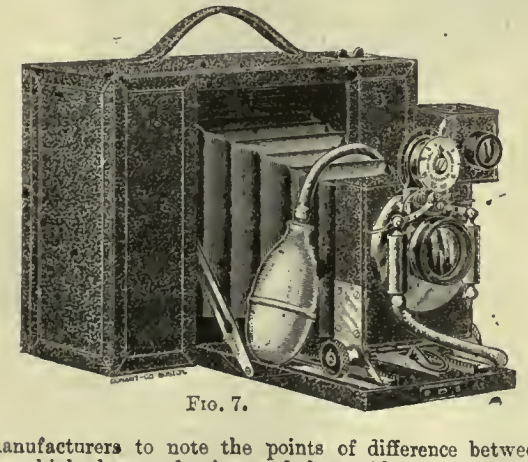


Fig. 7.

and manufacturers to note the points of difference between these American high-class productions and those of home manufacture. It only remains to be said that the workmanship on the former is equal to the ingenuity displayed in their design and construction, and reflect the greatest credit upon Mr. Blair.

ROYAL CORNWALL POLYTECHNIC SOCIETY'S EXHIBITION AT FALMOUTH.

Judges' Report on the Photographic Department.

The Judges on examining the exhibits were much impressed by the general high level of excellence reached by most of the exhibitors, and by the almost total absence of mediocre and common place work.

In many exhibitions the fact that wall space is paid for seems to deter the Hanging Committees from excluding any work that may be sent in, lest the finances should suffer, and the result is that the good work has often to be painfully picked out from amidst very inferior surroundings. This the Judges are glad to observe is not the case at Falmouth, and the absence of any charge for wall space, and the distinction conferred by winning the medals of the Society, have the effect of encouraging merit and excluding the failures of the incompetent.

Turning now to the exhibits, and taking them in the catalogue order, the Judges observed that Nos. 701–704 (R. Terras), although sharp enough in one plane, have little depth of focus, and the very dark backgrounds swallow up the subject. Nos. 708–711, by the same artist, are well composed and well lighted, though low in tone, but the detail is not sharp, and the models unprepossessing. No. 713 (R. H. Lord, first silver medal), is one of the most perfect things of its kind ever produced, even by the famous Rejlander, and has all the character and humour of a Webster, with better drawing. Nos. 714–718 (R. Frost, first silver medal for 714, *Iris*), are remarkable for the perfect focal rendering of the different planes of the objects, and for the exquisite delicacy of the gradations in the high lights of the petals. This is particularly seen in the prints on gelatino-chloride paper, and the picture No. 715 on bromide paper, shows strikingly its failure in that direction.

Nos. 720–724 (J. H. Coath, first bronze medal) are cleverly told stories, but are somewhat too suggestive of the shop show-frame.

Nos. 734–739 (W. J. Byrne).—Of these, No. 735 (first silver medal), *A Budget of Newspapers*, is delightfully original, well thought out, and capitally photographed. A little variety in the models would have improved it. Another first silver medal was awarded this artist for No. 738, *The Judging at Richmond Horse Show*, a good series of quick outdoor work in a branch unaccountably much neglected by professionals.

Nos. 740–744 (E. D. Lavender, first silver medal).—Two large frames of panel portraits in platinotype, as good in all respects as it is possible to make them, and three large direct portraits, of which No. 744 is perfectly charming.

Nos. 748–750 (E. Scamell, first bronze medal for No. 750).—No. 748, *At Home Portrait*, should have stopped there, and No. 749, *The Houses of Parliament*, are spoilt by an obtrusively painted-in boat; but No. 750, *Interior of St. Mary's Church*, is a splendid specimen of a church interior in correct perspective, and well worthy of a medal.

Nos. 757–760 (F. W. Edwards, first silver medal).—*Interiors of Westminster Abbey*. Perfect work printed in a most unpleasant colour.

No. 764 (J. H. Gear, highly commended).—Cattle lying down and nicely grouped. No. 767, by the same artist, is a beautifully rendered picture of the shrine of Edward the Confessor, and the difficulties of halation are quite successfully overcome in this case.

Amateur Section.

Amateur photography does not show up this year so well as usual, hand-camera work, the speciality of the amateur of the latest fashion in photography, being badly represented, and the more serious work of the scientific amateur hardly at all. The faults of under-exposure and lack of sharpness are painfully visible.

Nos. 851–854 are under-exposed and considerably worked up, apparently with black chalk.

Nos. 855–860 (A. R. Dresser, highly commended) are enough to show what an amateur can do who really knows something of the art. No. 859, a study of the heads of two "doggy" gentlemen, is full of character, as is also No. 855 by the same artist.

Nos. 871–874 (C. Court Cole), stained-glass windows, rendered on isochromatic plates in something like their true value, and also Nos. 875–878 (first bronze medal for No. 877) beautifully crisp Thames scenes, with sky and its reflections in running water perfectly rendered.

Nos. 879–882 (C. R. Taunton, first bronze medal for series).—Hand-camera work, tolerable, but under-exposed. Pity there was not a better display in this popular branch.

Nos. 883–885 (E. Dockree, first bronze medal).—Good and correct studies of architecture.

No. 887.—Ought not to have been sent; they look like first attempts with an objective, not corrected for photographic use; the magnification is insufficient, and the definition left out.

Nos. 888–894 (A. W. Gotlieb, first bronze medal for No. 893).—Meritorious.

Nos. 895, 896 (A. G. Tagliaferro, second silver medal).—No. 896 is a well-arranged study, sharp and well composed as to details. No. 895, a French peasant girl sticking wild flowers about a wayside image of the Virgin, is equally good.

Nos. 902–908.—Fair average work; the Roman baths at Bath perhaps the best.

There was no exhibit of apparatus this year. One hand-camera holding six plates 5×4 was brought up from the mechanical department for

inspection, and this, though showing much ingenuity and admirable workmanship by its inventor, was considered too complicated and bulky for honourable mention. It showed no practical improvement on existing forms.

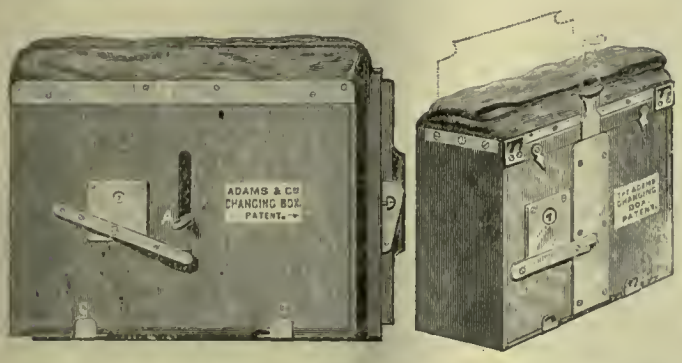
Other exhibitors in the photographic department included—Professional: Messrs. W. H. Harrison, W. Illingworth, G. T. Harris, F. A. Lee, W. M. Warneuke, W. J. Anckorn F. Whaley, Louis Duprez, M. H. Chubb, and J. A. Draycott. Amateurs: Viscount Maitland, Messrs. E. Beringer, S. Tresidder, jun., Sidney Brakspear, and Miss Katie E. Truscott.

(Signed) { W. Gage Tweedy, B.A.
{ W. Naylor Carne.

Our Editorial Table.

The Adams Changing Box.

When we say that we have, without previous experience in its use, effected the transformation from front to back of the twenty-four film sheaths enclosed in this new Changing Box of Messrs. Adams & Co., it will be seen that there is no difficulty in using it. It forms a neat package and contains either twelve glass plates or twenty-four films. By drawing up a slide at the back, the first of the series, which we will imagine has been exposed, is pulled up partially into a flexible bag above, and when grasped by finger and thumb, and drawn up until it is entirely free of the box, it is pushed down again through a suitable recess behind all the others. And thus it goes on till the last one is exposed, when an automatic check catch comes into action, entirely preventing a second exposure of the already exposed plates.



The above cuts show the box as made in two forms, the one for large and the other for smaller plates. Every plate exposed is registered automatically, and plates of varying rapidities may be placed in the box and exposed out of turn if desired. The sensitive surface of the plates or films comes into contact with the register of the box, hence the thickness of these is of no consequence. The bag is made of very soft, pliable leather, and is absolutely light-tight. Its construction is such as to afford ample room for transferring the plate from front to back without difficulty, and, taken all in all, the Adams Changing Box is singularly well adapted for its intended purpose.

A NEW ENAMEL FOR IRON.

Messrs. Fletcher, Russell, & Co., of Warrington, have introduced a new enamel which promises to prove both useful and ornamental, even to such utilitarian objects as cast-iron gas burners, as it entirely prevents rust and stands heat. The film of enamel is so thin that the most microscopic details on the metal are unchanged. The application is new, and admits of a large extension for permanent decorative work of all kinds; castings protected in this manner are not only capable of fine artistic treatment, but they are absolutely permanent and proof against dirt and smoke, which disfigure other work so rapidly.

News and Notes.

*** "Editorial Table," and several "Answers to Correspondents" unavoidably held over.

Photographic Club.—September 27, *Enlarging.*

Northern Photographic and Scientific Association.—September 23, Welwyn.

Hackney Photographic Society.—September 26, *Bromide Enlarging*, by Mr. R. Beckett.

London and Provincial Photographic Association.—September 23, Mr. A. Haddon demonstrates the preparation of plaques for vitro-enamel work. Visitors welcome.

Photographic Society of Great Britain.—Tuesday, September 26—Technical Meeting, at the Gallery, 5A, Pall Mall East. Explanation of the apparatus in the Exhibition by the exhibitors.

On Saturday, September 30, the annual joint outing of the members of the Photographic Club and the London and Provincial Photographic Association will take place to Hampstead. Tea at the "Bull and Bush" at six o'clock.

We are sorry to learn of the death, on Tuesday last, of Mr. W. Morley, the well-known dealer, of 70, Upper-street, Islington, N. The deceased gentleman had a long connexion with photography, to which we hope to refer in detail next week.

Leytonstone Camera Club.—September 23, Along the River Roding, second section from the Red House Bridge, Barking-side. Leader, Mr. F. W. Wates. The Club will assemble at headquarters at three o'clock. Open Social Evening at headquarters at eight o'clock.

People's Palace.—The calendar and syllabus of evening classes for the session 1893-4 is published. Mr. Charles W. Gamble is the lecturer on photography, the courses embracing negative-making, printing, optics, and practical instruction. Mr. Redmond Barrett is the professor of retouching, and the syllabus of the subject shows that it is to be treated completely and practically.

Photographic Section, Stanley Show.—The following gentlemen have kindly consented to act as Judges at the Photographic Section of the Stanley Show in November:—Messrs. J. Traill Taylor, Henry Sturmey, and E. J. Wall. All communications respecting the Photographic Section to be addressed to Walter D. Welford, manager Photographic Section, Stanley Show Office, 57, Chancery-lane, W.C.

Scene: Large West-end photographic establishment. Dark room—Two young assistants developing. Busybody housekeeper, bursts into dark room without knocking. Assistants, most anxious to save their plate from fog, frantically cover their plate and dish with anything that comes first. Busybody Housekeeper: "Ha! ha! my young friends, you are doing something, I am sure, you are ashamed of, or you wouldn't cover it up in such a hurry!"

Central Photographic Club.—We are glad to learn that the Central Photographic Club is at last *un fait accompli*. It has found a home at Coleman's Hotel, Henrietta-street and Maiden-lane, Covent Garden, where club comforts, conjoined to a reduced tariff for town and country members, will be obtainable. At the meeting held on the night of Wednesday week, the rules were revised and a committee appointed. Friday was selected as the meeting night.

A professional photographer writes: "I have been much troubled with old plates which on development have a band round the edge and are otherwise defective, also with plates of different batches which are not uniform in quality, being supplied through dealers. I think we ought to be able to get plates with the date marked on every box and batch number; in the collodion days each bottle of collodion had the date marked on the label when it was made."

A New Society for Queensland (Australia).—A Society was formed on July 8, 1893, called the Ipswich and West Moreton Amateur Photographic Society, having for its headquarters the town of Ipswich, in the colony of Queensland, Australia. It was decided to hold the meetings on the second Thursday and last Wednesday of each month, and the annual meeting on the second Thursday in the month of July of each year. The following office-bearers were then elected:—*President:* Dr. Lightoller.—*Vice-President:* Mr. Bostock.—*Committee:* Messrs. Carey, Ward, and Edwards, who are to act with the other office-bearers.—*Treasurer:* Mr. Durno.—*Secretary:* Mr. T. A. Darker, care of R. T. Darker, Locomotive Superintendent, Government Railway Works, Ipswich, Queensland, Australia.

Nottingham Mechanics' Institution Camera Club.—Annual Exhibition and Prize Competition, 1893.—The following are the Club prizes:—Class I., Instantaneous: prize for best set of three; certificate for second set, donors the Committee. Class II., Landscape: prize, value 1*l.*, for the best set of three, donor Mr. S. Bourne, J.P.; certificate for second set, donors the Committee. Class III., Portraiture: prize for best set of three; certificate for second set, donors the Committee. Class IV., Lantern Slides (the slides winning the medals to become the property of Messrs. Guy & Co., and the set, winning the certificate to become the property of the Club, the donors of the prizes): silver medal for best set of six; bronze medal for second best set of six, donors Messrs. Guy & Co.; certificate for third best set of six, donors the Committee. Class V., Pictures taken at the Club Excursions: prize, value 1*l.* 1*s.*, for the best set of three; certificate for second set; donors the Committee. The above classes are open to members only, and subject to the competition rules of the Club. Survey Exhibition Work, 1893.—Class VI., Six Photographs of Street Scenes in the Borough of Nottingham: first prize, silver medal, donor Mr. Councillor A. Pratt; second prize, certificate, donors the Committee. Class VII., Six Photographs of Nottinghamshire Churches—Three Interior and Three Exterior: first prize, silver medal, donor the Hon. Secretary; second prize, certificate, donors the Committee. Class VIII., Three Photographs of Buildings in the Borough of Nottingham: first prize, silver medal, donor Mr. Councillor J. A. H. Green; second prize, certificate, donors the Committee. Class IX., Three Photographs of Nottinghamshire Peasantry: first prize, silver medal, donor Mr. A. Flowerdew; second prize, certificate, donors the Committee. Class X., Six Photographs of Places of Interest in the County of Nottingham, not included in the previous Classes: first prize, silver medal, donor Mr. G. H. Wallis, F.S.A.; second prize, certificate, donor, the Committee. Classes VI. to X. are open to any one, either members of the Club or non-members, subject to the competition and Survey Exhibition rules of the Club. All photographs, either for exhibition or competition, to be sent in to the Hon. Secretary on or before December 1, 1893.

THE PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—Committee meeting was held on Friday, September 15, at the rooms of the Photographic Society of Great Britain, Mr. A. Mackie in the chair. The applications for assistance were as follows:—First.—An assistant who stated that he had come from the North of England on an engagement with a London photographer, and had been dismissed after working two and a half days without notice or salary in lieu of notice. He asked for legal assistance in obtaining the money due, and a small loan to enable him to live until he could obtain the arrears or find a new situation. An immediate loan of 1*l.* was granted, and the Secretary was instructed to instruct solicitor to proceed for recovery. Second.—Application for loan of 20*l.* from assistant who stated that his wife had been seriously ill for ten months, and was now quite unlikely to recover. The doctor's and other expenses had taken the whole of his savings, and he was now threatened with proceedings for rent and rates. The loan was granted. Third.—Application for a grant of 1*l.* to enable the purchase of a larger camera than the one at present possessed by applicant. He stated that he had been thirteen years in one situation, not as a photographer, and that he earned additional money by practising photography. In his situation he was receiving a salary of 18*s.* per week. The loan was refused, as the Committee considered it was not a fit case for assistance. Fourth.—Applicant wrote from a workhouse infirmary. He stated that he was to be discharged cured in a day or two, after being in the institution three months. Applied for a grant of 8*s.* for railway fare to a town where he had promise of wet-plate work, and a few shillings for subsistence until first wage should be due. A grant of 15*s.* was made. Fifth.—Application for loan of 5*l.* to enable applicant to pay small debts and reach a situation. Referred back to Secretary for further particulars and inquiries. Sixth.—Application for assistance, sum not stated, by an operator who stated that he was penniless owing to illness, which had prevented him working for some months. Referred back for further inquiries to be made. Seventh.—Application for loan of 20*l.* to assist in building a studio. Applicant had been many years in business, and stated the reasons which had caused him to fail. He had very small amount of capital in hand, and required 20*l.* further to enable him to start again. Referred back for further inquiries. The Secretary reported on the position of several persons who had been assisted during the spring, and said that two of them who appeared to be in a position to repay, at any rate, a portion of the loans granted to them had failed to do so. The Secretary was instructed to write these people further, and to take advice as to the possibility of instituting County Court proceedings in one case, and criminal proceedings in another. The Secretary reported that several of the applicants who had been assisted last winter and during the spring were progressing favourably. Arrangements were made for the lantern evening, which had been granted to the Benevolent by the Photographic Society of Great Britain. Messrs. E. Floate, Frank Hallen Smith, F. Nunn, J. H. Napier, W. T. M. Davidson, A. D. Fisher, McIsaac & Riddle, and Misses Hardy and L. Hicks were elected subscribers. Mr. George Mason was elected an honorary life governor. Donations of 5*l.* 5*s.* from Mr. George Mason, 5*l.* from the Convention, per Messrs. W. D. Welford and Hedley M. Smith were acknowledged with thanks.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 25 ...	Dundee Amateur	Asso. Studio, Netbergate, Dundee.
,, 25 ...	North Middlesex	Jubilee House, Hornsey-road, N.
,, 25 ...	Richmond	Greyhound Hotel.
,, 26 ...	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 26 ...	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 26 ...	Hackney	206, Mare-street, Hackney.
,, 26 ...	Halifax Camera Club	
,, 26 ...	Lancaster	Springfield Barracks, Lancaster.
,, 26 ...	Leith	165, Constitution-street, Leith.
,, 26 ...	Paisley	9, Ganze-street, Paisley.
,, 26 ...	Rochester	Mathematical School, Rochester.
,, 26 ...	Warrington	Museum, Bold-street, Warrington.
,, 27 ...	Bath	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 27 ...	Burnley	Bank Chambers, Hargreaves-street.
,, 27 ...	Leytonstone	The Assembly Rooms, High-road.
,, 27 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 27 ...	Southport	The Studio, 15, Cambridge-arcade.
,, 28 ...	Glossop Dale	
,, 28 ...	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 28 ...	Hull	71, Prospect-street, Hull.
,, 28 ...	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 28 ...	Liverpool Amateur	Percy-buildings, Eberle-street.
,, 28 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 28 ...	Oldham	The Lyceum, Union-st., Oldham.
,, 29 ...	Cardiff	
,, 29 ...	Croydon Microscopical	Public Hall, George-street, Croydon
,, 29 ...	Holborn	
,, 29 ...	Maidstone	"The Palace," Maidstone.
,, 29 ...	Swansea	Tenby Hotel, Swansea.
,, 30 ...	Hull	71 Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 14,—Mr. J. Weir-Brown in the chair.

PHOTO-HELIOCHROMY.

Mr. T. BOLAS showed specimens of three-colour heliochromy made at the State Paper Office, St. Petersburg, under the direction of M. Weissenberger, who was engaged by the Russian Government to work out the process. The subjects embraced landscapes, portraits, and old street views. He (Mr. Bolas) thought the results went beyond anything in the nature of three-colour printing on paper hitherto produced. The general effect was such as a skilled lithographer would not get with twenty stones by ordinary chromo-lithography. The general principles of three-colour heliochromy were set forth by Henry Collen many years ago, three negatives being taken, each one corresponding to one of the primary sensations, and printed in pigment or superimposed in some other way. Mr. Bolas showed, besides the finished results, prints in yellow, red, and blue. The printings were made in that order. A different effect would be produced if they were not printed in that order. As examples of photo-heliochromy, the results shown by Mr. Bolas were considered extremely fine.

In reply to the Chairman, Mr. BOLAS said only about two hundred first-class impressions could be obtained from one plate. If more were wanted, it was easy to make fresh plates. The results he showed were really photography in colours, no work being introduced beyond careful manipulation.

The CHAIRMAN observed that the process might easily fail in the hands of a cheap printer.

Mr. W. E. DEBENHAM remarked that it was essential that the superposed colours, and especially the last, should be transparent, although the first one might be opaque.

Mr. BOLAS pointed out that each separate colour picture seemed to be wonderfully complete in itself. This seemed to point to the fact that ordinary objects radiated all colours.

EFFECT OF METOL ON THE SKIN.

Mr. J. A. SINCLAIR had been developing largely with metol, and had found that the latter had a painful effect on the skin, ammonia being the alkali.

After the discussion of other matters the meeting adjourned.

MANCHESTER PHOTOGRAPHIC SOCIETY.

SEPTEMBER 14, Mr. A. Brothers, F.R.A.S. (vice-president) in the chair.

Mr. S. HERBERT FRY gave an address and demonstration on the "Sandell" multiple-coated dry plates. His contention was that with these plates the photographer was freer to devote his attention to the selection and posing of his pictures, not being hampered with so many technical restrictions, the double and triple films giving a great amount of latitude in exposure, and if developed in an intelligent manner, having regard to the action of the varying sensitiveness of the different films, good negatives could be produced of subjects which, with single-coated plates, would require an extra amount of care and preparation.

Hackney Photographic Society.—September 14, Mr. J. O. Grant in the chair. Messrs. Dean, Fort, Moore, Roberts, and Roofe showed work. From the question-box: "In taking photograph of factory with men at work, what kind of plate should be used?" Summarising the replies, backed and very rapid plate advised. Mr. BECKETT had tried Powell's backing, and would expect it to answer for all ordinary cases. Mr. SODEAU said, when caramel is slow in drying, he would advise applying a piece of slightly greased paper to the back of the plate before applying the backing. The Hon. Secretary showed one of Dyson's vignette backgrounds. Considering the price, it was thought wonderfully cheap. Mr. Barker showed a platinotype print much marked. The paper appeared at fault. Mr. Fort showed a negative having a mottled sky. It was thought irregular drying was the cause. Mr. F. W. Dodd showed a negative having marks on. The HON. SECRETARY thought the negative had been rubbed whilst wet. Mr. Gosling showed a negative which, by retouching, had been cured of line-markings. Mr. Dean showed a negative with silver stains. Methylated spirits were advised being used. Mr. Hudson handed up some negatives on which he failed to secure proper density. Mr. BECKETT said they were much under-exposed.

East London Photographic Society.—September 12, Mr. E. Stone occupied the chair.—Mr. Aldridge showed two whole-plate negatives, one an improved plate and one a Barnett, both of good quality. Prints shown by Mr. G. E. Bennett, and also some lantern slides. The date for sending in prints for the forthcoming Exhibition was altered from October 10 to October 24 for members' classes only. Mr. WILKINSON showed a very neat method of mounting P.O.P., which was to take the print from the water, lay it face downwards upon a slab of glass, remove the surplus water with a piece of blotting-paper, then apply the mountant (starch preferred), and place upon the mount. This, he said, gave a very nice finish to the picture. The HON. SECRETARY announced that at the next meeting (September 26) Mr. S. H. Fry would give a demonstration upon Sanedl plates.

FORTHCOMING EXHIBITIONS.

1893.	
September 25–Nov. 15	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1–31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 2–14	Midland Camera Club, Botanical Gardens, Moseley, Birmingham. Hon. Secretary, C. J. Fowler, 4, Woodstock-road, Moseley, Birmingham.
,, 9–Nov. ...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
,, 17–19	*Hackney Photographic Society, Morley Hall. Hon. Secretary, W. Fenton Jones, 12, King Edward-road, Hackney, N.E.

October 30, 31 ..... *East London Photographic Society, New Tabernacle, Old-street, E.C. Hon. Secretary, W. R. Gould, 61, Gibraltar-walk, Bethnal Green, E.

November 7-11 ..... *South London Photographic Society. Hon. Secretary, C. H. Oakden, 51, Melbourne-grove, Dulwich, S.E.

,, 20-25..... *Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.

December..... *Madras. The Hon. Secretary Amateur Photographic Society, Madras.

,, 18-Jan. 22, 1893 *Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 17,022.—"Improvements in the Construction of Portable Photographic Cameras and Stands." W. J. SPURRIER.—*Dated September* 11, 1893.

No. 17,060.—"Improved Means and Apparatus for securing Accurate Focus Registration in Photographic Cameras." T. R. DALLMEYER.—*Dated September* 11, 1893.

SPECIFICATIONS PUBLISHED.

1892.

No. 15,956.—"Photography." HARDY.

No. 13,373.—"Regulating Rays of Light passing through Photographic Lenses." FAWCETT.

Correspondence.

PHOTO-MICROGRAPHY.

To the EDITOR.

SIR,—Touching the letter of Mr. Ives to you in your issue of September 15, may I offer a few remarks? Mr. Ives' first point evidently is that some achromatic microscopic objectives are as good as, or better than, apochromatics. In low powers he knows of some achromatics "with flatter field and greater resolving power than the Zeiss apochromatic of the same focal length." These achromatics "define details so minute that it is only just possible to see them with the naked eye in the photographs" which are at about × 30, if I read aright. When it is considered that the Zeiss one-inch apochromatic has numerical aperture 0·3, and will resolve somewhere near 38,000 lines to the inch with photographic light—rays of the spectrum—Mr. Ives' description of his low-power achromatic will strike the average microscopist as somewhat vague, to say the least. Does Mr. Ives suggest that a Zeiss 24 mm. glass will *not* resolve details so minute that it is "only just possible to see them" with the unaided eye at × 30? If so—and I can see no other meaning in his words—he certainly has much to learn about apochromatic glasses, as, indeed, I have suspected from the first. I cannot gainsay Mr. Ives' statement about the comparative flatness of field of his achromatics and Zeiss apochromatics at equal apertures and magnifications; but I have never seen, nor till now heard of, achromatics surpassing apochromatics in this matter, especially in the lower powers.

Mr. Ives goes on to say that an achromatic objective has been made which resolves *A. Pellucida* "with ordinary white cloud and mirror illumination." I have also heard that about seventeen years ago this diatom was resolved in America with a quarter-inch objective. I cannot contradict either statement. I suspect we require a definition of the word "resolution."

Mr. Ives overlooks, or rather distorts, what I wrote about my own repeated statements as to the good qualities of achromatic glasses. I did not write that I had made the statement in "one" paper or journal; what I wrote was that I had made the statement in nearly all my communications, oral and written. My impression is that I have never once omitted to say that good work can be done with achromatic glasses, and more than once I have shown what I called good work done with such objectives.

I had no idea of sarcasm in thanking Mr. Ives for recommending my book, nor is there any need for Mr. Ives' production of evidence in proof of the quality of his own work. As I have never seen any of his work, I could not very well belittle it; but if he wanted evidence of his powers, surely he might have found something more convincing than ordinary journal criticism. I, too, have produced work with ordinary glasses which was used as proving the fine quality of the objectives; but the work was not to be compared with what I did with apochromatics, and nobody thought it was. I cannot see what bearing on the matter has the fact that Dr. Nicol took for aristotypes what were albumen prints, nor was I aware that Dr. Nicol was an authority on photo-micrography, though he is pretty smart in matters of ordinary photography. If Mr. Ives did not get beyond "beads" on *S. Gemma*, he did not get very far ahead, and why he used such an aperture as 1·3 for this exploit I cannot conceive. As to "secondary structure of diatoms," that is a very wide phrase; a half-inch or even a one-inch apochromatic will show this in some diatoms. Mr. Ives does not tell us whether he has seen the work of the men I named in my last letter—Nelson, Van Heurck, Comber, Smith, &c.—but I think he ought to make himself familiar with this class of work, and try to rival it with his achromatics, and *then* let us have his opinion on the relative merits of the glasses. It is no good to say so-and-so can be done with achromatic glasses; let Mr. Ives do it and show it. I never could do it, and I have never met any one who could.

By "highest-class" work I mean the most difficult work with the best results. As tests of Mr. Ives' ability and of his achromatic glasses, I suggest:—A good clear resolution with oblique light of *A. Pellucida* in *striæ*, the white intervals about four times as wide as the black lines—I say nothing about "dots"—a fair resolution of the same diatom with axial *conified* illumination. *C. Asteromphalus* with *dots and festoons*, *N. Rhomboides*, or even *S. Gemma* in dots. If he does not care to tackle diatoms he can amuse himself with the spike and barb on human spermatozoon, or even the *flagellum* of one of the smaller bacteria—say, *B. Termo*. When these are as well done with the achromatic as they have been done with the apochromatic, Mr. Ives can report progress, and we will try to find him something still more fascinatiog.

It may be, as Mr. Ives says, that there are achromatics equal to apochromatics. All I can say is, that I have never seen them, and would very much like to see even one of them. "Achromatic" and "apochromatic" are not merely trade designations; they represent different glass metals and different constructions. I have always understood "real authorities" to pronounce the latter to be superior to the former, and in my own experience they have shown themselves very distinctly superior. Apologising for the length of this letter,—I am, yours, &c.,

ANDREW PRINOLE.

P.S.—Mr. T. F. Smith and I have in the main agreed from the beginning as to facts, only we went to different lengths. Ordinary "uncorrected" glasses are made for the visual rays specially; colour-corrected plates are abnormally relatively sensitive to the same rays. I take it that the colour-correct plates pick out, and are affected by the rays which they absorb and are specially sensitive to, and reject the outstanding spectrum rays which with an ordinary plate are taken up and represented by blur. But I do not at all plume myself on being a theorist.

"ALUMINIUM *VERSUS* MAGNESIUM."

To the EDITOR.

SIR,—In your issue of September 7, 1893 (page 572), mention is made of "Aluminium *versus* Magnesium." I, and no doubt many other photographers, would esteem it a favour if Mr. Bolas or some other gentleman would be kind enough to inform me, through your columns, where "aluminium powder" of sufficient fineness to use in an ordinary flash lamp could be obtained, and its price, post free, per ounce, as I am desirous of taking portraits and groups by artificial light during the coming winter, and would like to give the aluminium powder a trial.

Can the oily matter with which the above powder seems to be at present contaminated be removed by stirring it up in *strong methylated spirit* and, after pouring the latter off, drying the powder on blotting-paper in the air, or should it be placed *in ether* after the spirit, in order that the powder may dry more rapidly after being freed from the oily matter? If the above process would not be suitable, would treatment with a solution of soda or potash be effective, removing the alkali afterwards by several waters? If not, how is it to be extracted? Any information on the above will greatly oblige.—I am, yours, &c,

J. T. HACKETT.

The Victoria Studio, Albert-street, Fleet, Hants, September 12, 1893.

HACKNEY PHOTOGRAPHIC SOCIETY'S EXHIBITION.

To the EDITOR.

SIR,—Will you allow me to correct a wrong impression which appears to exist about Class F in our forthcoming Exhibition? It reads as though amateurs are excluded. This is wrong. Amateurs are not excluded this class, the idea, in the first place, being to permit photographic firms to compete as such—*i.e.*, not being compelled to be the work entirely of one man. It would be better understood if the words "Professional class—no restriction" were expunged.—I am, yours, &c.,

September 18, 1893. W. FENTON JONES, *Hon. Sec.*

A CORRECTION.

To the EDITOR.

SIR,—I find two typographical errors in my letter (pp. 598–599). In the fifth paragraph "the proboscis" should be "the proboscis of a blow-fly." In the sixth paragraph, "provided that the photograph with the achromatic" should read, "provided that the photograph with the *apo*-chromatic," &c.—I am, yours, &c., F. E. IVES.

116, *Charing Cross-road, London, W.C., September* 15, 1893.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

*** Several answers are unavoidably held over.

J. H. A.—We note your remarks.

A. B.—Write to the Superintendent of Police of the locality named and state the case.

J. E. G.—The "Kangaroo" changing-box, by J. R. Gotz, 19, Buckingham-street, Strand, W.C.

A. C. TYLER.—We do not know the name and address of the maker of the "Excellens" lenses.

G. V. S.—Use your ordinary developer, but increase the reducing agent, and diminish the quantity of alkali to commence with.

S. W. B.—The solution should be clear. We cannot account for the blue colouration on the data given. Let us have samples of the ingredients of the developer.

WASP.—1, 2, and 3. Place the solutions in one receptacle, and precipitate with potassium sulphide ("liver of sulphur"). 4. Proper exposure and a sufficiency of amidol. 5. Possibly not. 6. Messrs. Marion & Co.

G. B.—1. The collodion you are using is unsuited for enamelling. It should dry transparent. 2. To prevent collodion from leaving the glass, run a little diluted albumen around the margin. 3. Filter the gelatine solution.

49.—We have no experience with the formulæ, but the reason that one advises a much larger quantity of pyro than the other is due to the fact that it is meant for rapid plates, while the one with the smaller quantity is for slow plates.

SPOTTY.—The spots look as if caused by iron or other impurity. Carelessness as regards particles of dust may cause them, as the dust stirred up in a photographic dark room is usually of a highly complex and deleterious character. This, however, is merely a suggestion, beyond which we fear we cannot help you.

LIVERPOOL.—Eosine is seldom to be obtained at an ordinary chemist's, but it is kept by most drysalters or dealers in dyer's material. There are several varieties of it, but the best way to ensure having the right kind for photographic purposes is to obtain it from such a house as that of Hopkin & Williams, Cross-street, Hatton Garden.

T. H. B.—By the way the sheets are described as sticking together, it is obvious that the paper has been kept in a damp place, and has absorbed sufficient moisture to soften the albumen. Under these circumstances we are not surprised that the paper, after sensitising, prints with a mottled appearance.

H. NEVILLE.—The best lens for taking portraits in an ordinary room is the "Petzval" form—the ordinary portrait lens—on account of its rapidity. Next to this a lens of the "Rapid" type would be the most useful. Of course, any lens would do equally as well as either of the above if the time of exposure were not a consideration.

WINDONE.—Canary medium is a very pleasant light to work with, and two thicknesses in front of a No. 3 fish-tail burner would be quite safe, and supply sufficient illumination. Although this medium is trustworthy with ordinary plates, it would not be so with plates orthochromatised with eosine, as they are sensitive to the yellow rays. When using such plates, the medium should be supplemented by one of red—say, a sheet of ruby glass.

S. E. WALLEY.—The stereoscopic lenses may have been accurately paired; but, as you say one has been used much more than the other, it is probable that the blacking on the tube of that has become, to an extent, polished, and so reflects a certain amount of light. If this be the case, one half of the negative might have the appearance of having had more exposure than the other. Probably, if both tubes were reblacked, the lenses would be found in unison.

AMATEUR.—It is very doubtful if the district surveyor will permit you, although the neighbours may not object, to erect a studio in the back garden constructed of wood, zinc, and glass. According to the Metropolitan Building Act, such a building must be "fireproof." But this is sometimes a very elastic term, and it seems to vary with different surveyors. Our advice is to consult that functionary before commencing the erection; it may save a deal of trouble in the end.

S. PANNELL.—The doubled appearance in the negative is due to movement. If you are sure that the camera did not move during the exposure, the plate must have dropped in the slide, owing to its not being placed at the bottom of the rabbet, and the spring being too weak to retain it in position.

NOVICE says: "In my first attempt at sensitising albumenised paper, I made my fingers in a sad mess, which sand and pumice would not remove; and I also got some on my cuffs and handkerchief. Can you tell me how to get them out?"—The rough-and-ready way is to treat them with a strong solution of cyanide of potassium. A more refined way is to treat them, in the first place, with a solution of iodine in iodide of potassium, followed by one of hyposulphite of soda or cyanide of potassium.

MECHANIC.—There is no firm in London that make a speciality of supplying apparatus and material for Woodburytype printing, and we cannot say where the paper ready prepared is to be had. This process is very little worked in this country now. Only two or three firms, we believe, work it to any great extent. One or other of these may supply you with the paper. Try Waterlow & Sons or Eyre & Spottiswoode. Liesegang, of Düsseldorf, used to stock Woodburytype papers, and, so far as we know, does so still.

T. COURTENEY says: "In sensitising albumenised paper I am much troubled with a marbled-like appearance on the surface. Some sheets are worse than others, and some are quite free from it, although the same solution is used. What can be the cause?"—It arises from scum on the solution. This is almost sure to form if the solution is allowed to remain an hour or two in the dish out of use. The surface of the solution should always be skimmed by drawing a slip of blotting-paper over it before recommencing to sensitise.

C. W.—Coignet's and gelatines of a similar kind are not suitable for mounting photographs, as they set too quickly when applied to the print, and hence do not retain their adhesive properties. Furthermore, they are usually decidedly acid, a thing to be avoided with silver prints. The sort of gelatine best for the purpose is one of a poorer quality, as a gelatine such as those sold as "soup strengtheners." These, if of English make, are generally quite free from acids. Try Nelson's No. 2 Soluble. It is the best for the purpose that we know of.

R. C.—Preparing copper plates to make them suitable for photo-etching purposes from the rolled copper of the metal warehouses, is very troublesome and tedious work for a novice to undertake. It will be found, as the plates are planished, that they contain numerous small holes or indentations which have to be hammered up from the back, even after the plate has been well hammered to harden it. Anyhow, there is no harm in trying your hand at it. First clean the surface of the metal with pumice-stone and water; after that, smooth with snake-stone and water, always in one direction only. Then polish with a stick of charcoal and oil, and finally finish with the oil rubber.

G. PERRY says: "I have often seen it stated that lenses all work with the same rapidity, provided the ratio of aperture to focal length is the same. My reason for doubting this is that I have two lenses of the same form (rapid rectilinear type), one is a whole-plate, and the other a ten by eight. When used with their full apertures *f*-8, or with smaller stops, the latter is always the quickest. I at first thought that the ratio of the stops was not the same with both lenses, but by careful measurement I find they are. Why, then, is one lens quicker than the other?"—All things being equal, the rapidity of the lenses should be identical; but there are disturbing causes. The glasses of one instrument may be more colourless than those of the other, or the balsam with which those of one is cemented may have become yellow. If the glasses be laid singly on a sheet of white paper, no doubt a difference in colour will be detected which will account for the discrepancy.

T. BIGGS writes as follows: "I have made several attempts at carbon printing, but cannot manage the development satisfactorily. I cannot hit the right time to stop development. Sometimes the prints, when finished, are too light, and at others, although some parts of the face are light enough, the darker portions of the picture are too dark, and are not distinct; they appear to have a lot of unaltered gelatine that seems as if it ought to be washed away. Can you give me any idea how long I should develop at a given temperature of water, say, 100°?"—Our correspondent's trouble arises entirely from under-exposure. The prints have not been exposed long enough to fix the image in the lighter parts, so as to allow of the proper development—that is, the complete washing away of all the unaltered gelatine not required to form the picture. If he will give considerably more exposure, and develop the picture until it appears as it should be when finished—bearing in mind one point, however, namely, that carbon prints dry a little darker than they appear in the water—his difficulty will be at an end.

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HOW THE EXHIBITION STRIKES ONE.

For details of the Annual Exhibition of the Photographic Society of Great Britain we refer our readers to another article in which these are dealt with.

The first thing that strikes one is the paucity of portrait exhibits. This is a department in which amateurs cannot hope to compete with professionals, whose studios are specially arranged for it, and hence the latter, in all save a few cases, may be expected to remain masters of the field. It is in landscape or general out-of-door work that both classes compete on equal terms.

For such work photographers now seem to be getting alive to the advantages of making their prints on a rough-surface paper, and, for the purpose of producing effective pictures of large dimensions for the walls of an Exhibition, there is no doubt as to its value, especially when the subjects selected for pictorial representation are such as lend themselves to a coarse texture —that is, when they are of a broad character, and do not possess features of fine detail, necessitating close inspection. This is the fashion at present; whether it survives many years time alone must show. It need scarcely be said that this applies mainly to large pictures intended for wall decoration.

A few of those of this class in the Exhibition, whether enlargements or taken direct we need not pause to inquire, are of a cold tone, which is not by any means so attractive as when the prevalent tone partakes more of a sepia or red nature. There being such a charm about the rough-surfaced paper, it is probable that its admirers will be speedily able to procure it from all dealers throughout the land.

Instructions for converting the cold tones of enlargements produced on gelatino-bromide prints have recently been given in such full detail that it is not now necessary to refer to this topic, except so far perhaps as it refers to the more recently introduced method of toning Nikko paper by the agency of sulphur. Sulphide of silver, when produced under the proper conditions, has long been known to be a most stable substance, and we see no reason for doubting the statements of those chemists who have been making a study of this renaissance, and who say that, when produced in the presence of gelatine containing silver obtained from the decomposition of silver bromide by a developing agent, it stands every reasonable test for unalterability. We know, and every other experimentalist knows, that this is not so when produced on albumenised paper, which is a pity, as its colour is often so beautiful. But albumen and gelatine as applied to photographic surfaces, whether for negatives or positives, are two entirely different things.

How there can exist any mystery, as spoken of in a daily paper, concerning the production of one of the pictures in the Exhibition (No. 103, *The Proud Turk*, by J. S. Bergheim) puzzles us. This is a photograph on a textile fabric such as oil paintings are painted upon, and similar things were, and perhaps still are, as "common as blackberries." The production of a photograph on prepared canvas has, for much over a score of years, been a regular item in commercial photography. The dingy yellow "whites," indicating the affinity of the photographic material, whether silver or anything else, for the surface preparation of the canvas or other substance, are all there, much as they were a quarter of a century since. But it appears to have bewitched the Judges, who have awarded it a medal. The sleepy-looking eyes of this "Proud Turk," although but barely visible to the ordinary spectator, appear to have still further hypnotised the Judges, who, while under the influence, have awarded another medal to a photograph which is catalogued as having been taken by a lady, but concerning which, at the risk of being considered ungallant, we must confess to sympathising with the almost universal feeling that there are considerably over three hundred specimens in the Exhibition (there are but three hundred and thirty-four altogether) better entitled to the honour. Indeed, the picture just hinted at is such a one as is weekly exhibited at our suburban and provincial societies by neophytes of a fortnight's standing, and who want to know the causes of their failures. A wise Judge abstains from giving the reasons for his verdict, but we imagine that there will be such a strong outcry concerning the reasons which have operated in the case of the judging of the Exhibition this year as must compel them to speak out. With most of the other awards made by the Judges no particular fault is to be found.

The abolition of the screens formerly present is an improvement which seems to be appreciated by the visitors. Something like five hundred pictures are said to have been rejected; but, from what we learn from those competent to form a judgment, some of these might, with great advantage, have been allowed to supplant others now remaining on the walls. And yet, notwithstanding these grumblings, the Exhibition, as a whole, is an excellent one, and will well repay one or more visits to it.

RAPID INTENSIFICATION.

When the necessity arises for the intensification of a negative, more especially if it be wanted in a hurry, the greatest trouble arises from the very careful washing required in order to ensure the entire success of the operation. The rule holds good more or less, whatever may be the particular process adopted, and

especially so with the most generally popular method based upon the use of mercuric chloride followed by weak ammonia solution.

When the mercury salt is employed it is essential in the first place that the negative be very thoroughly washed after fixing, much more so than is requisite when intensification is not to be performed. Where time permits, the efficiency of the washing or the complete elimination of the hyposulphite is promoted by allowing the negative to dry after a fair amount of washing, and then reimmersing it in fresh water, when any remaining crystalline matter is almost instantaneously removed in a more effective manner than would be the case after a considerable prolongation of the original soaking; but, when time is an object, this course can scarcely be pursued with advantage.

Some years ago the proposal was made by a member of the Photographic Society of France to utilise alcohol for the purpose of rapidly removing hypo from the negative film after fixing, though, as was pointed out at the time, there appeared to be some misapprehension as to the precise action of the alcohol, and we question whether, applied as was proposed, the result would not be rather injurious than beneficial; but certainly alcohol may be utilised for the purpose of indirectly hastening the removal of the hypo if it will not itself perform the part of eliminator.

Thus, if a negative be taken from the fixing bath, and after a brief rinse in water plunged into a dish of methylated alcohol, the transparent portion—the shadows—will be found to be filled up with a dense opalescence, caused by the precipitation in the gelatine film of the hyposulphites of soda and silver soluble in water but not in alcohol. A portion of the salts may be thrown down in minute crystals in the liquid itself, but the bulk will remain *in situ* in the gelatine, under which circumstances they can scarcely be considered to be in a safe condition; but, if the negative be again immersed in water, the opalescence will quickly disappear, and by the time the water runs evenly over the gelatine surface all soluble matter will be found to have been practically removed by the rapid diffusion of the alcohol clinging to the film. This method of treatment, in fact, produces precisely the same effect as drying and subsequent rewashing, but in a much shorter time, and leaves the negative ready for any further treatment that may be necessary.

But the most careful washing is required after the bleaching with mercuric chloride, and it is here that most failures are made, for, unless every trace of soluble mercuric salt be removed before the application of the darkening agent, a more or less heavy veil will be formed in the shadows of the negative. Such, at least, is the case with most of the reagents employed, such as ammonia or other alkali, the alkaline sulphides or ferrous oxalate; but we pointed out some years ago that sulphite of soda differs from those in not forming an insoluble compound with the bichloride, and it therefore presents little or no chance of fogging or veiling the image if the washing be insufficient.

Sulphite of soda, however, as a rule, gives but little increase in density, the result, such as it is, being more of the character of a change of colour than an increase in the opacity of the image. When but a slight augmentation of density is necessary, sulphite answers admirably, and gives a beautifully clean and bright result, the cleanness and absence of veil going far to compensate for its inferiority in intensifying power, while the reduction in the time required in washing is an item of some importance.

Having occasion, a short time back, to intensify a negative that was required immediately, we resolved to use the sulphite method; but, unfortunately, the sulphite bottle proved to be empty. We had at hand, however, a stock solution of metol and sulphite, which was called into use in place of the plain sulphite, and with such a satisfactory result that we have little hesitation in placing it at the head of the list of reducing agents for use after mercurial bleaching. Not only does it afford the same immunity from veil and stain as in the case of sulphite alone, and the reduced necessity for prolonged washing, but it gives as great an increase of density as can be secured with ammonia, while the colour and character of the image, and the clearness and brightness of the shadows are much better. The colour is, in fact, the nearest approach to the rich purple-black of the best type of wet-collodion negative that we have yet seen, and it is entirely free from the dull opacity that too frequently marks the negative that has been intensified with mercury.

There are no special precautions to be observed beyond giving a fair amount of washing after the application of the mercury solution. Three or four minutes under the flow of a tap, or a slight wash in that manner, followed by ten minutes' soaking in two or three changes of water, will prove ample. The strength of the metol solution does not seem to be very material, though we fancy the best result is obtained with a comparatively weak solution, containing from one to one and a half grain of metol, and ten times that quantity of sulphite to the ounce. This, if kept by itself, may be used repeatedly, though, if the films are carelessly washed, it soon becomes yellow. This does not, however, destroy its reducing power, nor, apparently, create any tendency to discolouration of the film.

The negative should be removed from this solution as soon as the bleached image has been reduced throughout its whole thickness, which will be recognised by the disappearance of the white colour from the back of the plate. If allowed to remain for any lengthened period in the reducing, there is a chance of the formation of a metallic scum on the surface of the negative, which is very difficult of removal; but, if the plate be washed as soon as the required result is attained, no danger arises.

It must be understood that no alkali is added to the metol solution, otherwise the same degree of care in washing will be required as with ammonia, and the quality of image obtained with metol and sulphite will be lost. It is this peculiar character of image which, in fact, especially recommends the process, which we can heartily recommend to those desiring a rapid and reliable method of intensification.

PHOTOGRAPHING HIGHLY POLISHED SURFACES.

When an ordinary portrait photographer is called upon to take a negative of an object, or group of objects, with highly polished or burnished surfaces, he is, if we may judge from several letters received of late, sometimes at a loss how to proceed. Of course, those who are familiar with this class of work know quite well that it presents no difficulties to them, but evidently the case is different with those who are not. The topic is a wide one, too wide, indeed, to be dealt with in a single article. Therefore, we propose to divide it into two. The experienced hand is well acquainted with a series of dodges that can gene-

rally be resorted to, such as might be termed sophistication of the articles themselves. But there are cases where this is not allowable, and, even if it were, would not help matters in any material degree.

We shall here treat the matter as in the latter proposition, that is, the objects have to be dealt with as they are, leaving for a future article a series of what may be classed as "dodges," or, at any rate, means to an end. What, however, is to be said now will apply equally well even when the surfaces can, to an extent, be modified.

Let us take, in the first place, by way of example, some silver plate that must be photographed in its natural state, and some of its parts are frosted, or matt, while others are highly burnished. The latter, as seen from some directions, will appear almost, if not quite, black, while the former will be brilliantly white. To add to the troubles of the photographer, some of the articles may have an inscription that it is desired should appear in the picture. Now, it will be admitted that this is a somewhat difficult subject to deal with under any circumstances, and particularly by those unaccustomed to such work. Unfortunately, it is impossible to give any very definite instructions that will answer under all conditions. It may, however, be said that success or failure is mainly a question of lighting. It should always be borne in mind, in photographing brilliant objects, that the angle of reflection equals the angle of incidence, and the illumination must always be arranged so that the reflections are not in the direction of the lens, but away from it. Hence it will be seen that direct front light must be strictly avoided. So important is this point that, when possible, a large black curtain should be hung from the roof of the studio, in front of the camera, and not at a very great distance from the object to be copied, with an aperture only sufficiently large for the lens to see the subjects without obstruction. Next, the whole of the light from one side should be stopped out as well as that from the direct top. Here, then, we have concentrated our light, so that it comes from one direction only, and it will at once be seen, on looking at the image on the ground glass, that many of the reflections have been overcome, and detail in the high lights, which could not be seen before, are now tolerably distinct.

The light, however, requires still more concentration. This is effected by further closing the curtains and blinds on the light side, so that the direct light falls on the plate at an angle of forty-five degrees; then the reflection will be at a similar angle and quite away from the lens; that is, this would be the case if the plate were a flat surface; but, more generally than not, it has many curved surfaces of varying radii, in which case much may be accomplished by slightly turning the different objects round so as to reduce what reflections there are in the direction of the lens to a minimum. With a little care it will be found that the major portions of the reflections towards the lens may be entirely got rid of. When that is accomplished, it will be seen, on examination of the image on the focussing screen, that there is full detail in the finest engraving and chasing, but that the shadows are very dark, because highly burnished silver is black when in shadow. Therefore it is necessary, in timing the exposure, to go on the good old maxim of exposing for the shadows, leaving the lights to take care of themselves.

The development must be tentative, and the density of the image kept back until full detail in the shadows is secured. To do this effectually with subjects such as we are now dealing with will require considerable ability on the part of the operator. What will be found a better plan by some is to ameliorate the darkness of the shadows with reflected light; but it will have to be done with judgment, and care must be exercised that the light projected by the reflector is not again reflected from the silver surface in the direction of the camera. A white reflector should be avoided. One of tolerably dark blue, French grey, or light green, will be preferable. If there is much fine chasing on the work, or engraved inscriptions, it may be advisable to illuminate with a more direct side light than one of forty-five degrees, so that the edges of the lettering throw a strong cast shadow, and care must be taken that this is not destroyed if a reflector be employed.

As a further illustration of our remarks on the illumination of highly polished surfaces for copying, let us take the case of a Daguerreotype. If this be illumined by a direct front light, it is impossible to obtain a good copy, as the light from it is reflected back into the lens; but if the front light be entirely stopped off, and the picture lighted only from one side, and then in the direction in which the metal plate was "buffed," excellent copies may be obtained even if the plate was somewhat scratched in the final polishing.

What has been said with regard to plates, whether silver or gold, for there is really no difference to be made, except in the matter of exposure, applies equally well to glass and china, so far as illumination is concerned, though with the last-named, if it be elaborately painted, it will be advisable to employ orthochromatised plates, and, if blue predominates, a yellow screen as well. Jewellery generally gives some trouble, as the innumerable small facets of the gems all reflect a brilliant light, and it is impossible to so arrange them that they reflect it all in the same direction. Still, as will now be seen, much may be accomplished by paying attention to the method of lighting. Coins and medals, when the photograph has to be made direct from them, sometimes give a little trouble, particularly when the relief is low, and gold, silver, and bronze have to be included on the same plate. Here, however, the same principle is followed, and it is advisable to use a somewhat high side light, so as to produce strong cast shadows from the relievo portion.

With reference to the photographic part of the subject, much might be said; but this is unnecessary here, as we assumed, when saying that, in the development of the image, density is to be avoided till full detail is obtained in the darker portions, the operator knows quite well how that is to be accomplished. We might, however, emphasise that the chief things to be avoided in this class of work are under-exposure and forced development. If dry plates be used, they should always be backed, to avoid halation in the highest lights. If the negatives are—and more generally than not they are—required for any of the photo-mechanical processes, collodion ones are preferable, and, if they are taken, they will be best developed with a strong developer, so as to secure, in the first instance, a thin image, full of detail, that can afterwards be intensified to the required degree.

Of course, in an article of this kind, it is manifestly impossible to make reference to even a tithe of the numerous things, with highly glazed articles that have, from time to time, to be depicted by photography. But sufficient has been said to indicate to the novice the direction in which he must proceed. In another article, as already mentioned, we shall give some of the dodges often resorted to for modifying the surface of the work, when that is allowable, before operations are commenced.

The Photographic Congress.—We draw attention to the first Congress of the Photographic Society of Great Britain, which will be held at the rooms of the Society of Arts on October 11 and 12, when many important papers will be read. A special lantern display will be held at the Exhibition Gallery on Thursday, October 12, and on Friday, at the Frascati Restaurant, a dinner is projected, at which it is hoped members of many affiliated Societies, including country members who may then be in town, will be present.

Fading of Eosine.—Touching the use of eosine, which, either of itself or in one of its many compounds, is the sheet-anchor of those who make isochromatic plates, it is interesting to note the results of one of the British Association communications—that on *The Action of Light upon Dyed Colours*. The authors made a vast number of experiments with the various natural and artificial dyestuffs in use by dyers generally. They were exposed to sunlight for different periods of time in an atmosphere removed from the smoke and gases of a town. It was found that of all the reds experimented with, dyed either on silk or wool, those which were first acted upon by light were the eosines and their allies.

A New Use for the Radiometer.—It has always been looked upon as a misfortune that this marvellous instrument could not be directly utilised in photographic practice; but hitherto such has been the state of the case. It is well known, for example, that a rapid revolution can be given to the vanes by simply blowing with the mouth upon the bulb of the instrument. However, Herr N. Tesla has put the radiometer to a valuable scientific use for determining the radiant transparency of bodies. It is arranged in such a manner that its velocity of rotation is determinable, and Herr Tesla finds this velocity and the intensity of the incident light to bear a definite proportion to one another. In his paper on the subject he gives tables showing the relative transparencies of various liquids ascertained in this manner.

Cheap Aluminium.—This metal, which now forms a staple quotation in the prices of lens-makers' catalogues, though a comparatively short time ago being scarcely ever quoted, is constantly forming the subject of newspaper paragraphs, as to probable increased cheapness. Many of these are so wild as to be capable of dismissal with a smile: but the most recent utterance in this direction seems very plausible. It is to the effect that the Government chemist has returned to Washington, after examining a new process rejected by the Patent Office at first because the process was held to be impossible, a report that the plan is operative, and that he has made three entirely satisfactory tests. The discoverer of the new process and his Dulak associates assert that they can produce metallic aluminium at a price cheaper, bulk for bulk, than copper.

Mr. A. A. Common on Lord Rayleigh's Suggestion.—Writing to *Nature* upon the suggestion of Lord Rayleigh to use specially constructed isochromatic plates in preference to specially constructed expensive telescopic object-glasses, Mr. Common says of this "novel suggestion," as he rightly terms it, that "if this can be done by a variation of the photographic process without paying too dearly for it, a good deal will be gained in many ways. The great doubt in my mind is whether it is possible to get rid of the blue rays without the use of screens." He further remarks, with surprise, upon the continued preference of expensive refractors to reflectors of comparatively low cost for this kind of work. With regard to the need of a screen, it must not be lost sight of that the necessarily thick object-glass must form of itself a coloured screen, for no glass is colourless, and, in view of possible experiments on the lines of Lord Rayleigh's suggestion, it would first be eminently desirable to have some definite data as to the particular portion of the spectrum diminished by passing through the object-glass, if for no other reason than to diminish the number of factors the isochromatic plate maker would have to deal with.

A Light and Vision-measurer.—The subject of relative visual illumination of the dark room has always been a topic of importance to the photographer, and has given rise to as much discussion, perhaps, as any one disputed question in photographic technics. From the days of the great "cathedral green" controversy down to the present time a definite standard of visibility has never yet been arrived at, but a new contrivance designed by Dr. Simonoff seems to offer a fair solution of the difficulty. He arranges a book of twenty-four pages, the first being a clear grey tint, and the succeeding pages advancing evenly in increasing depth of colour till the last is almost black—twenty-four times the intensity of page one. On every page a few phrases in black letters are printed. When the illumination is very good, the printing is visible on the last page, and, as the light diminishes, the observer has to turn nearer to page one before the type is legible. The instrument is only intended to be used inside a room, and it is anticipated that it will be of value in schoolrooms. If such books were easily obtainable, and made in such a way as to be capable of reproduction in a standard manner, it would be possible for photographers in any part of the world to describe with any necessary exactitude the intensity of illumination of their dark rooms generally, or at any particular point. Such a standard would be of immense value in experimenting with various coloured media for dark-room windows.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The Thirty-eighth Exhibition of the Photographic Society of Great Britain was preceded, on the evening of Saturday last, by a Conversazione, to which the Council had issued numerous invitations. The President (Captain W. de W. Abney, C.B., F.R.S.) and Mrs. Abney received the guests, among whom we observed:—Mr. J. Spiller, F.I.C. (Vice-President); Messrs. T. Bolas, F.I.C.; F. P. Cembrano, jun.; T. Sebastian Davis, F.C.S.; W. E. Debenham, W. England, T. E. Freshwater, F.R.M.S.; Colonel J. Gale, F. Hollyer, H. A. Lawrance, F.I.C.; A. Mackie, J. W. Swan, M.A.; J. Traill Taylor, Leon Warnerke, G. Scamell, E. Clifton, H. Chapman Jones, F.I.C. (Hon. Sec.), Members of Council; Mr. F. E. Ives, Mr. and Mrs. Snowden Ward, Miss Taylor, Mr. R. L. Kidd and Mrs. Kidd, Mr. H. M. Dennis, Mr. G. W. Atkins and Mrs. Atkins, Mr. F. A. Bridge, Mr. E. J. Wall and Mrs. Wall, Mr. C. R. Rowe, Mr. Thomas Bedding, Mr. H. E. Davis, Mr. G. W. Webster, Mr. J. A. Sinclair, Mr. A. S. Newman, Mr. L. Medland, Mr. J. Birtles and the Misses Birtles, Mr. J. J. Gerard, Mr. F. C. L. Wratten, Mr. S. H. Wratten, Mr. W. J. Belton, Mr. H. Smart, Mr. J. W. Marchant, Mr. C. W. Gamble, Mr. W. S. Bird, Mr. Birt Acres, Mr. J. Hay Taylor and Mrs. Taylor, Mr. H. M. Smith, Mr. A. Haddon, Mr. J. S. Teape, Mr. Charles W. Hastings, Mr. Conrad Beck, Mr. A. J. Golding, Mr. J. H. Avery, Mr. J. C. S. Mummery, Mr. C. Beadle, Mr. Perigal, Mr. A. Glendinning, Mr. N. A. Monnickendam, Mr. G. Gosling, Mr. R. R. Beard, Mr. J. D. England, Mr. T. Samuels, Mr. R. Child Bayley (Assistant Secretary), and many others. In the course of the evening nearly 400 were present, and locomotion was, at all times easy on account of the abolition of screens, the rearrangement of the apparatus tables, and the improved lantern-stand, which not only improve the appearance of the room, but give increased space.

There are 334 frames of pictures on the walls, eighteen exhibits of lantern slides, &c., and forty-three of apparatus, making a total of 395, a falling off of nearly three hundred as compared with last year, when 693 was the grand total. On this occasion there are 160 exhibitors, 49 of whom are members of the Society. Last year the numbers were 202 and 64 respectively. The comparative smallness of the Exhibition, however, implies no lack of desire on the part of the exhibiting public to find a place for their photographs on its walls, inasmuch as we understand that the number submitted to the Judges exceeded that of last year, a more rigorous weeding out than hitherto being therefore responsible for the comparative smallness of the display. Nine medals were awarded, as against seventeen last year. The Judges were Mr. P. H. Emerson, Colonel J. Gale, Mr. F. Hollyer, Mr. F. M. Sutcliffe, and Mr. J. B. B. Wellington, and, as scientific experts, Mr. Chapman Jones and Mr. Pringle. Great credit is due to the Hanging Committee for the excellent disposition of the pictures,

little room being left for complaint either on the part of exhibitors or spectators.

Analysing our impressions of the Exhibition in comparative and qualitative senses, we must come to the conclusion that, though undoubtedly good, it falls behind its immediate predecessors, whether considered from general or particular standpoints. Portraiture does not shine at its best, landscape remains virtually where it was, no new advances being apparent, while in the domain of *genre* studies, architectural work, enlarging, photo-mechanieal process work, and photography in its purely scientific uses, although each department is occasionally well represented, the aggregate effect is slightly disappointing. We do not envy those who may undertake the task of selecting a series of pictures of the year for reproduction, as, in that sense of the term, there are none which stand out with sufficient distinctness from their surroundings to warrant the appellation. It is gratifying to find, however, that, while most of the old supporters of the Society have preserved their allegiance to the Exhibition, several comparatively new men have come to the fore and secured recognition of their efforts. But the awards of the Judges constitute a puzzle which it would probably baffle even them to solve now, at least four of the medals having been given to obviously indifferent photographs *as* photographs, and which, considered as art studies, could not possibly appeal to anybody as such, unless so labelled by the Judges. They remind us very much of the juvenile's attempt at animal drawing, under which, in order that his intentions should be understanded of his critics, he obligingly writes, "This is a dog."

The Medal Pictures.

Nos. 3 and 72.—A series of thirty-five prints in all, depicting life *'mongst Mines and Miners*, for which Mr. J. C. Burrows deservedly gains an award. They are taken with a combination of magnesium and limelights, and are interesting as showing various phases of mine life. But, besides this, they are equally noteworthy as triumphs over abnormal difficulties in applied photography, being well exposed and carefully printed on gelatino-chloride paper. Photography shines here in its most useful educational aspect.

No. 18, *Study of a Child*, by Mr. W. A. Cadby.—This is a weak bromide enlargement of a seated child in slight drapery. The pose of the figure is undeniably good, but it is wanting in modelling and roundness, for which the very subdued tone and delicacy of treatment scarcely compensate. All the same, it is an able piece of work.

No. 30, *Un Harem en Déplacement*, by Emile Frecton.—One of a splendid series of highly refined collotypes, showing a group of well-loaded camels in progress across a piece of desert-like country. Clever alike in selection and execution, the process chosen exactly suits the subject, and the whole is an unconventional study, well worthy of the distinction it has received.

No. 40, *Omegna, Lake Orta*, by J. A. Sinclair.—A pretty view, with sepia-like tone, the introduction of the figure of a woman in the foreground materially aiding the effect. Mr. Sinclair is a prolific contributor to the Exhibition, and, to our taste, is more successful in many of his other studies, to which we shall presently refer.

No. 55, *After Sundown*, by Charles Moss.—This is a small study, in warm carbon. The sun has set behind a mill, and the night shadows are creeping over the rugged country towards an irregular sky line. The picture is quite in the recognised style of those whose aim it is to imitate by photographic means effects obtainable by brushwork, and is clever and successful—of its kind.

No. 103, *The Proud Turk*, by Mr. J. S. Bergheim.—The head of a distinguished-looking Mohammedan, tolerably well posed and lighted. The photograph appears to have been printed on some textile support, to which a tone of a bilious yellow has been imparted. If we take away this striking characteristic, there is probably nothing left to entitle the work to higher rank than many other portraits on the wall. As to the "yellow tint," it is, doubtless, meant for something which, after forty-eight hours' cogitation, we have not discovered, so we give it up. But it is the reverse of agreeable, at any rate.

No. 241, *Figure Study*.—One of about twenty figure studies from the nude, with (where necessary, which is frequent) classical drapings and surroundings. The artist, Count W. Gloeden, has evidently devoted a lot of time and trouble to the work, and is, in the main, to be congratulated on his results. The posings and groupings are, in most cases, exceedingly skilful, while the rendering of the flesh is excellent, both in lighting and texture, no coarseness or flatness being apparent. The prints are of a warm tint, which, of course, harmonises with the subjects.

No. 248.—Mr. Howson has chosen poetry for the title of his picture. It is a study of sea-craft before an imminent storm, and in active preparation to resist the same. The picture was enlarged by Mr. Howson from a small negative, and is in sepia on Alpha paper. The tone was happily chosen, gives realism to the effect aimed at, and is well printed and framed.

No. 254, *Waiting and Watching*, by Miss Emma J. Fitz.—A female figure, possibly that of a French peasant woman, is seated in the gloaming, apparently in an attitude of expectation, waiting and watching, we suppose, for some person (or persons) unknown. But, as Ibsen says, "they don't do these things." Her place should have been indoors, preparing supper. Had that been the case in this instance, Miss Fitz would have spared us and many more a great deal of wonderment as to what the picture really meant. If it be in the province of photography to produce effects which leave everything to the imagination, while violating the essentials of technique, we suppose we ought not to grudge Miss Fitz her medal; but, candidly, even the risk of being dubbed unchivalrous shall not stop us from saying that, while five photographers think she deserved it, there are probably as many hundreds who would not have awarded it her had they had the opportunity of doing so.

The Unmedalled Pictures.

Let us now pass to the general exhibits. Earliest to arrest attention among a lot of commonplace work, are four views (Nos. 6–9), by Colonel Gale: *The Rippling Brook; Sunrise on Salisbury Plain; Down by the Mill Ford; Ploughing and Twitch Burning.* What a pity these gems were not in competition! They exhibit Colonel Gale's faultless art to perfection and obviate criticism. In *The Postman* (No. 10) Mr. Terras shows the useful public servant at the door of a cottage, the female occupants of which are betraying interest in the contents of his bag. It is a nice piece of work, but a hackneyed subject. Mr. F. Downess' platinum portrait of Mr. Goodall, R.A. (No. 11), is striking and out of the common in posing. Passing by a careful bromide enlargement (No. 14) of clouds descending the Zermatt Valley, by Mr. W. England, and a *Mont Blanc by Moonlight;* (No. 15) taken at 10 p.m. on Jan. 7, by Captain Abney, we come to (No. 17), an unconstrained *Study of a Girl's Head*, by Mr. C. Beadle, soft and harmonious in lighting, and a rather chalky bromide (No. 19) study of a lady seated with distended bare arms, by Mr. W. Grove. Mr. Terras's study (No. 20), the head of a wrinkled old lady in a cap, is a passable one. Dr. Emerson is represented by two large carbon enlargements by the Autotype Company (No. 29), *Buckenham Ferry*, a not very interesting subject in the earlier Emersonian style, and (No. 33) *The Wherry*. This represents one of those popular craft on a river in the morning, and the light which strikes across the picture is cleverly rendered, while the distant mist and reflections in the water are also ably caught. Mr. Lewis Cohen's large platinum study (No. 32) of cloud, water, and mountain, with the sun striking a bright path down from the latter, is very effective, and in No. 35 Mr. H. K. Stephens shows a skilful instantaneous picture of *Football: Blackheath* v. *Kensington, Stoddart kicking a Goal.* Mr. W. Dawes in *Dibbling* (No. 41) portrays two or three men engaged in that occupation; but, although they are apparently working in a row, the face of one of them is quite indistinct. The *Nine Interiors* (No. 38) of Miss Weaver Arding, taken on multiple-coated plates, are excellent, at least two of the subjects having the maximum of difficulty. Mr. Henry Stevens shows (No. 31) *Chrysanthemums*, (No. 44) *White Lilies*, both in his usual style, and (No. 251) a youngster looking disagreeable because *Daddy wouldn't buy him a Bow-wow.* By the way, we do not see Mr. Stevens' well-known fox-terrier on the walls this year; we hope nothing has happened to him. *A Bivouac* (No. 45), by Mr. Cohen, is a thoughtful study of two horsemen making preparations for the night in a lonely spot. Captain Abney shows (No. 47) another Alpine moonlight view, Mr. Stewart Smith (No. 48) good yacht bits *On the Clyde:* and Mr. B. Gay Wilkinson a study of sheep coming *Down from the Hills*, apparently to avoid a storm.

Mr. W. M. Warneuke's large picture in platinum (No. 51) of *Sands of Iona—Twilight*, with the figures of two women on the shore; his *Conquest* (No. 97), a *rencontre* between two young lovers in a glade; *Kelp Gathering* (No. 113), in which figures are again skilfully introduced; and *At the Well* (No. 182), a study of a lady with charmingly rural surroundings, are all beautiful examples of sound work. We should have liked to have seen some of Mr. Warneuke's portraits, however. In Nos. 53, 54, and 55 Mr. Charles Moss shows similar work to his medal picture, but we prefer Mr. G. Ardaseer's delicate study (No. 59), *A Calm Evening*, where there is evidence of the highest artistic feeling, allied with brilliancy of treatment. We thought at one time Mr. Ardaseer was going over body and soul to the "blurrers," but he is saved! Mr. H. D. Warner's *Ice Storm* (No. 62) is well done, the contrast between the wintry-clad trees and a dark house in the view being not over accentuated. Mr. George McDonald has a small photograph (No. 63) purporting to represent *Brambles and Gorse*. It is difficult to tell which is which. *En recanche*, Mr. McDonald has some excellent photographs of flowers on the other walls. Nos. 69, 70, 114, 118, 180, and 184 are chiefly hand-camera studies in Italy by Mr. Sinclair, showing a wonderful degree of skill in treatment, the detail being ideally crisp and their whole effect most charming. One of them is evidently the original from which his medal picture is enlarged. On every ground we prefer the original, and so does everybody else, save five.

Good portrait work is shown by Messrs. Lutzel (No. 71), Mendelssohn (Nos. 75–8, rich, warm-toned pictures), Mowell and Morrison (No. 78). A series in different coloured carbons by Messrs. Lutzel are very attractive. A selection of rather muddy land and water scapes (Nos. 74, 82, 83, 92, 93, and 94) on sepia platinum are probably intended by Mr. J. McGrove to illustrate the utmost extent of diffused treatment to which a lenticularly produced picture may be subjected. We are agreeably surprised to find how well the same gentleman can use a photographic objective in (No. 128) *Dinner Time*, a little child beating the dinner gong, a natural and amusing bit of humour. As examples of the printing process (silver and gelatino-chloride platinum toned), Mr. J. Kidson Taylor's four contributions are technically perfect, while pictorially he shows that the best definition is not inimical to artistic effect, his *Low Tide* (No. 88), *Gleam of Sunshine* (No. 91), *A Snug Berth* (No. 98), and *Welsh Farmyard* (No. 99), being among the best in the room. Mr. T. Birtles is represented by half a dozen interesting progressive views of the Manchester Ship Canal, and Mr. Herbert W. Hughes by a series (No. 106) representing life in *Coal Mines*. Mr. R. H. Lord has two studies, both inferior to *How's That? Good News* (No. 95) shows an old couple seated at tea, the wife placidly listening while the husband placidly reads a letter, presumably from an absent son. Both faces are singularly destitute of emotion, so that we must take Mr. Lord's word for it that the news is good. We should not have known it otherwise. Mr. Lord's other effort shows a schoolmaster rebuking (No. 116) *A Stupid Boy* for having made a mistake in his sums. Mr. E. B. Wain, with a rustic twilight scene (No. 102), spoils the poetry of it by introducing a boy with a round felt hat, but is entirely successful with a tender study of (No. 111) *Quiet Waters*. Mr. W. Thomas has a number of hand-camera studies of river life, &c., and which are as good as those Mr. Thomas usually turns out; and in Nos. 61, 129, 132, 304, and 310, Miss Emma Justine Farnworth shows variations in the posing of the female figure which betray great artistic skill and poetical insight, as well as sound photographic knowledge. Mr. R. Keene's *Interiors of Gwdyr Castle* (No. 136) are beautiful examples of this kind of work, and Mr. W. Snell Anderson's hand-camera studies (No. 135) would be difficult to beat. Mr. Karl Gregor has eight views (Nos. 147–150 and 159–162) of pastoral subjects, better if anything than those which gained him a medal last year, as several of them have more sparkle.

This is a "warm" corner of the room, as there are quite a number of pictures in red carbon, notable among them being Mr. G. W. Webster's *Jack*, portrait of Henry Talbot, Esq. (No. 153), a portrait of a little lad in an unaffected standing position, and with an equally natural expression of face, which so many photographers strive after and so few obtain. Messrs. Russell (No. 154), and Messrs. Byrne (No. 154), and Mr. Bullingham (No. 156), also show capital portrait work. There are some excellently rendered clouds in Mr. B. G. Wilkinson's *Blowing up for Rain* (No. 157), but there is no effect of wind, as given by trees, so we will take the title on trust. Of Mr. Cembrano's exhibits, we prefer his large carbon picture of *A Moorland Mill* (No. 167); but, in the *Evening Glow* (No. 168), the effect sought is very good. Nos. 173 to 179 are familiar Derwentwater scenes in platinum by Mr. Pellet; and Mr. Bernard Lintott (No. 183), shows creditable examples of the same kind of work. Mr. Sandland's *Animals at the Zoo* (Nos. 189 and 197) are always worth studying, but we do not like *Ring a Ring of Roses* (No. 190), by Mr. C. E. Whitaker. The children are playing the game in a village street, and consciousness of being photographed is reflected in each of their faces. Mr. R. L. Kidd's carbon enlargement (No. 193), *Evening*, a riverside study, is an admirable piece of work, and here, too, is a delightful portrait group by Mr. Mendelssohn (No. 202), *Mrs. Waterlow and Sisters*, a quite easy and unrestrained piece of grouping. *Worn Out* (No. 212), by the Rev. R. C. Macleod, is badly named; the old fellow it shows, notwithstanding his bleached locks and wrinkled face, is good for several years yet. In *Such a Treat* (No. 225) Mr. Fred Boissonas, delineates a series of instantaneous portraits of the same child—studies of expression taken in about fifteen minutes; and in (No. 226), *An Artist's Rise and Fall*, two children at play in full liberty, taken in about twenty minutes. As specimens of instantaneous work, and cleverness in catching the varying attitudes and expressions of children, the two series are notable, but the humour of them is not very clearly brought out.

Commendably good work is also contributed by Messrs. R. J. Fry, J. H. Avery, A. R. Dresser, A. J. Golding, T. C. Hepworth (a rugged but effective blacksmith's forge), J. N. Hignett (excellent landscape), T. M. Brownrigg (painstaking as usual), Bedford Lemere, G. T. Harris, and many others.

Messrs. Marion show a series of studies, by Mr. W. E. Downey, of artistically posed ladies, well printed in collotype; Mrs. Main, a collection of Alpine studies, taken just as Mrs. Main knows how to take them. As for the rest of the Exhibition, at this part of the room, which comprises prints other than those made by photo-mechanical means, we can only deal with it in the briefest possible manner for two reasons: 1. We have not much more space to spare this week. 2. Many of the pictures do not deserve any space at all, either here or on the Society's wall. We must, therefore, content ourselves with passing a word of praise to Mr. F. Hollyer for his admirable photographs of flowers applied to decorate the new lantern stand, which looks uncommonly like a pulpit; to Mr. W. H. Grove for three nice portraits of a lady; to Mr. E. D. Stern for an interesting picture of the Caravel "Santa Maria" leaving Santa Cruz on its way to New York; and to Mr. G. Renwick for some frost studies.

The final section of the Exhibition includes a colossal direct carbon portrait by Mr. A. Werner; some comparative tests of tele-photography, as against enlargement. by Mr. W K. Burton; a tele-photograph of the solar eclipse, by Mr. L. Malein; some balloon views of Philadelphia, by Mr. W. N. Jennings, taken with tele-photo lenses, and resulting in, perhaps, the finest balloon views we have seen; and reproductions after Holbein, by Mr. Hollyer. There is a vast but admirable carbon enlargement of the *West Front of Exeter Cathedral*, made from a quarter-plate hand-camera negative of Mr. Birt Acres', by Messrs. Elliott & Son, who also contribute one of the most interesting exhibits in the room (No. 334), *A Yacht Race*, a carbon enlargement in colour, the effect being obtained by a series of different printings in coloured carbon. The picture where it hangs looks like a water-colour drawing, and is exceedingly effective. Coloured carbon would be a dangerous rival to heliochromic processes for certain kinds of work, and we should think easier to control. Lastly, reference must be made to the exhibits of the Autotype Company, which, as usual, are very numerous, and well illustrate the excellence and the variety of the many methods of reproduction practised by the House. In addition to numerous carbon enlargements from negatives by Major Nott, F. Bayley, Mendelssohn, Harold Baker, and others, the Company are represented by three gravure reproductions from paintings, which, especially the *Newhaven Packet*, after Henry Moore, are extremely fine.

We shall deal with the lantern slides, &c., and several other matters

of interest connected with the Exhibition, next week, and in, for the present, closing this part of our notice it is our pleasing task, as was the case last year, to acknowledge the courtesy and readiness with which the Assistant Secretary, Mr. R. Child-Bayley, afforded ourselves and other members of the Press such information as was sought after.

Apparatus.

The "Number 2 Frena," exhibited by Messrs. R. & J. Beck, is in several respects a very decided improvement upon their former one. Like it, this one when charged contains forty cut films, but the size of these is larger, being quarter-plate, whereas the original is for lantern size. The mechanism, too, differs materially from that of the other, and is much more effective. Films and card-backings with notched edges are used, as in the "Frena No. 1," but they are all cut to an exactly identical shape. The alternating notches in the Frena pack, which are necessary to the working of the Frena system, are obtained by packing the consecutive films in opposite directions. These notches are so arranged that the films and cards can be placed upon each other so that they are exactly superimposed and the notches coincide, forming, as it were, a solid block of films and cards, with notched channels running through the entire block. When packed for use, however, every other film, together with its backing card, is reversed end for end, the notches being alternate, so as to form the Frena pack. If a non-actinic backing were applied to the film, which, we think, could very easily be done, nearly twice as many films might be stored in the camera, as the use of the interleaving cards would be done away with. There is a chamber at the back of the camera, into which the films are shot after exposure. In the new Frena all springs and ratchets are absent, and every element of uncertainty is removed. The focussing adjustment is ingenious. Assuming that the lens is one of five and a half inches focus, and that the focus is fixed for objects beyond twenty feet away, a few supplementary lenses are provided, which, when inserted in front of the principal one, shorten the focus in a very slight degree, by which objects within the twenty feet mentioned, even to only three feet, can be sharply represented by the insertion of a suitable lens. This system is much to be commended.

The same firm exhibits a negative store album, a cycle carrier, and a developing clip, this last permitting of a film being developed without wetting the fingers.

Holmes & Watson exhibit a portable optical lantern. In this a light metal casing fits over the limelight, and prevents all leakage of light. The space between the condenser and the objective is left uncovered. Lantern-slide printing frames are shown by Mr. C. S. Scott, and oil and water colours, for transparency painting, by Barnard & Son.

Four cameras, for studio, hand, and field, the last being an improved form of the well-known "Acme," are exhibited by T. P. Watson (Watson & Sons). This has its fittings made of aluminium. The others include the "Vanneck" and "Alpha" hand cameras.

Adams & Co. exhibit three cameras of the "hand" variety, together with one for lantern slides, a pantoscope with chromoscope attachment, aluminium view meter, and other apparatus. These, with the apparatus of Messrs. Watson, have only recently been fully described in these pages.

The Unilux Biunial lantern, by Archer & Sons, suggests two lanterns placed back to back, but having only one lime cylinder common to both, though each has its own gas jet playing on opposite sides of the cylinder. The light is directed on the screen by a rectangular prism or mirror placed at the outer end of each object-glass, in manner like to the lanterns of Beechy or Keevil.

The "Allendale" lantern is contributed by an anonymous exhibitor, and Mr. Thomas Samuels exhibits a changing back, in which the lifting frame is attached to the bag and draws right up.

In the "Psycho" camera of Mr. J. R. Gotz we have the rack and pinion of a spiral form, similar to those of many microscopes now in use. This greatly conduces to smoothness of action.

Lenses are exhibited by Swift & Son and Taylor, Taylor, & Hobson. These are locked up in show-cases.

THE DAILY PRESS ON THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The Daily News says:—"If the collection now arranged is not of more than average interest, there is plenty of work that is sufficiently important, either artistically or scientifically. Novelty is not a conspicuous feature, though it is noticeable that there is an increasing tendency amongst both landscape and figure photographers to make their productions as much like those of the painter as possible."

The Daily Telegraph says:—"Rarely has a more attractive show been held, the high pitch of perfection to which many of the works are brought giving visitors a first impression that they gaze upon delicately finished water colours or artistic crayons rather than products of the camera. Every branch of skilful development receives full representation, and where so much is delightful and clever the Judges must have found it a hard task to allot their favours."

The Morning Post says:—"The collection of photographs is a very fine one, and considerable care has been taken in their arrangement."

The Times says:—"The Photographic Society is not an artistic but rather a scientific society. Its principal aims are eminently to foster the researches of science in the advancement of the optical and chemical investigations which result in the triumphant discoveries with which photography from time to time startles the world; to encourage perfection in the instruments and apparatus employed; and to preserve the standard of perfect technique so necessary for the successful application of theory to practice. To the scientific photographer the terms perfect negative and perfect technique have absolute and definite meanings. Qualities such as clearness and brilliancy would appear to be essential. On the other hand, in the production of results which would appeal more strongly to the eye of an artist than the ordinary topographical view or commercial portrait, negatives would probably be used and methods employed which it would be the duty of a jury of scientific photographers to dismiss as imperfect. On the whole, it is a very good exhibition; the best, perhaps, that the Society has yet given us."

The Daily Chronicle says:—"The collection of photographs included every variety, and was of considerable interest."

FILM WORKING.

[London and Provincial Photographic Association.]

In introduction it may be remarked that the celluloid films of to-day are the outcome of various endeavours made from time to substitute as a support for the sensitive film something lighter than glass and less liable to breakage, and so to reduce the weight of the photographer's outfit. From its special suitability for the purpose, celluloid has come to be almost universally used as a support for the gelatine emulsion in the manufacture of negative films. That it is in all respects as perfect as glass for this purpose can hardly be contended; but it represents our present stage of advancement in this direction.

The exact composition of different makes of celluloid probably varies, but, broadly speaking, the sheet of celluloid as coated (the solvents employed having then evaporated) consists mainly of converted pyroxyline and camphor, both of which are inert to the chemicals used in photography.

It may here be noted, for the benefit of those persons who labour under the impression that all our photographic improvements come from abroad, that the two essential items in the celluloid film are the result of English research and invention, celluloid being due to the late Mr. Parkes, of Birmingham, and gelatino-bromide emulsion to the labour of English experimenters.

Among the principal advantages obtained by using films are the saving effected in weight and bulk—points of great importance, not only to the amateur travelling, but also to the professional photographer doing outdoor work of any kind. The gain on these points is very apparent in the case of magazine hand cameras, it being possible to carry so many more exposures. A comparison between the weight and bulk of films and plates respectively will illustrate this more freely. A gross of quarter-plates weighs thirteen and a half pounds, while the same quantity of films weighs two pounds one ounce; a gross of half-plates, thirty and a half pounds; films, four and a quarter pounds, in each case inclusive of packages. Again, a gross of plates packed will measure sixteen inches in height, while the same quantity of films measures only four inches; so you see, bulk for bulk, films take only a quarter the space, and weigh considerably less than a sixth of the same quantity of plates.

Other points of advantage which films possess are the non-liability to breakage, the small amount of room required for the storage of the negatives, and a lessened tendency to halation.

A considerable amount of want of confidence seems to exist in the minds of many who have tried to make their negatives on films

instead of glass in the early days of film photography; some of these defects were, doubtless, defects in the manufacture, due to want of experience in the use of a new material, while other, and perhaps the larger number of, failures were due to the fact that the manipulation which answered perfectly with glass plates required to be modified to some extent when using a material of such a different character.

The defects of manufacture have mostly been overcome by improved processes, and very little extra care is required to avoid the defects arising from errors in manipulation.

The question is frequently asked whether films keep as well as glass plates, and I have heard many condemnatory remarks concerning films in this respect, not at all justified by my own experience of them. An emulsion which keeps well when coated on glass will, so far as my observation goes, keep equally well on celluloid.

With regard to the suitability of the material, from a chemical point of view, to take the place of glass, I have already stated that the celluloid film is, when the solvents have evaporated, composed of substances which are photographically inert. We know this to be the case as regards the pyroxyline so long used as a vehicle in the wet-collodion process. With regard to the camphor, some of which undoubtedly remains in the film, and is supposed to tend to deterioration, with a view to set this matter at rest, I have made a few experiments, of which I now show you the results:—

No. 1 is a plate exposed as taken from the box, without being treated in any way.

No. 2 is a plate from the same box. A slab of camphor three inches squre had one face carefully scraped over a straight edge to make it as level as possible. This was pressed closely in contact with the emulsion side of the plate, and allowed to remain in this position for thirty-six hours.

No. 3 is also a plate from the same box. It was placed in a grooved box with a quantity of broken camphor, and left for thirty-six hours.

These plates were all exposed on the same subject, for the same time, and developed together in one dish, and there is no evidence of any effect produced by the camphor.

I have here also some negatives taken on films treated to ascertain the effect of pressure. A packet of six half-plate films in the paper envelopes only were placed in the ordinary letter-copying press, six pennies were laid singly on the package, and the press screwed down very tightly; after thirty-six hours the films were taken out, exposed, and developed, and, although the pressure was sufficient to cause a perfectly glossy circular mark on the face of the film, where the penny had rested, no difference is observable after development.

There is an idea prevalent in the minds of some that an emulsion coated on celluloid is less sensitive than when coated on glass. I frequently try films and glass plates coated with the same emulsion, and do not find this to be the case.

We now come to the question of exposure. Celluloid films may easily be exposed in ordinary dark slides by placing black cardboard of the same size at the back of the film to keep them flat and take the pressure of the spring. This method works well when the rebate of the slide is fairly wide; but, with narrow rebates, some difficulty arises, and film-carriers to hold the film are certainly more generally convenient. The films should slip quite loosely into the carrier, as, if they fit at all tightly, this causes a buckling of the film and there is also a danger of strippring the emulsion from the celluloid by the sharp edge of the metal grooving. Several patterns of film-carriers are in the market, and which, I dare say, are known to you. I have here one recently introduced by Messrs. B. J. Edwards & Co., which you will see is very simple and can be easily worked by following the directions printed on the back of the card.

In this way films can be worked very conveniently in ordinary slides; but, to gain the fullest measure of advantage from their use, slides specially designed for films should be used, as these can be made much lighter and less bulky.

Here is a dark slide specially designed for films, but which can also be used for plates. This, like the film-carrier I have just shown, is the invention of Mr. B. J. Edwards. It will hold two films or plates, and two of these slides take up about the same space as an ordinary wooden one, and weigh considerably less. The shutter is of xylonite, coloured black on one side and red on the other. Black outside indicates unexposed films or plates; this draws right out, and after exposure is replaced, red outwards, which not only shows at a glance exposed and unexposed films or plates, but the red side can be written on with lead pencil, and thus affords space to make memoranda in reference to exposure, &c. Afterwards the writing can be erased with a damp sponge or cloth.

The development of films may be conducted in the same way as plates if it is only required to do one at a time. It is, well, however, to have a full quantity of developer, and the use of a brush to ensure the absence of air bells is certainly to be recommended; but, even when developing them singly, films are less convenient to handle than glass plates, and, unless some contrivance is used to prevent them floating over one another, several cannot satisfactorily be developed at once. I have utilised for this purpose the metal frame of the film-carrier I have just shown, after giving it a coat of varnish. The films are simply slipped into the groove, without the card backing, in which they remain during the operations of developing, fixing, washing, and drying. The opening in the frame allows you to judge of density during development.

This is, however, somewhat of a makeshift contrivance, and I hope on a future occasion to be able to show you a more perfect holder which Mr. Edwards has recently designed.

In this way a film becomes as easy to manipulate as a glass plate, and several may be developed at the same time.

Developers.—With respect to the developers most suitable for films, it is best to use the developer with the peculiarities of which you are best acquainted; a developer suitable for plates will answer equally well for films.

Personally I have always given pyro and ammonia the premier position as regards the quality of the negatives obtained.

Pyro and soda has, to a considerable extent, superseded it of late years, but the pyro and soda-developing formulæ generally in use appear to me to give negatives lacking something of the quality obtained with pyro and ammonia.

In order to arrive, if possible, at a pyro and soda formula equal to pyro and ammonia, I have recently made a somewhat exhaustive series of trials, with varied proportions of soda and sulphite, in this developer, and have also tried various modifications of it. The following formula is the outcome of these trials, and I believe it to be decidedly superior to those generally in use. It is the only one I have employed that gives negatives quite equal to those developed with pyro and ammonia.

No. 1 Solution.

Pyrogallic acid	1 ounce.
Metabisulphite of potassium	1 „
Water	80 ounces.

No. 2 Solution.

Carbonate of soda (crystals)	12 ounces.
Water	80 „

No. 3 Solution.

Bromide of potassium	1 ounce.
Water	9 ounces.

To develop, mix equal parts of Nos. 1 and 2. For most purposes the addition of five minims of No. 3 to each ounce of the mixed developer is recommended (or one and a half ounces of No. 3 may be added to the eighty ounces of No. 2). For instantaneous exposures, where under-exposure is probable, the bromide may be omitted, and also for studio work. This point, as to the addition of bromide, must, in fact, be left to the discretion of the operator.

If the colour of negative given by this developer is not considered grey enough, a greyer image may be obtained by adding two ounces of sulphite of soda to the No. 2 solution.

Fixing.—Very little need be said on this point. If the film negatives are manipulated without holders, it is advisable to fix in a *deep* dish, and to see that the films are well under the surface of the solution, otherwise stains may result. An acid fixing bath may be used; a ready method of mixing this is to add two ounces of metabisulphite of potassium to each pound of hypo crystals. One ounce of the metabisulphite will answer, but I prefer the larger proportion.

Washing.—When a holder is not used, it is best, in placing the films in the washing tank, to place two back to back in one groove.

Drying.—After washing, they are best hung up to dry by means of spring clips; the clips answer very well. The method of hastening the drying of negatives by immersing them in alcohol must not be practised with film negatives, as the alcohol attacks the celluloid.

Varnishing.—It is certainly advisable to varnish the film negatives, and this can be readily accomplished by means of this varnish, which is specially prepared for the purpose. Some of the varnish is poured into a dish, and the film is immersed for one or two minutes, and then hung up for the varnish to dry and harden; no warming of the negative is required.

Cleaning the Varnish off a Negative.—Should the removal of the varnish from a varnished film negative be necessary for intensification or other purpose, this is best effected by soaking the negative in some of the varnish for five or ten minutes, rubbing the surface with a pledget of cotton-wool, and then well washing it under the tap.

W. H. Barnes.

THE PHOTOGRAPHIC CONGRESS AUXILIARY OF THE WORLD'S COLUMBIAN EXPOSITION.

THE following additional papers were read:—

PHOTOGRAPHY FOR ILLUSTRATING THE PRACTICE OF MEDICINE AND SURGERY IN A GREAT HOSPITAL.

WHEN the sturdy manhood of our forefathers led them to the declaration "that all men are created free and equal, with certain unalienable rights," they publicly recognised the brotherhood of the entire human race. They had unwavering faith in their belief and the justice of their cause. They established the broad principle of public right to do the greatest good to the greatest number. In their customs and declared principles they recognised the imperative law that the physical well-being of a people is an important factor in its progress; hence they made public provision for the treatment of public disease, and their descendants, imbued with the broad classification of public good in private welfare, have nobly extended the principle of public treatment to private ills. This principle has made it possible to establish and maintain great hospitals at public expense, and has engendered that wide-spread feeling of philanthropy which leads to the ample endowment of the many noble institutions, almost yearly added to the list, for the better treatment of those not blessed with the requisite means for home treatment. In each of these great gatherings of human pain, and its large staff of skilled practitioners of the healing arts, are found opportunities never seen in private practice, and, until the discovery of that universal panacea with which the ancients hoped to effect a cure for all the ills of life, there will be cause for study and comparison in the treatment of disease in its almost innumerable varieties.

What affects one member of a family may affect all. A neglected ill may engender a pestilence. A deed for the relief of a single individual may effect the delivery of a whole people from impending calamity. That which first attacks the lowest and weakest often pulls down the highest and strongest. Disease is a condition in the life of every individual. That knowledge is the forerunner of power, and that the best lessons for our guidance in the future are learned by a careful study of the past, are as true now as when first promulgated. When the facilities for communication have become so vast that the history of yesterday is read on the printed page of to-day, and the means of recording facts are so simple, our followers may reasonably expect to find help in the record of our work. From long observation it is known that certain ills are almost sure to follow certain modes of life. Natural traits are found to produce certain deformities and diseases. Many proofs soon change an hypothesis to a well-established fact. A properly illustrated record of the facts thus established is of great value in the treatment of future cases of like character. The advantages and disadvantages of methods of treatment are clearly indicated. Mistakes and successes are readily recognised. The what, how, and why of certain lines of treatment are plainly shown. Shall they be followed, modified, or discarded, are the questions with which the succeeding practitioner has to deal, and, in order that he may be successful, the word and picture record should be correct even in the most minute detail.

Hasty sketches are not sufficient for such purpose. The importance of the subject demands the use of the best means available, and to this work photography is most admirably suited. Photography gives correct location, form, and size, with an amount of detail otherwise unattainable. No human hand can rival the work done by actinic light and the lens. In cases requiring colour for their proper representation, that element can be added by hand and the printing-press, as seen in many recent works. In the early days of photographic work at Bellevue Hospital more than a quarter of a century ago, only the most marked or prominent deformities, dislocations, tumours, and operations were illustrated in the photographical department.

As each succeeding year made the work more widely known, and its importance as an auxiliary in the treatment of disease received more general recognition, the field of operation rapidly extended. At first the members of the staff having in charge the surgical wards were the only ones calling to their service the assistance of photography. Their cases before, during, and after treatment were so successfully illustrated, that the members having in charge the medical wards soon began the illustration of their prominent cases. Skin diseases, changes in outline and enlargements of various members of the body, position and expression, resulting from derangement of the nervous system, the effects produced by stimulants and various exciting causes, were added to the list passing through the photographical department. Outline drawings in crayon, charcoal, or other easy removable pigment are made upon the skin of the patient, for the purpose of showing in the photograph the exact location, extent, and so forth of the internal disease under treatment. By placing in front of the nude or partially nude patient especially constructed wire screens, with fixed scales reading both horizontally and perpendicularly, it is quite possible to record changes of outline by inhalation and exhalation, and peculiarities of posture occasioned by certain diseases or modes of treatment. In much of this work very rapid plates and instantaneous exposures are required. After long experience in ordinary and general photographic work, and twenty-five years of continus hospital service, it has been found that, in order to treat all this great variety successfully, certain conditions and appliances not seen in ordinary photographic establishments are necessary. These have, as far as possible, been supplied and utilised at Bellevue. The operating or exposure-room is on the seventh floor of the central or administrative portion of the main building, and is easy of access by elevator from all parts. The walls of this room are about eight feet high, and painted a light grey without gloss.

The floor is covered with heavy cork-surfaced cloth, painted light slate colour, also without gloss. The operating window reaches from the floor up the north wall of the room and across the entire top to the south wall. The angle of inclination is with that of the roof and just enough to shed water. It is situated just below the great dome of the amphitheatre, which protects it from direct sunlight most of the day. The glazing of the window is plain clear glass. All necessary controlling in direction and amount of light is done by curtains, screens, and reflectors of cloth, paper, and glass. The heating and ventilation of this room is as perfect as possible, and so arranged as to be under ready and complete control of the operator. Neither a broiling nor freezing atmosphere are conducive to the successful photographic treatment of living matter. Upon a low platform, mounted on castors, is placed a rotating disc, which carries the operating chair. This arrangement admits the patients being moved in any direction without leaving their first position. Reclining chairs, couches, and tables in necessary number are ready for use. Special rests for hands, arms, feet, and various parts of the body are easy of access. Plate-glass tanks for photographing under water or other fluids are at hand. The photographic apparatus is of the best procurable, and ample in variety for all sizes, from microscopic to full size of the human figure. What is best for one class of illustration may be almost valueless for another. A series of quick-acting lenses, provided with adjustable exposure or "shutter" appliances, prove to be of paramount importance. All the exposures in the department are made by this means. Many patients are in almost constant pain, and more sensitive to surrounding influence than those in health. Hence the temperature of the room should be well regulated, and as little time occupied in their treatment as is consistent without apparent haste. The cameras are easy to adjust, and modifications can be quickly made to suit the case in hand. Several dozen double plateholders are kept filled with various sizes used. These are stored in a case near the camera. The backgrounds, of various shades, are mounted on self-acting spring rollers, carried on a frame so arranged as to be easily placed where desired.

In the illustration of important cases before a class or when a large number of assistants are required, either the large square operating-room or the amphitheatre are utilised. In the first-named the operating window in the north wall is thirteen feet high and eighteen feet wide, while in the latter the light is from a top window twenty feet square, and a side window ten by fifteen feet. Among the articles less frequently found in photographic workrooms, but which are almost indispensable in a practice like that at Bellevue, are the electric-signal clock, which never allows the workman to forget his duty at a prearranged time, and the mechanical motor in the chemical room can be implicitly trusted to keep the developing pans in constant motion during any chosen length of time less than two hours. The tentative method in development with a liberal use of ice in warm weather is practised. Most of the exposures are on subjects which will not admit any risk in result, as the conditions are often greatly changed soon after the patient leaves the photographical department. Some capital operation or treatment may make the appearance quite dissimilar. The developing-room is so constructed that natural or artificial light may be used, or, if necessary, it can in fifteen seconds be made totally dark, and yet permit free entrance and exit while work is being done, while it can by the large door and window be as freely opened, in a moment, to air and view, as any other room in the series. The entire surface of this room —floor, walls, and ceiling—together with all the fixtures in it, are painted a dark tint of "Indian red," which effectually prevents the reflection of actinic light, in case such should by mistake be admitted from outside, or the artificial illuminants used. The other workrooms are a general shop

with benches, lathes, and mechanical appliances for the repair and construction of the many special devices found necessary in practice. The printing, mounting, and finishing-room on the south side of the dome contains such apparatus and furniture as is usually found in like places. One peculiarity of the printing-room is a sliding window four feet by six feet, put in flush with the wall. This window is so arranged that the ordinary sash can be slid away, leaving a clear opening of four feet by six feet. In cold, or windy, stormy weather a single plate of glass is slid into the space usually occupied by the ordinary sash. For direct sunlight effects, or for reflecting light into deep cavities, this window is convenient. As the photographical rooms are all situated in the highest part of the building, the light is not obscured by any surrounding objects, a distant horizon is seen in all directions. O. G. Mason.

(To be continued.)

PHOTO-MECHANICAL PROCESSES IN ENGLAND—HALF-TONE BLOCKS FOR TYPE PRINTING.

To England must be given the honour of being the home of photo-mechanical photography, and a casual glance at the publications using photo blocks will show that good use is made of such productions. The gauze used by Fox Talbot in 1854 has given way to perfect ruled screens, which, as a general rule, are made in America.

The old wet-collodion process has no rival for the production of the grained negatives, and at present there is little chance of having any. The prints on the metal are usually made in bitumen, some operators using bichromated albumen, especially in dull weather; but this requires great skill both in the preparation of the film free from dust, as well as in the subsequent rolling up with a sufficiently strong ink resist. Printing the ink image on prepared paper and subsequently transferring to metal is also practised, but this method requires great lithographic experience to get a good image. The metal used is generally zinc, but some firms use copper.

Line Blocks for Type Printing.

This branch of photo-mechanical work is nearly all done by the etching process, the swelled gelatine method being worked by one firm only, who, however, turn out splendid results. The wet-collodion process is here paramount for making negatives, the silvered mirror being used to get the necessary reversal, one or two films only adhering to the method of turning the plate in the dark slide, stripping the film is very seldom practised; when a number of small images are to be put on one sheet of metal, separate exposures are made, the metal plate being resensitised for each print.

Line blocks are produced very cheaply, but there is a constant demand for them; hence they pay in spite of the low price; they are used by the square yard in halfpenny papers as well as in very high-class ones.

Photo-Lithography in Line.

Photo-litho transfers are getting into very general use all over the country; firms who a few years ago would not hear of such a thing are now using large numbers of them; but there is one drawback in the difficulty in obtaining good transfers, so few operators know, or will be told, how important it is to keep the ink spare instead of thick, especially in fine work.

The best method of inking up these transfers is to use a glue roller charged with transfer ink thinned with turpentine, a method which I had the honour of first introducing; and, as it is simple, easy, and efficient, some operators prefer to use the old and clumsy methods of rubbing over the ink with a sponge, or else ink up a stone, place the exposed print upon it, and pull through the press; the sponge method yields heavy and uneven transfers, the inked stone gives rotten lines and dirty whites.

In chromo-lithography, photo transfers are much used when different sizes of one subject are required; then one drawing or set of stones only are prepared; then from each stone a black pull is taken; this is photographed, put on the stone and printed.

Photo-Lithography in Half-Tone.

This process is not very extensively practised; but, where it is, very fine work is produced; the best work is done by transfer from a collographic plate, the necessary grain being obtained by using either ferrocyanide of potassium, or calcium chloride, or both.

Collotype.

This process has been very extensively taken up within the last three years, but there are only about four firms who turn out really good work, simply because the process is starved in initial stage, viz., the negative; money is lavished on machinery, &c., good wages are paid to platemakers and printers, but any one is considered capable of making a dry-plate negative; now and again by a fluke a good collotype is turned out, but as for ninety per cent. it is stale, flat, and unprofitable.

This process is essentially a photographer's process, and only those who are capable of constantly making good negatives can ensure good collotype prints; the process is simplicity itself, given a good negative, but not without.

Photogravure.

England was a short time back very backward with this process, simply because of the difficulty of getting men capable of producing the prints from the intaglio plates; now, thanks to the pluck and enterprise of firms like Annan & Swan (London), English photogravure prints hold their own in comparison with any.

Some firms use the Talbot-Klic process, in which the grain is obtained by dusting with finely powdered resin, the resist being a carbon negative, *i.e.*, a pigmented gelatine print from a transparent positive, mounted upon the copper plate and developed thereon.

Other firms use the method of dusting over a gelatine image with resin in fine powder, and when the image is dry obtain the grain by dissolving out the resin, and then obtain an intaglio plate by electrolysis.

Others, again, prepare gelatine films with plumbago, &c., of varying degrees of coarseness, which, when exposed to light and developed, yield a granular-surfaced image, from which, by the electrotype process, a printing plate can be obtained in copper or steel.

Taken altogether, England has no cause to be ashamed of her photo-mechanical work, and it does not require any great stretch of imagination to say that in the future this satisfaction will be maintained.

W. T. Wilkinson.

FRILLING.

During very hot weather there may be expected complaints of the frilling of gelatine negatives. Some years ago this was by no means an infrequent occurrence; possibly improvements in manufacture, and a series of average summers, have had something—a good deal, in fact—to do with an almost total cessation of grumblings on this ground. But such things are still possible, and it is well to consider what is the best thing to do in the event arising of a necessity to guard against a series of "frillings."

Personally, I don't think plates are so liable to frill as they were in the days of, well, seventy-nines and eighties, but I have had painful experience lately that the thing is by no means to be disregarded.

Although a "water famine" is not without the bounds of practical possibilities, still we may suggest, to start with, the advisability of using the aqueous fluid in as frigid a state as possible. Ice is obtainable, and the professional will, no doubt, take care that the developers are kept at the proper temperatures by the use of either ice or a freezing mixture.

On page 461 of the volume of this Journal for 1881 will be found some observations by an anonymous contributor, which, though scarcely applicable to the workers of to-day, still throw light upon a subject which at that period was of considerable interest. We read that "there are two causes of frilling caused by gelatine—one where a large amount of hard gelatine is employed in making emulsion, the other is where a *very* soft gelatine is used." The latter-day worker, although he doesn't make his own plates, may still appreciate the significance of the above extract. Again, "Hard gelatine frills on account of its rapid expansion when moistened on one side only." Causes of frilling are mentioned as follows, which are not entirely due to the gelatine, viz., "imperfect elimination of the soluble salts"—*i.e.* in making the emulsion; "the imperfect drying of the plates;" "by decomposition being set up in the negative by imperfect washing between the applications of the alum and hypo baths, or *vice versâ*, thereby liberating gases;" lastly, in "the changes of temperature in developing, washing, and fixing solutions." "If a plate which has frilling tendencies be removed from a cold solution to a warmer, the chances of frilling are increased; yet you may allow a plate to remain in the colder solution till it becomes considerably warmer, so long as the change be gradual, without frilling taking place."

We have no longer anything to do with the manufacture of dry plates, therefore our interest will lie naturally with the above concluding quotation only. It is well worth considering, and amounts to this, that we have only to keep our developers and fixing baths at normal temperatures in order to escape the bugbear of frilling. The manufacturers may be given credit, no doubt, for a great deal in the way of immunity from this trouble experienced during past years,

but we can't be too sure, and, of course, our first endeavour should be to use, if requisite, ice or freezing mixtures for the purpose of ensuring "equable temperatures."

Chrome alum in solution, two ounces to a gallon of water, may be effectively used *after* developing, and prior to fixing, to prevent frilling. Chrome alum is cheap, and a little of it goes a long way. I recommend this to be used during the "dog days."

The strength of the "fixing bath" is of importance, *vide* "Editorial," THE BRITISH JOURNAL OF PHOTOGRAPHY, 1883, page 353. "By the use of a weak fixing bath, or by allowing the negative to drain an hour or two after being fixed in a strong bath, a constant source of trouble and worry (frilling) is greatly reduced, if not entirely removed."

A point worth mentioning is, the advisability of using a freshly prepared hypo bath; this will naturally be, if fresh, *cold*. I have on many occasions made a fresh bath in a large dish, and used it as a "cooler" for the developing tray, allowing the latter, an ebonite tray, to float upon the, in this case, freezing mixture, care being taken of course to avoid any risk of contact. The deep ebonite dishes are the best to use.

If the developer, preferably pyro-sulphite and ammonia, or pyro-glycerine and ammonia, or amidol, be used properly reduced in temperature, followed by a freshly prepared, therefore cold, hypo bath, then a bath of chrome alum, one in fifty, may be used for five minutes or so, finally washing in water, not prolonged either, the alum acting somewhat as a hypo eliminator. This method may be reckoned on to prevent frilling.

A suggestion of Captain Abney's, viz., a preliminary coating with plain collodion, should not be forgotten. I have used collodion many times with success when having a batch of plates showing a tendency to frill, as also an application of grease, rubber solution, varnish, or wax, to the edges of the plate previous to developing.

"Frilling," on a wholesale scale, would be a serious matter for the professional, but can, with care, be prevented. It is to the amateur and student sometimes an interesting occurrence. If a film starts to "frill," *encourage* it to do so, and, with a camel's-hair brush, remove it altogether from the glass; transfer to clean water, thence to a larger piece of glass, and allow it to dry, which it does sometimes on a larger scale than before. The application of methylated spirit quickly puts a stop to an incipient "frill." And here, finally, I may remark, with reference to the possibilities of a water famine mentioned before, that frilling having hitherto been always associated with water, would it not be possible to initiate a method of developing and fixing in which "spirits" might take a more important part? Total abstinence doesn't suit every one, and may not be quite the best thing in hot weather for gelatine dry plates.

While on this subject, it may be well to mention a few simple methods of *cooling* solutions. Of course where ice is obtainable, a few lumps of this will be found the best to use, a small piece being immersed bodily into the developer. In the absence of this, I have found nothing better, working in a small way, than to make a freezing compound. Fill a test-tube, cork the same, and carefully cleanse the outside, and place the tube in the mixed developer, using a mixture of sulphate of soda and hydrochloric acid in the proportion of eight parts soda to five of acid. I have in this way frequently lowered the temperature of the developer ten degrees in about four minutes. For cooling larger quantities of fluid, I put the acid and soda into one of the thin glass beakers sold in various sizes by many chemists; pyro bottles may also be used for this purpose. I have suggested soda sulphate, and acid, these being very cheap chemicals. In a retail list at hand I find the former (Glauber salts) quoted at 1*d*. per pound, the latter (common spirits of salts) at 2*d*.—prices reasonable enough.

A freshly made (with cold water) hypo bath is well known to be some degrees below the normal temperature. I have, therefore, utilised this fact, by making a fresh solution in a large glass-bottomed tray, a piece of plate glass to cover this being used as a developing bench. Every little incident of this kind tends to coolness, and is therefore not to be despised. A marked difference is noticed, too, where the bottles, &c., of solutions are kept on a shelf where they are exposed to a good draught of air.

It will not be passed over by readers of a valuable paper lately, *On the Washing of Prints*, that something similar will apply to *gelatine negatives suspended* vertically in water; a negative will, without an inordinate quantity of water, and without agitation or prolonged immersion, become quite sufficiently washed, the process being much assisted (*i.e.*, for getting *clean* negatives) by the application of a wet pledget of wool carefully rubbed over the surface. Far more water is used than is necessary for the perfect washing of negatives, and as it is easier to cool a small bulk of water than a large one, if frilling is feared the fact may be borne in mind.

J. PIKE.

News and Notes.

NORTHERN PHOTOGRAPHIC AND SCIENTIFIC ASSOCIATION.—September 30, Hyde Park.

PUTNEY PHOTOGRAPHIC SOCIETY.—October 2, Introductory Meeting at 116, Upper Richmond-road.

STANLEY SHOW.—The apparatus section this year is to be in the main gallery, whilst the pictures will be hung in the Arcade Gallery as before. Several firms have already secured space.

ERRATUM.—In Mr. Driffield's paper, published last week, the symbol "C.M.S." (candle-metre-second) was converted into "cm." The author's meaning, however, will doubtless be understood.

MESSRS. ADAMSON & SON, of Rothesay, have sent us two most interesting views of Rothesay illuminated on the occasion of a *fête*. One of them contains rockets bursting, showing their path through the air with singular distinctness.

EMERY'S DRY PLATE VARNISH.—Mr. W. Emery, of 24, South-street, Baker-street, has sent us a sample of his Premier Dry Plate Varnish. It is applied to negatives after the latter are warmed, dries quickly, and answers well for the purpose.

MR. H. B. CONSTABLE, who for some time has performed the duties appertaining to the Secretaryship of the Lewes Photographic Society, has resigned that post in consequence of his leaving the town. All communications should be sent to G. Carpenter, 81, High-street, Lewes.

LEYTONSTONE CAMERA CLUB.—September 30, Sewardstone and the Valley of the Lea. Leader, Mr. G. H. Cricks. The Club will proceed by the train leaving Liverpool-street, G.E.R., calling at Stratford at thirty-six minutes past two, arriving at Chingford at one minute past three. Open Social Evening at Headquarters at eight o'clock.

KEEPING PROPERTIES OF COLLODIO-BROMIDE PLATES.—We have received from Mr. H. R. Robertson, Wavertree, two prints which interest us as showing the keeping qualities of collodio-bromide plates. The negative was taken last month on a stereoscopic plate prepared by Mr. Maudsley, of the Liverpool Dry Plate Company, in June, 1870. The prints are perfect.

WHEELER'S "MANCUNIUM" MOUNTS AND RECORDING NEGATIVE ENVELOPES.—Messrs. George Wheeler & Co., of Manchester, are bringing out two specialities which should be useful to amateurs. The "Mancunium" mount is a species of duplex mount made so that the unmounted print may be easily slipped into its proper position. It is a very handy form of mount. The "Recording" envelopes have spaces on their faces for inserting details as to exposure, &c.

THE late Mr. W. H. Morley, whose death we announced last week as having taken place at his residence, The Shrubbery, East Finchley, on the 19th inst., was born in the year 1818, and was thus in his seventy-fifth year. He commenced business in Upper-street, Islington, in 1843, and was assisted by his son, Mr. W. Morley (the founder of the music publishing business in Regent-street), from 1866 to 1882. In 1886 Mr. Morley's son-in-law, Mr. Henry Cooper, became his partner, and, through Mr. Morley's failing health, has practically had the sole management for some years. We understand that the photographic business in Upper-street will in future be carried on entirely by Mr. Cooper, under the style of Morley & Cooper.

HACKNEY PHOTOGRAPHIC SOCIETY'S EXHIBITION, MORLEY HALL.—Arrangements: Open at 7.30, Tuesday, October 17. Judges, Lieut.-Col. Gale, F. P. Cembrano, W. E. Debenham. Results of awards known at opening. Orchestral performance by string band. Wednesday, 18, open at twelve midday. Distribution of awards by Captain Abney at eight. Orchestral performance. Thursday, 19, open at twelve midday. Organ performances by Messrs. S. Moore and W. Fenton-Jones (Hon. Sec.). Lantern slides through lantern. Will exhibitors please note that last day for receiving forms is September 30, and that we have still a little space left for trade apparatus, for the best of which a silver medal is awarded? Messrs. Marion, Platte & Witte, Fuerst, Wray, and others, are exhibiting. Arrangements for October, 1893:—3, *Lenses*, by Mr. E. Wall. 10, *My Italian Campaign*, lantern lecture; an account of my trip *viâ* France and Switzerland, by Mr. W. F. Fenton-Jones. (Ladies' Night.) This lecture will be given in the Drill Hall, entrance through Club premises. Owing to extreme length, it will be necessary to commence punctually at eight p.m. 17, 18, 19, Annual Exhibition at Morley Hall. Prize distribution on 18 by Captain Abney. Lantern on 19. 24, Open Night. 31, *Paget Printing-out Processes*, by Mr. S. H. Fry. Albumen, Emulsions on Opal, Colour, Gradation, Tone, Surface, Permanency, Combined *versus* Single Baths Demonstrations, &c. Important Exhibition Notice. Members are requested to note that, with respect to the condition on "Exhibiting," attendances count from date of last Exhibition, not from the Annual Meeting.

THE South London Photographic Society's Fifth Annual Exhibition will be held at the Peckham Public Hall, Rye-lane, Peckham, S.E., on Tuesday, Wednesday, Thursday, Friday, and Saturday, November 7–11, 1893. The following classes are open to members only:—A. Portraiture and figure study, including animals. B. Architecture. C. Landscape and seascape, above half-plate. D. Landscape and seascape, half-plate and under. E. Enlargements. F. Lantern slides. Medals will be given in the above classes according to the number of competitors and the quality of the work. In addition a silver medal will be given for general excellence. Open classes:—G. Pictures which have previously received an award. H. Pictures not previously medalled. I. Lantern slides which have previously received an awards K. Lantern slides not previously medalled. The silver and bronze medal

competed for in the above classes will be awarded at the discretion of the Judges. Entry forms and further information respecting the Exhibition can be obtained from Charles H. Oakden, Hon. Secretary, 51, Melbourne-grove, East Dulwich, S.E.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 17,685.—"Improvements in or relating to Photographic Shutters." Complete specification. J. T. CLARKE.—*Dated September* 20, 1893.

No. 17,701.—"An Improved Adjustable Limelight Burner for Magic Lanterns and similar purposes." A. C. JACKSON and H. L. TOMS.—*Dated September* 20, 1893.

No. 17,702.—"Improvements in Photographic Camera Stands." E. BISHOP.—*Dated September* 20, 1893.

No. 17,816.—"An Improved Limelight Apparatus and Saturator for use in connexion with Biunial, Side-by-side, and other Optical Lanterns." Complete specification. J. RILEY and W. LAWSON.—*Dated September* 22, 1893.

No. 17,875.—"Improvements in Photographic Shutter Mechanism." C. HASELER and C. E. HASELER.—*Dated September* 23, 1893.

No. 17,913.—"Improvements in Screen Stands for Magic Lanterns and Dissolving View Apparatus." J. PEPPER.—*Dated September* 23, 1893

SPECIFICATION PUBLISHED.

1892.

No. 19,251.—"Photographic Cameras." MICKLEWOOD.

PATENTS COMPLETED.

IMPROVEMENTS IN AND APPARATUS FOR THE PRODUCTION OF OXYGEN AND NITROGEN FROM ATMOSPHERIC AIR.

No. 19,078. LEONARD CHAPMAN, 232, Camberwell New-road, Surrey. *August* 26, 1893.

THE object of my invention is to provide means whereby oxygen and nitrogen can be obtained from atmospheric air by a continuous process, avoiding the waste of oxygen which takes place when the operation is carried on intermittently as hitherto, and ensuring a product of greater purity. According to my invention, I provide a pair or a series of vessels or chambers in which the material by which oxygen is absorbed, and from which it is liberated, is contained in a liquid form, or suspended in a liquid, the said material, after it has been peroxidised by absorbing oxygen from the atmospheric air supplied thereto, being caused to pass into the vessel in which the deoxidising takes place, and afterwards to pass back again to the preceding vessel to again be peroxidised. The apparatus, in which my invention may be carried into practical effect, consists, in its simple form, of two vessels which communicate with each other by passages in such manner that a circulation of the material throughout the two vessels is obtained. The communications consist preferably of pipes, which ascend centrally from the bottom of the vessel, and open at top below the level of the liquid therein, the lower ends of the pipes communicating each with the other of the vessels.

An equal pressure above the material in the said vessels can be maintained by means of suitably weighted outlet valves, that of the peroxidising vessel leading to the open air, or to the place where nitrogen or unabsorbed gas or gases is or are to be stored or employed, and that of the deoxidising vessel leading to the condenser or separator, and to the place of storage of the oxygen. A current or circulation of the oxygen-absorbent material is maintained throughout the two vessels, that from the peroxidising vessel, after having absorbed oxygen from the air which is caused to pass therethrough, descends the central pipe and passes into the deoxidising vessel, in which the oxygen is withdrawn or liberated from it by the aid of steam, and then the material flows down the central pipe of the deoxidising vessel, and passes back into the peroxidising vessel, to again absorb oxygen, and this is continuous whilst the apparatus is at work. In order to control the speed of movement of the material, I may use controlling valves to render the movement slower. To hasten the movement, I employ either an injector arrangement for air for the passage between the upper part of the deoxidising vessel and the lower part of the peroxidising vessel, or an injector arrangement for steam for the passage between the upper part of the peroxidising and the lower part of the deoxidising vessel, or I use both such injector arrangements together.

The air and steam used in the said injector arrangements can, in whole or in part, be the air which is used for peroxidising and the steam which is used for deoxidising.

The inlets for air and for steam may be provided with automatic pressure regulating valves.

The vessels are heated by any suitable means, such as by an external furnace or furnaces, and the oxygen-absorbent material may be of any suitable character which will pass from vessel to vessel as described. The two vessels may be heated to the same or to different temperatures.

Although I have named two vessels in the foregoing description, I may conduct the process in a series of any suitable number, having communications from the one to the other for the purpose described.

IMPROVEMENTS IN AND IN CONNEXION WITH PHOTOGRAPHIC CAMERAS.

No. 19,251. EDMUND HAWTHORN MICKLEWOOD, 5, St. Michael's-terrace, Plymouth, Devonshire.—*September* 2, 1893.

MY invention relates to a means of exposing sensitive plates or films in a photographic camera so as to give a due ratio or balance of exposure to all parts, and refers to the invention described in the specification of my Patent No. 9042, dated May 28, 1891. In that invention I effected the desired result by means of a rising and falling shutter in combination with a dark chamber between the lens and the shutter. I now simplify the mechanical details, and produce the same result by having the shutter, still in combination with the said dark chamber, but with a motion in one direction only, under which condition the result may be attained in either of the following methods.

1. The opening in the shutter, which, by passing vertically across front of dark chamber, effects the exposure, may move at a uniform speed, but the actuating mechanism to be so connected with an iris diaphragm on the lens, that the several parts of the sensitive surface shall receive the desired variation of exposure by the expansion or contraction of the diaphragmatic opening.

2. The said opening in the shutter is so controlled by suitable mechanism, that its motion across the exposing aperture shall be one of uniformly accelerated or retarded speed, according as its passage is in an upward or downward direction.

The above result may be attained or enhanced by combining with the actuating mechanism a brake which comes into action during the slow part of the motion only, or allows a graduated speed by a graduated degree of friction.

The slot in the shutter may pass in front of opening of chamber in a horizontal direction at a uniform speed, and the graduation of exposure may be attained by having the slot of a V shape, whereby the wider part exposes the foreground and the narrower part the sky.

It will be apparent from the optical considerations involved that the dark chamber may be formed before or behind the lens, the motion of the shutter being reversed in the latter case on account of the crossing of the rays of light after passing through the lens.

In every case the combination of the dark chamber with the moving shutter at opposite end thereof to the lens is essential, for reasons fully set forth in the specification of my Patent, No. 9042, of 1891.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 2	Camera Club	Charing Cross-road, W.C.
,, 2	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 2	Peterborough	Museum, Minster Precincts.
,, 2	Richmond	Greyhound Hotel, Richmond.
,, 2	South Loudon	Hanover Hall, Hanover-park, S.E.
,, 2	Stereoscopic Club	Brooklands Hotel, Brooklands.
,, 3	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 3	Bolton Photo. Society	10, Rushton-street, Bolton.
,, 3	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 3	Exeter	City Chambers, Gandy-st., Exeter.
,, 3	Hackney	206, Mare-street, Hackney.
,, 3	Herefordshire (Annual)	Mansion House, Hereford.
,, 3	Keighley and District	Mechanics' Institute, North-street.
,, 3	Lewes	Fitzroy Library, High-st., Lewes.
,, 3	North London	Canonbury Tower, Islington, N.
,, 3	Oxford Photo. Society (Annual)	Society's Rooms, 136, High-street.
,, 3	Paisley	9, Ganze-street, Paisley.
,, 3	Rotherham (Annual)	5, Frederick-street, Rotherham.
,, 3	Sheffield Photo. Society (An.)	Masonic Hall, Surrey-street.
,, 3	York	Victoria Hall, Goodramgate, York.
,, 4	Edinburgh Photo. Society	38, Castle-street, Edinburgh.
,, 4	Leytonstone	The Assembly Rooms, High-road.
,, 4	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 4	Southport	The Studio, 15, Cambridge-arcade.
,, 4	Southsea	3, King's-road, Southsea.
,, 4	Wallasey	Egremont Institute, Egremont.
,, 5	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 5	Camera Club	Charing Cross-road, W.C.
,, 5	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 5	Glossop Dale	
,, 5	Hull	71, Prospect-street, Hull.
,, 5	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 5	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 5	Oldham	The Lyceum, Union-street, Oldham.
,, 5	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
,, 6	Cardiff	
,, 6	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 6	Holborn	
,, 6	Leamington	Trinity Church Room, Morton-st.
,, 6	Maidstone	"The Palace," Maidstone.
,, 7	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

SEPTEMBER 26,—Technical Meeting.—The apparatus on view at the Exhibition was explained, several of the exhibitors being present for that purpose. Most of the exhibits will be found described either in back numbers of the JOURNAL or in our notice of the Apparatus Section of the Exhibition.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 21, Mr. Thomas Bedding in the chair.

Mr. P. R. SALMON was unanimously elected a member.

The HON. SECRETARY drew attention to the dinner of members of affiliated Societies to be held at the Frascati Restaurant on Friday, October 13. The tickets (6*s.* each) may be obtained from hon. secretaries of those Societies.

FILM-WORKING.

Mr. W. H. BARNES read a paper on this subject [see page 623].

In the course of a discussion that followed, the Chairman said that he had recently been using a few films, the remainder of a batch he had employed about eighteen months ago, and could not detect any degradation of quality. As to the drying of films, where only a few were used, he thought it a good plan to place their backs in contact with plain sheets of glass, and place them sideways against the wall, in the same manner as glass plates. He had found some films had a greater tendency to curl than others, so that a much greater depth of fixing or other solution was necessary to cover them.

Mr. BARNES showed a reversed negative taken through the back of the film, in which there was no perceptible loss of sharpness.

Mr. W. E. DEBENHAM commented on Mr. Barnes' statement that pyro-ammonia gave greater distinctness between the high lights and the lights that came next to them, and said that, if it were so, it would be contrary to Messrs. Hurter & Driffield's contention.

Mr. B. J. EDWARDS said his experience was that there was no developer that would give the difference between the high lights and the next highest lights so well as pyro-ammonia. Photographing a white patch against black velvet, different developers would give a difference in the amount of detail. A large excess of carbonate of soda would give the high lights black compared with a dilute developer.

Mr. J. S. TEAPE, speaking of the use of cut films, said he had not had much experience of them, but what he had had, did not give him much confidence in them.

Mr. T. E. FRESHWATER said that films had had an advantage in weight when it was desired to send them from place to place.

Mr. BARNES said that, as regards films not being as reliable as plates, they would be found better as the manufacture of them improved.

Mr. A. MACKIE thought that the advantages of films ended with development.

The CHAIRMAN said there were occasional difficulties in the manipulation of film negatives as compared with glass, and instanced the fact that that day he was making some stereoscopic transparencies by copying, and, desiring to use some film negatives, could not do so on account of the carrier not being adapted for them.

Mr. EDWARDS pointed out a particular advantage of always varnishing film negatives, as minute surface scratches on the film would be got rid of.

After other discussion the meeting terminated with a vote of thanks to Mr. Barnes.

North London Photographic Society.—September 19, Mr. Douglas in the chair.—Experiments were made in the development of Nikko paper, the members bringing the developers preferred by them respectively in working bromide papers. The best and very similar results were obtained by the use of eikonogen and metol, only half the exposure being given when metol was used as the developer. The following formulæ were liked best:—*Eikonogen Developer:* Eikonogen, 4 grains; sulphite of soda, 16 grains; carbonate of lithium, 2 grains; bromide of potassium (10 per cent. solution), 1 minim; water, 1 ounce. (This is the formula first introduced, it is believed, by Mr. Cowan.) *Metol Developer:* The standard metol-soda developer of Hanff's diluted with 7 parts water. The pink colour of the paper will restrict its use. In answer to a query as to how the name came to be selected, it was suggested that the manufacturers, with transatlantic modesty, had named it after Nikko, a spot in Japan, so charming that the Japs have a proverb, "He who has not seen *Nikko* (sun brightness) must not say *Kekko* (beautiful)." As there is plenty of shine and colour in the paper, some may contend that the appellation is appropriate.

North Middlesex Photographic Society.—On Wednesday, September 20, another of the series of Instruction Evenings was held, Mr. C. Beadle being in the chair. The subject, *Lantern Slides by Contact*, was dealt with by Mr. A. J. Golding. He described briefly the *modus operandi*, explaining the kind of negatives which would give the best results, the method of obtaining the range of tones from red to black by a difference of exposure and restrained developer, the fixing, clearing, &c., and then demonstrated his remarks by developing two plates. After this the members were set to work under his supervision, the result being that many really good slides were made, to the pleasure and profit of the workers. On October 9 Mr. W. E. Debenham will demonstrate *Wet Collodion*. An interesting evening is anticipated, to which visitors are welcome.

SEPTEMBER 25.—Ordinary Meeting, Mr. W. B. Goodwin, A.R.I.B.A., in the chair.—Mr. THOMAS BEDDING lectured on *Stereoscopic Photography*. [This will appear in our next.] Mr. Traill Taylor, who accompanied Mr. Bedding, produced several stereoscopes and some hundreds of slides, and kept the members interested and amused for some time by the wise and witty remarks and comments he passed upon them. Mr. H. Smith took first place for picturea taken at West Drayton. Next meeting, October 9, *Wet Collodion*, by Mr. W. E. Debenham. Visitors welcome.

Hackney Photographic Society.—September 19, Mr. W. Houghton (president) in the chair.—Mr. S. J. Beckett showed boards for holding prints flat, held together by means of a leather strap. Members' work was shown by Messrs. Sodeau and Grant. Mr. Barnes showed an under-exposed negative developed for half an hour in metol, and asked for a remedy. The general opinion was that it was useless. Messrs. Holmes and Watson showed "Matthews'" portable lantern; its weight is only ten pounds, and is carried in a box 13½×6×5. It was a very ingenious arrangement, and had many improvements to aid the lanternist in exhibiting slides. A report of the Society's outing (under the leadership of Mr. Gosling) was read. The dull weather rather interfered with hand-camera work; however, a few good snapshots were obtained. The excursion was to Kew and Richmond by steamer from Old Swan Pier. The latter part of the evening was devoted to an exhibition of members' slides with the lantern (under the management of Mr. Rose). Slides were shown by Messrs. S. J. Beckett, Carpenter, Cross, Grant, Hankins, Hensler, W. Fenton-Jones, Nunn, Roofe, Rose, Sharman, and Sodeau, from whom some excellent work was exhibited.

South London Photographic Society.—September 18, Mr. F. W. Edwards in the chair. The evening was devoted to a demonstration of *Lantern-slide Making*, by Mr. H. E. Farmer. Several Ilford special lantern plates were exposed under negatives of different characters, and afterwards developed before the members. He sketched the apparatus used by him for making slides by reduction, and explained the method of using the same. Some slides which were too dense for use by over-development were reduced by the use of sulphocyanide of ammonium and ferridcyanide of potassium, which the lecturer considered preferable to hypo and ferridcyanide. Slides requiring more pluck and density were intensified by using a bath consisting of uranium nitrate, red prussiate of potash, acetic acid, and water. In the event of the slides becoming too dense by this method, the red colour can be discharged by using a bath of carbonate of soda, and the toning, after washing, started afresh, but not carried so far. Several methods of rectifying various faults were fully explained by the demonstrator. On October 2 Mr. E. J. Lester will read a paper on *Outdoor Portraiture*.

Brixton and Clapham Camera Club.—September 18, the President, Dr. J. Reynolds, F.R.G.S., in the chair.—A demonstration upon carbon printing was given by one of the members, Mr. F. W. Levett. Four names were given in as candidates for membership, and further names will be gladly received. Photographers residing in the locality are informed that a Committee of Instruction has been formed for the purpose of assisting members, and a Committee of Criticism for the purpose of examining and criticising members' work. Next meeting, October 3. Paper by Mr. E. Dockree on *Gelatino-chloride Papers*.

Birmingham Photographic Society.—September 19, Mr. J. T. Mousley in the chair.—This was the first of the so-called one-man exhibitions inaugurated by the Club, which it is proposed to hold through the winter. The gentleman showing, Mr. J. H. Pickard, had staged for inspection a large number of fine photographs, ranging from the lordly 15×12 to the humble half-plate, and the Exhibition was very much appreciated. Mr. Pickard kindly made the tour of the room, giving interesting details of processes, &c., and answering the numerous questions put to him.

Newcastle and Northern Counties Photographic Association.—The last out-door meeting of the season was held on Thursday, the 21st inst., Ridley Hall Woods and Staward Pele being the places selected for the day's operations. There was a large muster of members, who were reinforced by contingents from the Hexham, Sunderland, and Durham Photographic Societies. The day's work was done under almost perfect conditions as to weather, and many good pictures will, doubtless, result. Mr. J. Pattison Gibson, of Hexham, acted as leader of the expedition.

Wigan Photographic Society.—September 21, Annual meeting.—Annual report and balance-sheet presented showed a balance in hand of 2*l.* 13*s.* All retiring officers, with one exception, were re-elected as follows:—*President:* Mr. J. A. E. Lowe. *Vice-Presidents:* Rev. J. S. Barnes, M.A., and Messrs. R. Wardman and G. R. Newman. *Ordinary Members of Council:* Messrs. J. Smith, J. H. Atherton, B. B. Hartley, S. Richardson, H. H. Hill, P. Clark, and C. R. S. Kirkpatrick. *Hon. Secretary and Treasurer:* Mr. Fred. Betley, 10, Ashland-avenue, Wigan. Meetings held fortnightly on Thursday at Y.M.C.A. Rooms, Rodney-street, Wigan.

FORTHCOMING EXHIBITIONS.

1893.		
September 29–Nov. 15		*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
October 1–31	.....	*Hamburg. Das Ansstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 2–14	.....	Midland Camera Club, Botanical Gardens, Moseley, Birmingham. Hon. Secretary, C. J. Fowler, 4, Woodstock-road, Moseley, Birmingham.
,, 9–Nov.	...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
,, 17–19	.....	*Hackney Photographic Society, Morley Hall. Hon. Secretary, W. Fenton Jones, 12, King Edward-road, Hackney, N.E.
,, 30, 31	.....	*East London Photographic Society, New Tabernacle, Old-street, E.C. Hon. Secretary, W. R. Gould, 61, Gibraltar-walk, Bethnal Green, E.
November 7–11	.....	*South London Photographic Society. Hon. Secretary, C. H. Oakden, 51, Melbourne-grove, Dulwich, S.E.
,, 20–25	.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December	.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18–Jan. 22, 1894		*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

ALUMINIUM *VERSUS* MAGNESIUM.

To the EDITOR.

SIR,—Your correspondent, Mr. J. T. Hackett, will be able to obtain the fine aluminium powder from Mr. W. C. Home, 2, White Horse-alley,

Cow Cross-street, London, E C., and, I believe, the price of an ounce, post free, would be 1*s.* 6*d.* No. 2 fineness should be asked for.

As regards removing the greasy matter, the method which I recommended—viz., heating to about the temperature of melting zinc—was the result of several experiments, which included the treatment of the powder with neutral fat-dissolving liquids, as suggested by Mr. Hackett, the heating method being more convenient and economical. Methylated spirit is not solvent enough of fat to be useful, but ether or benzole may be employed. Even after treatment with one of these, a sharp drying at a temperature over the boiling point of water is desirable, indeed, almost essential. This drying is substantially as much trouble as sufficient heating to drive off the original oily matter, so there is scarcely any inducement to employ the fat-solvent. Treatment with alkalies is not practicable, as they dissolve the metal, and a mere trace remaining will set up oxidation.

If any considerable demand should arise for aluminium for flashlight purposes, no doubt it will be sold quite ready for use. To free it from the trace of oily matter would not cost one penny a pound on a large scale, but the trace of fatty matter is no disadvantage, but rather the reverse when the metal is used as a dusting bronze.—I am, yours, &c.,

THOMAS BOLAS.

Chemical Laboratories, Chiswick, September 25, 1893.

AMATEUR *VERSUS* PROFESSIONAL.

To the EDITOR.

SIR,—I am sorry Mr. Blair does not approve my tone and conclusions in reference to the subject he writes of. But he neither comprehends clearly, nor represents fairly, what I wrote, and which seems to have called out his "regret." I did not say that the professional had done *nothing* to make outdoor photography a practical affair, but very little in comparison with what the amateur has done. All the dry-plate processes were formulated by amateurs, and, if the commercial manufacture has been more successfully carried out by men who were formerly professionals, that is nothing to the point. When I say that out-door photography is made a practical affair, I mean that it has been made possible by improved processes to use any plates with certainty, and to depend on their keeping for considerable periods and working with a trustworthy regularity. And this was, in the case of the great step of gelatine plates, the work of amateurs; who afterwards takes up the process and furnishes us with plates commercially has done comparatively very little. And, so far as I can remember, every step in the development of the dry plate of to-day, from the Taupenot, through the dry collodion, collodio-bromide of Major Russel, and collodio-bromide emulsion of Sayce and Bolton, to the gelatine of Mr. Bennett, has been made by amateurs, every one of whom has given the general public the benefit of his brains. The plates of Mr. Carbutt or Cramer, and of Edwards, Sandell, Fitch, and all the list of commercial manufacturers, are probably better than I could make for myself, and much cheaper, but if I had them not I should make them myself, as I did the other dry plates for glass before there were such things as commercial plates. These amateur discoverers collectively "made outdoor photography a practical affair."

As for cameras, Mr. Kinnear made the first really portable field camera, and the next advance beyond that, a folding camera, which always had all its parts in their proper position, shutting up like a book, and extending at pleasure, was mine, and nearly every modern extending camera has borrowed the principle I made practical, and have improved it in details.

When, therefore, the benighted professional, straightened in his circumstances, begins to abuse the amateur as the cause of his straightness, I have only to say to him, as I said in the letter to which Mr. Blair objects, "What have you and your fellow professionals attributed to practical photography which will compare with what the amateurs have done? and where would photography be practically if we had waited for professionals to work out the processes, and spend their brains and money in doing what amateurs have done without compensation and (so far as the professionals are concerned, who get their bread by the results) without even a thank-you, but, on the contrary, with great abuse, and proposals to put them on a licence to work their own inventions?"—I am, yours, &c.,

Rome, September 20, 1893. W. J. STILLMAN.

PHOTOGRAPHIC SOPHISTICATION AND PERSPECTIVE.

To the EDITOR.

SIR,—Your contributor, "Free Lance,"—who is generally accurate in optical matters—in criticising my "illustration of a block of buildings viewed in perspective, and a model, one-tenth scale, viewed at one-tenth the distance" implies that the vanishing lines in the two cases would be very different. Will he be good enough to demonstrate this proposition, or admit that for once he has made a mistake?

There is one other point on which I cannot agree with him. He says that, if photographs are taken at a distance of thirty or forty feet, no one will complain of distorted hands and feet. In single-figure pictures, taken in such poses as photographers usually adopt, the difference of size of parts due to perspective is so little, between a figure taken at the distance I mentioned (anything over twenty feet) and of the same figure taken at thirty or forty feet, that I believe few people could discover it. Moreover, if people complain that their heads and waists come out too large—parts not usually enlarged by perspective in a photograph—the mere taking of the picture from a greater distance will not satisfy them. Photography and modern painting have done much towards destroying the conventional ideal which people liked to see themselves resemble. If photo-optical sophistication should ever become at all general, much of this good work would be undone.—I am, yours, &c.,

September 25, 1893. W. E. DEBENHAM.

PHOTO-MICROGRAPHY.

To the EDITOR.

SIR,—Every expert optician knows that achromatic objectives may be as perfectly corrected for the light of a narrow band of the spectrum, as the apochromatics are for a wider band. Every real expert in orthochromatic photography knows that photographs can be made by the light of any part of the spectrum at will, by the use of colour-sensitive plates and colour-screens. It follows that every expert photo-micrographist should know that, except in rare instances, where the colour of the objects affects the conditions, achromatic objectives should be capable of giving as perfect definition in photo-micrography as apochromatic objectives give visually. I recognised this fact, proved it experimentally, and called public attention to it, in a few words, years ago. Mr. Pringle, after writing fifty times as much upon the subject, even now recognises only a part of the facts. "A word to the wise" should be sufficient, and I have far more important work to do than to repeat experiments for the purpose of convincing Mr. Pringle of what I know many experts already recognise as obvious facts.

Mr. Pringle's assumption that I "certainly have much to learn about apochromatic glasses," as he "suspected from the first," is justified only by an altogether wrong interpretation of my reference to low-power achromatics. I meant to make it clear that a flat field with good definition over a large area is more valuable for low-power photo-micrography than better colour correction with a less flat field, provided that the resolving power is more than sufficient for the magnification. There is no advantage in resolving details too small to be seen in the photograph. I gave the preference to an American one-inch objective over an apochromatic of similar focal length only after making actual comparative tests, and because the American objective had the flatter field; but it also had a greater angular aperture.

I also tested some high-power apochromatics, and was the first to convince a sceptical microscopist, the son of a well-known maker of microscope objectives, of the advantages which these objectives actually do possess over even the best possible achromatics. If Mr. Pringle had not been pleased to "suspect from the first" that I was ignorant of the capabilities of the apochromatics, I do not believe that he would have been so easily persuaded to that effect.

With regard to the American objectives Mr. Pringle is sceptical about, I can only say that besides seeing the published testimony of others, I have been assured by two expert microscopists that they saw "*A. pellucida* "unmistakably" resolved by a Gundlach objective, with ordinary mirror illumination; and by another, that he had seen *A. pellucida* resolved by a Jolles "dry" objective, after sitting by for two hours while Jolles himself worked to secure the necessary conditions of illumination. It is recognised that both of these feats are quite possible in theory and although I believe neither of these makers claimed to have succeeded in making another objective of the same kind that would do the same thing, the testimony as to these two appears to be fairly conclusive.

Mr. Pringle thinks getting to "beads" on *S. Gemma* is not getting very far ahead, but that *S Gemma* in "dots" may be regarded as "high-class" photo-micrography. I am made to realise that I used the wrong word. My photograph showed *S. Gemma* with rows of black dots.

There is really no evident reason why Mr. Pringle should assume that I need to be told that apochromatic objectives are of different glass and different construction than achromatics. Nor do I find it pleasant to be charged (unjustly as I believe) with making careless statements, by one who himself explicitly credits me, when he has my letter before him, with an assertion which I never made or would make. I never asserted that "there are achromatics equal to apochromatics." What I did say was that, assuming certain things, supported by certain testimony, "it seems to me to follow that one achromatic objective may be better for high-class photo-micrography than another apochromatic objective," &c. I will now go so far as to say that some achromatic objectives will certainly give better results with yellow light than any apochromatics will with the ordinary white light and ordinary gelatine-bromide plates which Mr. Pringle formerly thought were suitable for "high-class" photo-micrography with apochromatic objectives.

I confess that when I obtained notably fine photographs of all the more difficult subjects reproduced in Mr. Pringle's book, besides others still more difficult, I thought I had fairly demonstrated the possibility of doing "high-class" work with achromatic objectives. If Mr. Pringle denies that such a test proves that possibility, I ask, why did he not see fit to include a single example of "high-class" photo-micrography among many illustrations in his book? And how should I know except through

the "ordinary journalistic criticism," that he had ever done any "high class" photo-micrography?—I am yours, &c., F. E. Ives.

116, *Charing Cross-road, W.C., September* 26, 1893.

SPOTS AND PINHOLES.

To the Editor.

Sir,—The above have recently been discussed in your columns by Mr. Dunmore, who refers only to dust and bubbles as being the sources of pinholes in the negative. Experience leads me to conclude that to these two causes, which it is within the power of the photographer to avoid, may be added a third which is beyond his control, because it is a fault existing within the plate itself. In July, 1887, a year abounding in dust, I was using plates of three different makers; these were all treated in precisely the same way, so far as the avoidance of dust and bubbles was concerned, yet plates of one brand gave negatives full of pinholes, equally distributed over the surface, whilst those of the other two makers were practically free from this defect. The same camera was used for all, the slides were filled indiscriminately, and as the trouble was met with in one set of plates only, and the pinholes were not more abundant on that part of the plate which was placed downwards during exposure (where dust effects most usually are found), it would appear that the mischief must have been owing to defect in the film. I thought that a probable explanation was that during the processes of making the negative minute blisters were formed, that these arose from the glass surface being imperfectly cleaned before it was coated, and that as the gelatine dried and contracted the blisters split into the pinholes which ruined my negatives. The films also tended to frill at the edges, another symptom of imperfect cleansing of the supporting surface. I tried the same make of plates on a future occasion and met with the same defect.

This year has been as prolific of dust as was the never-to-be-forgotten "Jubilee year," but so far I have been quite undisturbed by the appearance of pinholes on my negatives. This desirable condition, I believe, is due to the observance of two precautions. First, beyond the usual dusting of films and slides after the latter are filled, the shutters are pulled in and out two or three times, and the face of the film again dusted as it lies in position. Second, the plates are firmly wedged in the slides so that no rubbing can take place between the edges of the former and the rebates of the latter. I may add that changing of plates has been done in the dark without the aid of light of any kind.—I am, yours, &c.,

September 19th, 1893. F. R. Fisher.

WARMING THE DARK ROOM.

To the Editor.

Sir,—In reply to Mr. J. Tilfor's inquiry, there is not any better gas stove made than "George's Calorigen" for either dark room or any other place; it gives a constant supply of pure warmed air, and does not emit any light—but it has the drawback of requiring two openings making in an outer wall, one for inflow of air to be heated, and one for outflow of the products of combustion. If this requirement can be complied with, it is a perfect stove. It is years since I bought mine, but I think the depôt was then in Regent street, but any ironmonger would supply one. They will *not* answer connected with an ordinary chimney.

If the stove must be placed where no communication can be had with the outer air, then I recommend a "Clark's Syphon Stove;" they can be had fitted with a ruby chimney, which, however, is not by itself a "safe" light, but becomes perfectly so if an outer casing of canary paper be added. These stoves are also made quite dark, but I find it a convenience to have a little light on the floor; if one happens to drop anything it saves a good deal of unparliamentary language during its recovery. They do not require any flue whatever, and all the products of combustion (except carbon dioxide) are carried off into the water-trough.

I do not recommend them to be placed in a room without *any* ventilation, because of the carbon dioxide, but if there be a reasonable access of air they are in my opinion to be preferred to those stoves that have a flue led into an ordinary chimney, in which very frequently there is a down draught.

Damp and sulphur fumes are great enemies to the photographer, and very few are aware of the enormous quantity of water manufactured by gas, an ordinary single gas jet, consuming five cubic feet per hour, will throw into the atmosphere of a room *a pint and a half* of water per twenty-four hours. The Clark Syphon Stove condenses all this, and with it the sulphur and other fumes.

My dark room is 13 ft. × 9 × 10, and was satisfactorily warmed last winter from November 18 to February 17, *night and day*, at a cost of 1*l.* 5*s.* 10*d.* (We are blessed in the North with cheap gas, 2*s.* net per 1000 cubic feet.)

There is a great advantage in using gas and having the heat on all night, no frozen pipes, no ice-cold solutions, no dust, no trouble of any sort.

Clark's address is Park-street, Islington, N., but the stoves can readily be procured through any dealer.—I am, yours, &c., Edward J. Smith.

Park Royd, Halifax, September 19, 1893.

RETOUCHERS' TROUBLES.

To the Editor.

Sir,—It is a source of wonder and amazement to many an old photographer to notice the readiness with which his younger *confrères* settle off-hand doubtful questions and give equally off-hand advice. Take the case of Mr. Pike's letter in a recent issue, under the above heading. A writer has complained of a simple difficulty of a greasiness on the surface of a gelatine negative rendering it difficult to use the pencil. Mr. Pike seems to see that the negative wants *cleansing*, and forthwith recommends the use—presumably for all negatives, thick and thin—of a powerful reducer and *cleanser*. Does he happen to know that this reducer is one of the most dangerous to the gradations of the negative that can be used, and that Messrs. Hurter & Driffield specially caution photographers to beware of its effects? Does he also know that no reducer gives a more shiny and toothless surface to a gelatine film than this, so that, if a film fairly rich in gelatine is used, every negative reduced by it can be instantly seen by the glossy surface amongst a batch of others? If your correspondent had searched industriously for a remedy that should be worse than the disease, he could hardly have hit upon a greater success than in advocating ferridcyanide and hypo as a cure for a greasy surface.—I am, yours, &c., An Old Hand.

THE PHOTOGRAPHIC EXHIBITION.

To the Editor.

Sir,—May I ask you to find room for the following correspondence in your columns, in order that I may not have any credit which is not due to me?

My part consisted in enlarging to the special colour I thought best suited to the subject, inventing the title, and choosing the method of mounting, making the exhibit a harmonious whole, my object being to enforce views which I have frequently expressed as to the great necessity for adapting the colour of a print to the subject, and the advantages offered in this respect by Alpha paper.—I am, yours, &c., John Howson.

Camera Club, Charing Cross-road, W.C., September 25.

"*Telegram to* Child-Bayley, 50, *Great Russell-street, W.C.*

"Just discovered that I omitted to state in entry form that my Alpha enlargement was from a quarter-plate negative by Mr. Howell, of Barbadoes, and I hasten to disclaim any credit not due to me, in case it affects the award.

"Howson."

"50, *Great Russell-street, W.C.*

"Dear Sir,—In reply to your telegram, the omission from entry form will not affect the award in any way.

"You might, of course, make the announcement through the press if you wish.—Yours faithfully, "R. Child-Bayley, *Assistant Sec.*

"J. Howson, Esq."

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange 5×4 set complete for tripod dark slides (double half-plate) and shutter.—Address, R. S. Winterburn, 1 Alexander-terrace, Wealdstone, R.S.O.

Wanted, a 12×10 modern camera, with slides, &c., in exchange for a Ross No. 3 improved portrait lens.—Address, H. Bartholomew, Great Linford, Newport Pagnell.

Wanted, 15×12 studio camera in new condition in exchange for 10×8 brass-bound, square, leather bellows camera, double swing and reversing back, rising front—three double book slides nearly new; cost 14*l.*—Address, H. Bullock, 48, Leicester-street, Leamington Spa.

Answers to Correspondents.

*** *All matters intended for the text portion of this* Journal, *including queries and Exchanges, must be addressed to* "The Editor, The British Journal of Photography," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* Henry Greenwood & Co., 2 *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

Perplexed.—We have forwarded your letter to the gentleman named.

Torbay.—You would require a lens of sixteen inches equivalent focus.

J. E. G.—We do not think that there is a better one than Hare's automatic.

E. J. SMITH.—Thanks. We shall investigate the matter, and correct where necessary.

J. E. P.—The firm have no right to detain the negatives. Threaten an action for illegal detention.

TRANSPARENT.—Any waterproof material would do for covering the tent, so long as it is light-tight.

J. DAVIES.—A cement formed of a solution of celluloid in amyl acetate may be used to mend your tray.

A. E. G.—Messrs. Tunny & Co., Maitland-street, Edinburgh, produce burnt-in opals. Apply to that firm.

MOUNTS.—We fear that this is one of the mysteries in photography that will remain unsolved for perhaps several years yet.

A. M.—Such classes as those to which you refer are held at the Polytechnic Institution, Regent-street, London. Write for a prospectus.

H. A. G.—Inasmuch as the markings appear to be on both sides of the film, we should imagine the plates to be at fault, but we cannot hazard the cause of the markings.

NITCHEGO.—Both articles mentioned have been made and sold for many years; the stand by the Scovill Manufacturing Company, and the lens shade by Ross & Co.

W. BIRRELL.—Our correspondent wishes to know the address of any firm who manufactures articles in glass—glass-blowers, in fact. Can any reader give the information?

A. KIRKWOOD.—By all means employ a condenser. It is immaterial whether you use coal gas or an oil lamp for such a small degree of enlargement, but only one light must be used.

OPERATOR.—In the formula named we should think the quantity of sulphocyanide insufficient. The precipitate should be redissolved, otherwise, as you note, there is a loss of gold.

F. B.—We cannot quite recommend such a course as that suggested, nor do we know of a competent teacher in your part of the country. There may be several, only we do not know them.

ANXIOUS.—The only thing we can suggest as likely to be useful in increasing the light is to employ corrugated mirrors fixed outside the window, on the same system as Chappuis' reflectors.

AMATEUR.—Directions for making blocks will be found in our last ALMANAC. We do not know where lessons can be obtained. The electrotype process for making surface blocks has proved too slow for this high-pressure age.

TERRA.—1. The markings are very singular, and, if elsewhere, would be considered beautiful. We cannot give an explanation of the cause. 2. Terra-cotta toues may be obtained by printing deeply and fixing without gold toning.

LIGHT.—Erect a large sheet of white card at an angle behind the negative, and illuminate this by any powerful light. Place the camera at a suitable distance in front, and the large negative can thus be reduced to the small-sized transparency required.

B. H. R.—You are by no means the first that has been told by the country druggist that hyposulphite of soda and sulphite of soda are the same thing. No wonder that the plates were spoilt! and it is very annoying. Sulphite of soda is rarely kept by the village chemist.

P. EGLI.—We do not recommend particular makes of hand cameras. See the advertisement pages of the ALMANAC and JOURNAL for particulars of innumerable varieties, among which you should be able to find one to suit you. The "Hawkeye" camera was described in last week's JOURNAL.

T. KELSEY.—In copying the water-colour drawings a better result will be obtained by employing plates that have been treated with the orthochromatising mixture referred to. With the monochromes, ordinary plates will answer quite as well, if the paper upon which they are is, as we assumed it to be, white.

T. KIRBY.—The majority of the lantern slides seen in the shop windows are by the wet-collodion process. Very few are now made in albumen, or, at least, in this country. If they were made, we imagine that a higher price would be charged for them, as by that method they are more troublesome to make than collodion slides.

G. YEMANS.—The zinc plates employed at the Ordnance Survey Office are not supplied ready for use, but are smoothed and planished on the premises, or, at least, they were two or three years ago, and we have not heard of any change being made since. Zinc, as well as copper, plates are now supplied ready for use by all the dealers in lithographic materials.

C. W. C. sends some prints in which there is a decided blurring or doubling of the image. He says, "The camera was used on a stand, and the shutter worked by a pneumatic release, so that he doubts if the blurring is due to movement."—It certainly is, however. Evidently there is a jerk on the shutter, when it reaches the full opening, or as it begins to close.

H. S. W.—You are under an entire misconception in the matter. No one is entitled to style a thing "patented" that is not. Any one doing so renders himself liable to a heavy penalty. The mere fact that a provisional specification has been lodged does not confer the right to use the word patented. All you can legally do is to say in the prospectus, "patent applied for."

COLNE.—So far as we know, the orthochromatised collodio-bromide plates referred to have not been put on the market. The method was not patented, nor do we see how it could be, as the earliest experiments in orthochromatic photography were with collodio-bromide emulsion; indeed, the process was really brought up to its present state in conjunction with dry collodion.

R. T. JONES inquires if there is any objection on the score of permanency to using the fixing bath for P.O. P. for two or three days in succession, the same as is done with the fixing bath for negatives?—Yes, there is a grand objection to such proceedure if stability in the prints is a consideration. A fresh solution should be made for every batch of prints. Hyposulphite of soda is a very inexpensive salt.

D. CRAIG.—As the collodion splits off the glass as soon as it is dry, it shows that it is of too contractile a character. This may be got over by the addition of a very small proportion of castor oil. Do not use more than is absolutely necessary. One or two experiments will determine the quantity. Methylated ether and alcohol will do very well for enamel collodion provided they are tolerably strong.

ALF. EVANS.—1. If the paper has become as brown as described, it will not yield pure whites, whatever toning bath may be employed, the vendor's assertion to the contrary notwithstauding. 2. The sulphocyanide bath can be used for albumen paper, but there is no advantage in doing so, as the latter tones evenly in any of the ordinary baths. 3. The best strength for fixing solution is half a pound of hyposulphite of soda to the quart of water.

LONDON, E. asks if there "is anything that can be mixed with kerosene oil that will avoid the unpleasant smell given off when it is burnt in the lantern, as it is only in that that it is offensive? The same oil used in an ordinary lamp does not smell."—Different things, such as camphor, have at times been suggested, but they are not really effective. The smell complained of is generally caused by oil outside the lamp. If the lamp and wick tubes be carefully wiped with a clean cloth just before the lamp is lit, there ought to no smell.

B. SCOTT wishes to know if he makes up a silver bath for negatives according to the formula given in the sixth edition of Hardwich's *Photographic Chemistry*, and gets Mawson's collodion, he can develop with any of the new developers made according to the formula supplied with them, or the ferrous-oxalate developer, with the working of which he is familiar?"—No, they will not answer. If our correspondent desires to work the wet-collodion process, he will have to employ the developer suited to it. Dry-plate developers are of no use for wet collodion.

T. C. BENN.—The print shows the lens to be a very good one, although it bears no maker's name. The lack of marginal definition is due to its being worked on too large a plate. A lens of five inches equivalent focus, and an aperture of *f*-5·6, must not be expected to cover a five by four plate sharp to the corners, unless it is somewhat stopped down. With a small stop it will, doubtless, cover a larger plate than that mentioned. We should say, taking the aperture and focal length into account, there is nothing whatever to complain about. If that size plate has to be covered sharp all over, with an aperture as wide as that named, a lens of greater focal length must be obtained.

SAXON.—This correspondent writes as follows:—"I send herewith four copper plates and prints therefrom. The plates were produced by the method described by Mr. Dennison some time ago. If you will kindly examine them, you will see that the etching is quite as deep as an ordinary mezzotint plate (of which I possess two or three), and yet the impressions are poor and flat. In fact, in one of them, the half-tones print stronger than the shadows. The proofs were printed by a professional copper-plate printer, so that I do not think the printing is at fault. I shall be obliged for your opinion on the subject, and also for the return of the plates, for which I enclose stamps?"—The etching is quite deep enough—indeed, much deeper than is necessary—but it has no ink-holding power, owing to the absence of grain in the deepest parts. Hence the ink wipes out as the ink is cleared off the surface. This is not the case with the lighter tones. We can only assume that the etching was carried too far in the first instance. Plates and prints returned as requested.

H. H. C. says: "I have to make some negatives, copies of engravings, and my customer particularly wants them by the wet-collodion process. Now, this is a process I have never actually worked, though I have an old manual on it. I think it would scarcely pay me to learn the process, unless it is an easy one to acquire, on purpose to copy these few pictures, less than a dozen, as probably I shall never have to use it again. Will you please answer the following queries for me? 1. Is the wet-collodion process to be easily learnt by one of seven years' experience with dry-plate photography—say, in two or three days? 2. Can the plates be bought partially prepared, that is, for dipping in the bath? 3. Failing collodion, what dry plates and developer will give negatives most like collodion in character?"—In reply: 1. The collodion process is not difficult to work by those *au fait* with it, but the necessary ability is not to be acquired with only a few days' practice. 2. No; the plates must be prepared at the time of sensitising. 3. Any of the slow plates, specially prepared for photo-mechanical work, developed with formulæ supplied with them, will yield negatives somewhat approaching collodion in character.

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THE BRITISH
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No. 1744. Vol. XL.—OCTOBER 6, 1893.

PHOTO-CERAMICS.

We invite attention to a report on another page, in which an account is given of a demonstration at the London and Provincial Association last week, by Mr. Haddon, on the preparation of enamel plaques on which to produce ceramic, or burnt-in, photographs. As Mr. Haddon has confined himself to the production of the enamels, we will take advantage of the mooting of the subject to carry it a stage farther, and describe in what manner such tablets may be used for producing those beautiful, and undoubtedly permanent, photographs which charm all by whom they are examined.

But, previous to doing so, let us state that the production of ceramic photographs is very far from being a new thing, although so little known, for it dates so far back as 1854, in which year a patent was obtained, in this country, by Peter Armand le Compte de Fontainemoreau, whose invention consists "in fixing, vitrifying, and colouring photographic images taken by the collodion process upon enamel, metal, stone, porcelain, glass, china, and all kinds of earthenware." This, it will be observed, is moderately comprehensive. His method, when boiled down from the technical terms in which it is couched, consists in making a proof upon a plate of glass, and, after fixing, washing, and subjecting to a bath of bichloride of mercury, afterwards placing the film upon one of the substances above enumerated, and baking it in a porcelain furnace. There may, perhaps, be earlier notice of the invention, but this is the first of which we are aware.

This application has by several persons been usually attributed to Lafon de Camarsac, but his first publication was made some time after the other, being June 11, 1855, in *Comptes Rendus*, and in this he seems to be careful in avoiding the giving of such information as would enable any one to produce practical results.

There are now several methods by which photographs may be made upon or transferred to enamels or plaques for subsequent vitrification. Of these the simplest is that of collodion transfer. A plate of glass receives a coating of bromo-iodised collodion. This is then immersed in a thirty-five-grain solution of silver nitrate for two or three minutes. A transparency is developed upon this, but it must be carried to a farther extent than would be the case were it intended for a lantern slide.

The image thus obtained must now be toned, for, if the picture were to be burnt in without this, it would prove of a yellow colour, and not at all pleasant to behold. But, previous to toning, the picture must have been fixed with cyanide of potassium, washed well, and the collodion film removed from the glass plate. This removal is effected by placing the plate in water which has been acidulated with a few drops of sulphuric acid. It will not have been long in this before it is found to have had its hold upon the glass loosened, when it will soon be floating in the water.

The selection of a toning agent is one that involves judgment and the exercise of taste, and it is possible that no two photo-ceramists will employ exactly the same substances. Chloride of platinum has long been a favourite toning bath, used sometimes alone, and sometimes modified by the presence of gold, iridium, and other metals. It is in the selection and proportions of these that the ultimate colour of the burnt-in picture depends. We possess enamels of a rich dark violet tone, made with platinum alone as the toning agent. The tones obtained by iridium are warmer, but there is no difficulty in getting almost any tone desired. Whatever bath be ultimately selected, it is of importance that the toning be carried to such an extent as to obliterate the details of the silver image and bury them in a mass of blackness. The necessity for this will appear when it is borne in mind that the silver which is allowed to remain in the image, and which, as above stated, burns in of a yellow colour, conduces to modify the tone. Let any one who desires to satisfy himself as to this transfer an ordinary collodion positive or negative to a piece of white porcelain dish, and, in absence of a furnace, push it between the bars of a clear coke fire until it becomes red. When removed and examined after it has cooled, the negative or positive, as the case may be, is found to have been burnt in in a yellow colour.

To effect the complete removal of the silver, the services of a solvent are occasionally had recourse to; but this is not always necessary, especially when a toning agent is selected that is not adversely affected by any trace of silver remaining, and when the toning has been carried to the extent suggested. The enamel tablet having been cleaned, it is placed in the vessel of water in which the film is being washed, and by a little dexterous manipulation the film is floated in position and the water decanted. Pressed close up against the surface, the film then is tucked up around the edge, and, as it were, plastered around the back to prevent it from becoming displaced. It is then placed aside to dry, after which the plastered-down portion that was overlapped behind should be removed by means of a pad wetted with ether, or by a scraper.

The fire-clay furnace to which it is now transferred need only be small, and is most conveniently heated by gas. Experience alone can tell when the picture is properly vitrified, but such experience is quickly attained. A convenient way is to insert the blade of a long and otherwise worthless table

knife under the enamel, which, when in the furnace, rests on the top of a plaster of Paris block with a convex top, and lifting it out subject it to a brief examination. It will probably now be found to be bright and full of clear detail when contrasted with the black smudgy appearance it had previously to the heat having been applied. We have seen them returned to the furnace more than once after examination, in order to ensure the desired effect being obtained.

Good vitrifications are also produced by the dusting-on process, fusible enamel powder, which can be obtained in commerce in a variety of colours, being dusted on to form the image, which is afterwards fused by heat.

By means analogous to carbon printing, a vitrifiable powder being used in the tissue instead of carbon, ceramic pictures can be produced without difficulty.

An advantage in the employment of the two methods last mentioned is found in the fact of uniform tones being obtained.

There are some charming example of ceramic photographs in the Pall Mall Exhibition at present open to the public, to which we would invite attention. The absolute permanence of this class of picture is undoubted, and from the hasty outline of proceeding we have now given it will be seen that it is not attended with any inherent difficulty, or one which cannot be overcome by ordinary care.

HEATING THE DARK ROOM BY GAS.

Some correspondence on this subject, which has recently appeared in these columns, renders it probable that a further elucidation of the subject will be of use to some of our readers. It is very difficult to lay down a general rule, inasmuch as dark rooms vary so much in size from the mere cupboard of the tyro to the magnificent laboratory of some workers. The first consideration, one of paramount importance, is the healthfulness or otherwise of gas as a heating agent. This subject is not usually fairly looked at. Most of us are familiar with the lighted gas burner used for illumination, and any remarks about any unsanitary qualities it possesses are taken little heed of. A gas used for a stove, under ordinary conditions, is neither more nor less hurtful than an equal quantity of gas used for lighting purposes. Where the danger comes in is that stoves being only lighted up to produce heat that is just the time when ventilation is most interfered with by closing all doors and windows. We then get the products of combustion in the atmosphere, and experience their evil effects, but not more than if the gas were burnt at ordinary open illuminating burners. There is, however, the possibility of a larger amount of gas being used to produce heat than is ever likely to be employed for illumination, and then the danger comes in. We believe that when gas has been employed for heating water for a bath, the products of combustion have proved quickly fatal, at least one life having been so lost. Hence, for dark-room heating, it will be advisable as a matter of safety to have all products of combustion carried away by a chimney. There are chimneyless stoves sold, which are supposed to condense the products of combustion. They condense the water produced and some of the acid; but the more injurious product of burning of coal gas, the carbonic acid, is practically untouched, and contaminates the air just as with any ordinary stove. We would never advise such a stove to be employed for dark-room work, though all the actual heat produced is, as it were, turned into the room. It is, however, quite possible to have a stove which permits a part of the heat to escape through the draught into the chimney, but which at the same time is as efficient a heater as the other. The efficiency of a stove depends not only upon the heat it produces, but rather upon the way it is distributed. Heat all in one spot is apt to cause a quick upward current of air which fails to cause the whole apartment to gain the benefit of what is really generated. The patterns to choose from are of the most varied character, and should be chosen for the mode in which they spread the heat and prevent its being wasted up the flue. As a matter of fact, the actual heat produced from the consumption of a given quantity of gas in one or other burner varies only to an insignificant extent in any maker's pattern. The vital points are distribution and waste.

Formerly a very large proportion of the heat obtained went outside through the chimney; but of late years there have been made patterns of stoves on the regenerative principle, which utilise some of the heat left in the spent gases before allowing them to pass into the chimney. It is, of course, not for us to name a particular maker.

One well-known pattern of stove is a very important modification of the usual mode of utilising them. It has an egress for spent gas and one for ingress of fresh air placed close together, the result being to render it independent of ordinary chimney or flue. These two apertures are to be connected with the outer air.

The getting rid of the effluent fumes is the one difficulty with gas stoves, yet it must be said that, when used with discretion, they need cause little more trouble than a coal fire, the "smoking chimney" being not an unknown phenomenon with coal. It should be said, however, that no chimney which does not possess a good draught should be used for gas fires. The fumes from the latter are invisible, while smoke tells its own tale; hence danger might lurk in heating a dark room through the fumes conveyed into the chimney failing to rise and being disseminated into the apartment.

There is difficulty in conveying the gas through a flue directly into the open air through an aperture in the wall. The draught will not always act. But we may inform the reader that if he contemplates putting a gas heating apparatus in his dark room he may be sure that, if he write for advice direct to the maker of a stove proposed to be used, he will be well advised on any difficulty anticipated by the maker, and will have simple explanations courteously tendered.

REFLECTED LIGHT IN THE CAMERA.

Probably more negatives are ruined and plates spoilt by the access of light into the camera than is imagined, even by those who fancy themselves constantly on the alert to guard against such accidents, and we should, perhaps, be not far from the truth in asserting that the majority of the complaints made about faulty plates are really traceable to the same cause.

There are, of course, many different ways in which stray light may reach the sensitive film; that is to say, light other than that legitimately employed in the formation of the image. Defects in the construction of the camera, badly fitting or damaged woodwork, minute cracks or perforations in the bellows, flanges not properly screwed up, and similar accidents are sufficiently familiar, and are usually sought for when there is reason to suspect that trouble is being caused by the improper action of light. But, although these are the most commonly *recognised* forms in which the evil is experienced,

we doubt whether more frequent and greater injury does not arise from other causes less readily recognised or suspected, namely, from light passing through the lens and suffering reflection from some portions of the interior of the apparatus; it may be of the lens mount itself, or it may be of the body of the camera.

Most instruction books direct the beginner to examine carefully the interior of the camera for such palpable defects, but few go farther in calling attention to the possibility of an injurious, or, we may say, ruinous amount of light being reflected from the sides of the camera itself. Yet this is the case, but more especially with wooden-bodied cameras, either solid or sliding, the broken or zigzag sides of a bellows camera tending in a measure to neutralise the ill effects of reflected light. In bygone days, when the wooden-bodied camera was more in vogue, both in the studio and the field, this danger was more palpable, and was, consequently, more generally recognised than at present; but that it still exists in an extreme form was forced on to our notice a short time back by an examination of a hand camera, with which, under certain conditions, it would be perfectly impossible to take a picture.

The instrument was one of fixed focus, the body being of wood, and the interior entirely open from the lens to the focal plane; it was fitted with a lens of the modern rapid rectilinear type, that is to say, one of large aperture, and when this was used at full power it admitted a considerable volume of light, much of which fell upon the smooth sides of the camera, from which it suffered reflection directly on to the sensitive plate. What wonder, then, that almost every plate proved to be hopelessly fogged. This camera, we say without hesitation, was constructed with an utter disregard for the most elementary rules of common sense.

Another instance of a similar kind was found in the case of a sliding-bodied camera, with portrait lens, that was being used for outdoor portraits and groups; the negatives were invariably, more or less, veiled, and it was obviously from extraneous light on the camera, although the latter was most carefully and completely wrapped up in the focussing cloth in order to cover up any undiscoverable leaks. It was not until it was pointed out that the smooth floor of the interior of the camera reflected a perfect "blaze" of light coming through the lens from the sky that the cause of the trouble was suspected.

It is only with such instruments that this trouble shows itself in such an aggravated form, though even with a bellows camera, quick plates and lens worked at full aperture quite sufficient reflected light will reach the plate to seriously degrade the purity of the shadows, and we have no doubt very many of the cases of fog laid to the charge of the plate-maker are really due to this cause. It is, of course, with the more rapid kinds of plates that the evil is most seriously felt, such being more readily impressed by feeble rays of light, and these are generally the plates that secure the greater share of blame.

How to guard against the trouble is the question to be considered. In the first place, the most obvious step to be taken is to avoid as far as possible working under such circumstances as will conduce to it. Thus, never work with the full aperture of the lens unless compelled to do so, and never, when it can be avoided, employ a lens of the rapid doublet type when there is a large volume of light from the front, whether sky or water, or, when such a course is unavoidable, be careful not to permit the light to fall directly on the lens. In dealing with subjects of this class, landscapes with a wide expanse of sky, or with the sun almost in front of the camera, or more particularly with seascapes, a single lens with the stop in front is far preferable to the doublet with its large surface of glass presented directly to the source of light. Not only does the projecting tube shield the lens from the direct impact of the light, but the stop itself, if in proper position, will, by curtailing the field of view, cut off a great portion of the rays of light that would otherwise fall on the interior of the camera. There is no reason why lenses of the rapid type should be used for the class of subjects we have named; on the contrary, they are just the ones that will most readily permit of the employment of a comparatively slow lens, although a single lens, with stop in front, need not be particularly slow; they may be used with very satisfactory definition with apertures of *f*-11, which is far more rapid than is required for seascapes.

A very useful lesson may be learnt by pointing the camera fitted with a lens working with large aperture to an open landscape with a clear sky, and if the sun be in that quarter so much the better. Level the camera in such a manner that the sky line is almost at the bottom of the plate, the whole of the subject being practically landscape. If now a small white card or an envelope be laid inside the camera close to the focussing glass, it will be found that an image of the clouds is thrown upon the white surface, upon which it is perfectly distinct, although on the black lining of the bellows it may pass unnoticed. If a single lens be used with the stop placed at such a distance in front that the field of view is restricted to little more than the area of the plate, the amount of image falling upon the card will be comparatively small; hence the recommendation to employ such a lens under those circumstances.

If now the focussing glass be placed in position, and the image examined under the focussing-cloth, a patch of bright light will be seen to be reflected from the white card showing distinctly in contrast to the black lining of the camera, and demonstrating only too plainly the reality of the danger that exists. If another card or envelope be taken and placed in a perpendicular position inside the camera—it may easily be propped between the folds of the bellows—a position will be found in which it just cuts off these useless or superfluous rays, and prevents their reaching the sides of the camera, and consequently their reflection on to the plate. This gives the cue for a very simple remedy against light reflected from the interior of the body of the camera.

It consists of a simple screen of blackened cardboard, thin wood, or metal fixed inside the camera at a short distance from the lens, and having an aperture of such dimensions as to permit the passage of only such rays as fall directly upon the plate. All others, those which fall upon the front of the screen, are confined in the narrow chamber formed between it and the camera front, when they are lost or made harmless. This screen also acts as a safeguard against any accidental flaws or defects in the front of the camera, its weakest point. The screen can be easily fixed, and can remain always in position, as it interferes in no way with any of the ordinary functions of the camera, or it can be made removable, if preferred, and completely guards against any reflections from the camera.

But not so easy is it to guard against reflections from the interior of the lens, which may be, and sometimes are, very

serious. We have in our possession at the present time an old portrait lens of French make which is capable of fogging hopelessly any plate placed behind it. The internal blacking has become with age partly polished, and if the camera be turned towards a well-lit subject, and the inside of the tube examined from the back, the focussing glass being raised, it shines into the camera almost like a mirror. Not being fitted with Waterhouse diaphragms, the whole of the tube is open, which makes matters considerably worse, although any lens of the rapid doublet form will thus reflect a very dangerous amount of light unless the blacking be constantly kept in good order.

The lens we refer to is easily cured by simply sliding in a piece of black cotton velvet cut to the proper size to line its interior, and it is kept in position by the rather elongated cells carrying the two combinations. These in turn are provided with two rings of the same velvet, which effectually prevent reflection and convert an otherwise useless lens into the reverse. For smaller lenses we should use a good matt black varnish, though we have yet to find one that will equal velvet in its power of arresting reflection when the latter can be used.

In conclusion, we would suggest that any of our readers who may be quarrelling with their results, and probably blaming the plates, should make a careful examination of their apparatus for reflected light as distinguished from leakage light. Possibly a good many may be surprised.

Civic Honour to a "R.A."—A little while ago, it will be remembered, we alluded to the generous gift by Sir John Gilbert, R.A., of several of his works to the Corporation of the City of London for their Art Gallery at the Guildhall. The handsome present is highly appreciated by visitors at the Gallery and also by the Corporation. One day last week, at the meeting of the Common Council, the freedom of the City was conferred upon Sir John, the presentation being enclosed in a gold casket. This, we believe, is the first time such an honour has been conferred upon an artist. It is generally reserved for crowned heads, members of the Royal Family, and other noble persons. It is to be hoped that the example set by Sir John Gilbert will be followed by others, particularly as the Government is so niggardly in the purchase of pictures for our national collections. Still, after all, it may be mentioned that the English possess more pictures that cost the nation nothing than any other country, not excepting France and Germany. It is somewhat to be regretted, however, that so few good photographic copies of them are available for art students.

Artistic Vignettes.—More than once attention has been called to the generally inartistic appearance of the majority of vignettes issued by professional portraitists; indeed, it may be said that, in the matter of vignetting, we are no better off than we were a couple of decades ago—it is still the same monotonous pear-shaped picture. Some time ago we alluded to a great improvement in this respect in some pictures we had just then seen. They were platinotypes on rough paper with hatched backgrounds, after the style introduced by the late Mr. Oliver Sarony many years ago, but we have not seen any like them since. We have, however, recently had the opportunity of seeing some others very much after the same style. These were large heads, cabinet size, on very rough drawing-paper of various tints, with a slightly hatched background, and vignettes, of course. The process appeared to be gelatino-chloride, toned with uranium, as some of the prints were almost a Bartolozzi red, while others were of a sepia, and also of a good black tone. So good were the pictures that they closely resembled the once famous Richmond heads in miniature. It is just possible that, if this style of picture were taken up by some in the profession, it might give a fillip to their businesses, particularly amongst clients of the impressionist school. It may, however, be mentioned that the pictures in question were perfectly sharp, or, at least, as sharp as the coarseness of the paper would allow them to be.

Effect of Photographic Chemicals on the Skin.—At a recent meeting of one of the London Societies, a member called attention to the circumstance that, after working somewhat largely with the new developer, metol, he found it produced an unpleasant effect on the fingers, although no other member appeared to have had a similar experience. Others of the newly introduced have also been charged with having a pernicious action on the skin, but only, as in the instance referred to, in isolated cases. The skins of some persons are peculiarly constituted as regard alkalies, and it is these, we fancy, that are the cause of the trouble. We well remember, when the alkaline system of toning was first introduced, that there were many complaints that the toning solution produced an eruption on the hands of some workers. Some laundresses, we are informed, frequently suffer from the action of the alkalies they use, causing a slight eruption of the skin of the hands. The action of the alkalies on the skin is to soften it, and, even in a very dilute form with some skins its action is very marked, and, if it be allowed to dry on it, to afterwards have the opposite effect, to harden it. If, after working with any alkaline solutions, whether new developers or not, the hands were well rinsed with cold water, and the solution never permitted to dry upon them, we think no inconvenience would be anticipated with any solution employed in photography. The same remark applies also to the more pernicious chemicals, such as bichromate of potash, bichloride of mercury, &c.

A Plea for the Photographers' Benevolent Association.—The report of the last meeting of this deserving Institution shows that there is a great necessity for it, and we fear there will be a still greater as the winter advances. There are now between two and three hundred Photographic Societies in Great Britain, and the larger number of them are now arranging their programmes for the winter season. We therefore take this opportunity of reminding them of the suggestion we have made before, namely, that they should follow the example of the Photographic Society of Great Britain and devote a Lantern Evening to the benefit of the Association, who are in need of increased funds to carry out its laudable objects. Much has been said of late of the alleged injury done by amateurs to the profession; and, as the majority of the Societies are largely composed of amateurs, it is not too much to ask them, without considering as to whether the allegation is well founded or not, to consider the distressed among the profession, particularly when is is considered that a Lantern entertainment with a little music is an enjoyable evening, quite apart from the pleasure of contributing to a deserving object. The report referred to is quite sufficient to convince every one that the funds of the Benevolent Association are carefully administered, so that those helping have the assurance that the money is not wasted. If each of the Societies were, by the means suggested, to raise but a single pound, the income of the Association would be considerably more than doubled. Possibly a polite circular to the different Societies would bring the subject more prominently before them.

Reproductions.—One of the first things considered when ancient manuscripts are discovered—and they are now continually being found—is to have them reproduced by photographic means. Then the question arises as to how they are to be rendered; that is, as they are in their present condition, or to reproduce them as nearly as possible as they were when the writing was first executed? This subject has exercised the minds of the authorities of most museums containing ancient documents, and is exercising them still in some quarters where it is yet a vexed question. It seems that the majority are in favour of having the copies as an exact representation of the originals as in their present state with all the imperfections wrought by time. On the other hand, some prefer to have the reproductions as nearly approaching, as they can be made, what they were in their pristine condition. We recently had the opportunity of seeing

the same manuscripts reproduced both ways. The former were by the collotype method, and the stains and discolouration of the parchment and paper were exactly rendered. The latter were by photo-lithography, as presumably by an orthochromatic method and also by dodging the stones all these were obliterated. The contrast between the two reproductions was great, yet the writing itself was the same in both cases, except that on the clean surface of the photographs it appeared more distinct. In the collotype, where the stains on the original were very strong, the lettering was scarcely readable. Whatever may be the opinions as to this question as regards old manuscripts, we imagine there is not a divided opinion as regards paintings. No one, we surmise, would care to have copies of the old masters with all the cracks in the paint conspicuously reproduced when by skilful treatment in the lighting they can be, and usually are, considerably ameliorated.

CHICAGO EXHIBITION—AWARDS.

The following awards have been made in the Photographic and Apparatus Sections :—

British Society for the Promotion of the Employment of Women, photographs.

Mr. Henry Wilkinson, instruments to indicate the action of engine valves.

Messrs. Riley Brothers, optical lanterns and slides.

Messrs. Ross & Co., lenses, field-glasses, and instruments of precision.

Messrs. F. Darton & Co., meteorological instruments.

Mr. J. Lafayette, photographs printed in carbon.

Mr. H. Mendelssohn, portraits.

Sheffield High School, photographs.

Educational exhibit (Mrs. Ayrton's line divider and Miss Gregory's geodoscope).

Mr. A. Baker, photographs.

Mr. W. Byrne, photographic portraits.

Mr. J. Dore, photographic lantern transparencies.

The Esmail Enamel Company, miniatures on enamel.

Mr. Henry Flather, carbon photographs.

Messrs. B. Lemere & Co., architectural photographs.

Mr. Lyddell Sawyer, photographs.

Messrs. Symonds & Co., photographs of British ships.

Mr. Henry Van der Weyde, electric-light photographs.

Mr. W. M. Warneuke, photographs.

Messrs. Alfred Werner & Son, photographic portraits.

Messrs. Window & Grove, photographs.

Mr. W. W. Winter, photographic lantern slides.

Messrs. W. Watson & Son, (1) mathematical, astronomical, surgical, and English instruments; (2) lanterns; (3) photographic lenses, &c.

Mr. W. Clement Williams, photographs.

Messrs. R. & J. Beck, photographic apparatus.

DENSITY AND COLOUR IN COLLODION EMULSION.

I have before me a letter from a correspondent on the above subject, upon which I wrote a couple of articles in these pages last November. As my correspondent has carried out the suggestions there made with only partial success, there may be others in the same position as himself, for whom my reply to him may have an interest.

The gist of the present complaint is briefly as follows: Although immediately after emulsification, the emulsion was of a rich ruby-orange colour, and gave transparencies of good density and excellent tone, after ripening for six to eleven days, the colour by transmitted light changed from the rich red to a cold grey colour, and after pouring out, drying, washing, and re-dissolving, it would only produce images of a bluish-grey tone.

Bearing in mind what I have already said in my previous articles on the subject of unsuitable pyroxyline, I think there can be little doubt in this case that the cause is too-prolonged ripening, combined, it may be, with a partially unsuitable cotton—*i.e.*, one that will not bear long emulsification. Different samples of pyroxyline vary as much in this way as in any other respect, but their behaviour during the progress of ripening may usually be taken as a pretty safe guide as to how to act. Some specimens—and they are wholly unsuitable for the purpose—will give at the very outset an emulsion possessing a grey, blue or lavender colour by transmitted light, and under no conditions whatever a red colour. Others may present more or less of a yellow or orange tint at first, but rapidly lose it, changing to the cold blue or grey, and these should be regarded with suspicion, as they will rarely if ever pass the ordeal of washing, even if they should prove of any use unwashed.

But when the pyroxyline is of such a character as to give to the emulsion the rich transmitted colour described by my correspondent, it may, in nine cases out of ten, be relied upon to stand washing without losing any of its good qualities, if properly treated, and, in this connexion, the period of ripening forms an important item. The change of colour of the particles of bromide mark, in fact, the progress of the ripening both in collodion and gelatine emulsion, and although with the latter the cold grey or blue colour may be a desirable indication of great sensitiveness, it is to be avoided on all counts with collodion. It may be a sensitiveness, but it is an equally sure sign that all the "body" has gone out of the emulsion—that, in fact, it is over-emulsified.

But with regard to the question of sensitiveness, I doubt whether any greater rapidity is secured—that is to say, rapidity of a practical character—by eleven days' emulsification than by one or two, if the emulsion be mixed in the proper way. In earlier days, when an excess of soluble bromide was the rule throughout, it was the regular plan to allow a very long period for the complete combustion of the salts; but when excess of silver came into vogue, not only was the period of ripening considerably curtailed, but it became necessary to employ a large proportion of restraining acid in order to prevent fog, and to keep the emulsion from passing into the grey stage.

Prolonged emulsification in the acid state and in the presence of free silver may perhaps result in the very highest degree of sensitiveness that is obtainable with collodion emulsion, but for all practical purposes, and especially for lantern-slide work, a much better result will be obtained by a very brief submission of the constituents of the collodion to the action of free silver without the restraining acid, and then a further few hour's ripening after the excess of silver has been converted. Thus, if the plan I mentioned in the first of my articles last November be adopted, namely if a portion of the bromised collodion be held back in sensitising and the remainder have added to it the full quantity of silver so as to show an excess, the accessory requirements will be fulfilled. The emulsion may remain in this state for an hour, half an hour, or only two or three minutes—the period is not very material, but perhaps half an hour is ample—and the remainder of the bromised collodion is then added and well mixed.

The emulsion may be poured out to set *at once* if desired, or may be allowed to ripen for a few hours longer, and will prove at the finish to be just as sensitive as, and a good deal better in other respects, than if it had been allowed to ripen for days. It must be borne in mind that the ripening proceeds during the drying of the "pellicle," and more especially during the latter portion when heat is applied, and many an emulsion that is poured out in just the right condition is spoilt by forgetting this fact.

I should advise this course in connexion with any sample of pyroxyline, though there are, of course, some sorts that require such treatment less than others. The only commercial sample I am aware of at the present time that is altogether independent of any special treatment, except care in not over emulsifying, is Rouch's. The best kind I ever used in years gone by for washed emulsion was an American sample known as "Pary's Cream," I think was its name, and there were two or three grades of it, what I used being "No. 2." I doubt whether it is made now, but Mr. J. J. Atkinson, of Liverpool may know.

It is a hopeless task for an amateur to make his own pyroxyline with any chance of uniformity, as working on a small scale it is absolutely impossible to secure regularity of temperature, or, indeed, of any of the conditions requisite to success. Otherwise, I should advise those who want good results to make their own pyroxyline. It gives

the best results as regards quality of image and colour, but it has a serious fault for lantern work—it is very apt to dry slightly opalescent. This, however, is not a necessary characteristic, and when it does occur varnishing removes it.

In conclusion, I may say that the kind of cotton that is best suited for washed emulsion is one that gives a film that is neither "rotten" nor "horny," but which when rubbed with the fingers after washing has a "soapy" feel, and is rather short in texture.

W. B. Bolton.

ELEMENTARY STEREOGRAPHY.

[North Middlesex Photographic Society.]

A Plea for Stereoscopic Photography.

A correctly prepared stereoscopic slide or transparency, when examined in the stereoscope, shows us the original view with all the realism that invested it at the moment we exposed our plate upon it. Stereoscopic pictures, binocularly observed, take us one step further than does the faculty of memory. The latter recalls to the mental gaze scenes invisible to the material eye; the former re-create, if not the veritable scenes themselves, at least transcriptions of them, perfect in all respects but two, namely, movement and colour. Atmosphere, distance, solidity, height, depth, and breadth are more than merely suggested in stereographs; to the eye, or rather to the brain, they appear as though they were really present in them. No single or monocular photograph, however skilful or cunning in the management of its lights and shadows, suggests more than a faint similitude of the attributes of actuality I have enumerated. The æsthetic beauty of good stereographs is inferior to that of Nature herself alone; their fidelity to that original can be scientifically demonstrated, and yet, while they allow little rein to the fads and freaks of your modern photographic impressionists, they are, nevertheless, artistic, as most of us understand that indefinable yet easily realisable term. The delight at viewing stereographs is so genuine and lasting, they are so easily prepared, and the educational advantages of stereography are so considerable, that there is room for wonder at the comparatively few photographers who practise it. Stereography is an art within an art, and it is readily acquired by anybody having an ordinary acquaintance with monocular photography. I have called it a thing of beauty. That it is a joy for ever, that its fascinations are of an enduring nature, may be proved by broaching the topic to most veteran photographers. The deep affection they retain for binocular work, their regret at its decadence, their pleasure at its resuscitation, can only be understood by stereographers.

Some Mistaken Ideas.

I have been extremely surprised, and just as much amused, at the large numbers of photographers—professional and amateur, veterans and novices—who are ignorant of the fundamentals of stereography, and whose ignorance leads them into all kinds of blunders when they come to talk or write of it. The supposition that stereoscopic effect is obtainable from two similar pictures is a common fallacy, and quite recently has formed the groundwork of articles and papers by people posing as teachers of their subject. As two dissimilar pictures are necessary to obtain stereoscopic effect, the absurdity is manifest. The other day, too, the novel property of "stereoscopicity of effect" was claimed for negatives on multiple-coated plates. Then, not long ago a writer of considerable scientific eminence said he had stood outside a shop window filled with monocular photographs, and, at a distance of several feet, saw them stereoscopically. Such a thing can't be done by any mortal man. Consider: I am quoting photographic "authorities" who enjoy the profit and dignity attaching to that agreeable reputation. I can the more readily excuse the ignorance of a bystander (an amateur, I divined, by his conversation) who, when I was recently using a binocular camera in Norfolk, told a friend who was with him that the function of my two lenses was to "unite the two images in the camera;" but even he, like the supposedly better-informed gentlemen I have quoted, had two eyes, and could not have known how, why, or what he saw with them.

Stereography in a Nutshell.

For here—in the philosophy of eyesight, in binocular vision—lies the whole subject of stereography ready cut and dried for assimilation by the meanest capacity. With our two eyes we see stereoscopically—that is, through them two dissimilar or unlike pictures of an object are carried to the brain, which combines them to form a third, which is what we think we see with the two eyes simultaneously. Now, mark the analogy between the eyes and the stereoscope. In the latter, two lenses are placed side by side to enable us at short focus to look at two dissimilar photographs—that is, photographs taken from slightly different points of view—and these pictures are conveyed through the eyes to the brain, which combines them to form a third picture having all the illusion of reality. That there are two points of view in binocular vision necessarily follows from the fact of the eyes being separated, but anybody can practically test the point for himself by using, first, the right eye alone, and then the left to look at a view or object, when it will be seen that the right eye takes in more of the right side of the view or object, and the left eye of the left side, while the picture seen, or supposed to be seen, by the two eyes differs from both the monocular pictures. Furthermore, the convergence of the optic axes upon near or distant objects enables us to appreciate solidity, relative size, and relative distance, and when looking through a stereoscope at two dissimilar photographs, convergence of the optic axes by refraction again comes into play to separate the planes of the subject, and to, in short, impart to the picture what I have already termed the realism of the original view or object.

Now suppose a pair of lenses, mounted on a camera front and separated by about the distance that separates the eyes, and a twin or binocular negative to be taken. The point of view of each lens was different, hence there must, in theory, be a dissimilarity in the two pictures, just as we have seen that there is in the two pictures seen by the two eyes. Practice agrees with theory in this. The right-hand negative has more of the right side of the picture than the left-hand negative has, and the left-hand negative has more of the left-hand side of the picture than the right-hand negative; and where the two negatives are joined the amount of subject included on those sides is severally less than that on the corresponding sides. Prints from such negatives having the same relation in the matter of right and left, and inclusion of subject as the double view as seen by the two lenses had, fulfil every condition necessary for binocular examination. Put it in another way. Imagine the lenses to be your eyes. They saw two dissimilar pictures of the view, and your positive prints are, practically, what your eyes or your lenses saw. The stereoscope lets you see the two views under the same angular conditions as they were taken, the result is a coalescence of the dissimilar results in the brain, and Nature herself over again, a perfect *facsimile* in miniature.

The Stereoscopic Camera and Lenses.

Although not essential to the production of binocular pictures, I shall assume the use of a binocular camera in stereography—that is, a camera fitted with a pair of lenses and a collapsible division extending from back to front, and virtually making two cameras of one. The lenses must be accurately paired as regards focus and diaphragms. For most kinds of work single lenses are employed, although rectilinear doublets have an advantage in the matter of extra rapidity and for short-focus work in giving freedom from distortion. A focal length of five inches will be most convenient; but for confined subjects a pair of wide-angle doublets, of about four inches focus, and for distant objects a pair of singles, of, say, seven inches, are desirable. Beyond that focal length it is seldom desirable to go, and I shall show you later that the occasions when even a pair of seven inches would be found serviceable are not frequent in the course of ordinary work. I do not wish to dogmatise on the debated point as to the distance of separation of the lenses when mounted on the camera front, but, from my own experience, would recommend three inches from centre to centre. The acme of convenience is, of course, gained by having the power of adjusting the lenses to suit near and distant objects, the rule to follow being, the nearer the object the less the separation, and the more distant the object the greater the separation. Three inches, however, will be found to strike a happy mean, and will obviate exaggeration of relief in most subjects. It need hardly be said that such a shutter must be used as will allow of simultaneous exposure of the two halves of the negative. Some photographers use a double cap.

A camera of the old-fashioned square bellows form is necessary, with an extra front for the twin lenses, and the collapsible septum already spoken of. A half-plate or larger camera is a stereoscopic camera *per se*, and can be converted for practical use at a small cost. As to size, I do not recommend anything larger than $7\frac{1}{2} \times 5$ or 8×5; using whole-plates and upwards for binocular work is a waste of plate area, and renders contact work, either for lantern slides or stereoscopic transparencies, out of the question if one wishes to have choice of the whole of the subject. Briefly, anything larger than half-plate is unnecessary, and has its drawbacks.

Mention of the camera gives me an opportunity of condemning the, it is to be feared, still existent mania for taper-bellows cameras. These, perhaps, have some slight advantage in lightness, but often put a barrier

in the way of the effective use of the rising and sliding fronts, and are useless for stereoscopic purposes. For these and other reasons I would strongly recommend the beginner to procure a camera of the square form. Many of my friends lament having sacrificed so much for the privilege of knocking off an ounce or two's weight. Up to about ten or a dozen years ago, such makers as Lane, Meagher, Spicer, and others, always sent out their square-form cameras with a detachable elastic division, to be used for binocular work. In those times, however, the division was rarely, if ever, required, stereography being virtually a dead letter, and I remember that, in the establishment of a well-known firm with whom I was then connected, there was quite an accumulation of these useless divisions. By-and-by, the makers ceased sending them out altogether.

Selection of Subject.

As this is a branch of stereography upon which little has been written, I enter upon it with peculiar pleasure. Most subjects are suitable for binocular treatment. In exercising the faculty of selection, a safe rule for the young stereographer is to split up his subject into several planes, and to assume that, in the foreground, the middle distance, and the distance, some prominent object, or series of objects, is placed. Such a rule simplifies the selection of subject considerably. Ninety photographers out of a hundred working monocular cameras, would either despise or overlook subjects capable of producing the most charming effects in the stereoscope. Conceive a bank of reeds in your foreground, a stream of water, with a gnarled tree overhanging it, a distance of shelving bank studded with brake and bramble—each of us can recall dozens of such rural vignettes, but most of us would not think them worth a plate in the monocular camera. Yet how entrancing and riveting in its realism, how astonishing to note each nodding reed standing out like life itself, each bough, twig, and branch solid and round against the sky, the liquid transparency of the water, the wonderful effect of distance in this simple picture when binocularly treated, and how one is tempted to stretch out one's hand—to look behind the picture as it were—to grasp the substance of what, after all, is only a shadow? An old cottage behind a rustic gate backed up with sheltering trees, a crazy bridge over a willow-lined river, shipping, most architectural subjects, interiors, tree studies, flowers, statuary, portraiture—all pay for binocular treatment. Nevertheless, open landscapes and seascapes, and subjects on one plane, however truthfully rendered, fail in binocular effect—indeed, long-focus work generally is scarcely satisfactory, and in that category possibly come instantaneous views of rapidly moving objects, though street life, and scenes deriving animation from the presence of people and other animals form capital subjects. Hand-camera studies of animated life always convey to me the negation of animation, but binocular hand-camera work gives me an idea of movement—of having a better approach to visual effect. Some binocular street scenes of Plymouth, taken by Mr. Seaman during the late Convention, struck me as wonderfully successful in that respect. With a stand camera it is not always possible to obtain such pictures, and therefore a hand camera must be used. Hence I regard the stereoscopic hand camera as the hand camera of the future. It will be a valuable adjunct to stereography. I refrain from saying how much it will benefit its users physically and mentally, how much it will increase the rapidity of plates, sharpen our nerves, add to our weight and our banking account, assure artistic expression to all our pictures, and decrease the distance between us and the photographic millennium; or I do not, alas! make hand cameras, do not sell them, have not a mandate to boom the hand camera, and sing its praises on every conceivable occasion. Hence this silence.

Reverting, however, to selection of subject, it will, I think, be found that there are more subjects within the scope of the binocular camera than the monocular—that is, there are subjects which are worthless as single pictures which well repay binocular treatment. Of course, the ideal amateur should be ready for both kinds of pictures as occasion may arise.

Stereographic Printing.

Stereoscopic negatives should be well exposed, and, if anything, incline towards softness, so that the prints may be without violent contrasts of light and shade, and too prominent high-lights printing out white. Indeed, flat-looking prints are preferable for binocular examination. I have a daughter aged eight. When she first saw some stereoscopic slides she thus summed up their principal charm and commonest defect, "They look quite real," she said; and of one of them, "Did it snow when you took that picture?" This snowiness is fatal to the best results, and, if unavoidable in the negative, should be obviated by a careful sunning down of all white patches in the prints. A surface paper is essential, as all rugosities are magnified in the stereoscope. Gelatine or collodion prints are preferable to albumen prints; enamelled bromide prints are also suitable. Tone is, of course, a matter of individual taste, but warm tones are, I think, more agreeable than cold ones, and contribute better to fidelity of effects.

We come now to a part of our subject which is very puzzling to the beginner, that is the transposition, trimming, and mounting of the prints. Still, all difficulty vanishes if we consider for a moment what it is we desire to produce in our finished print. We have taken two pictures. The one taken with the right lens must come on the right side of our mount; the one taken with the left lens, on the left side of the mount. But in the print from our negative the two pictures occupy reverse positions, so that the print must be cut in two in order that the two halves may be made to change places. For the sake of brevity, I will summarise the procedure necessary.

1. Both prints must have an identical base-line.
2. Each print must be two and a half inches wide.
3. Three inches in height will be sufficient; a little more or less is immaterial.
4. Trim the prints so that on the left of the right-hand picture and the right side of the left-hand picture a little more of the subject is seen than on the other sides of the pictures. Or, to put it another way, the sides of the prints which come together in mounting should each show more of the subject than the outside sides. A difference of from one-sixteenth to an eighth of an inch is usually a sufficient margin.
5. Allow a space of from one-sixteenth to an eighth of an inch to separate the prints.
6. Trim by foreground objects, and let a distance of not more than three inches separate them.

Spots or other defects in one of the prints show in the combined image, but if one print be printed a little deeper than the other it is hardly appreciable.

Stereoscopic Transparencies.

We must concede that stereoscopic prints do not compare in beauty of effect with stereoscopic transparencies; but I do not go so far as some in counselling transparency making alone, for in the preparation of prints one can graduate in the small niceties of stereography, and let them find ultimate expression in transparency work. Besides, sensitive paper is cheaper to learn on than glass plates. In actual practice, transparencies are easier to make than prints. What I have said of the desirable qualities of stereoscopic prints as compared with monocular prints applies, in a like degree, to binocular transparencies as compared with lantern slides. The ideal brilliancy, clearness, and transparency of the latter are not necessary; indeed, they are in the nature of drawbacks. Of the methods of making glass stereographs, commend me to that by copying in the camera. The following outline of a working method will supply such details as will enable an amateur to undertake stereoscopic transparency making at a very small outlay of ingenuity and money. At the back of an open box, having a central partition, the negative is placed in a suitable holder, inverted as regards top and bottom, film side out, and facing the light, which may be either direct or reflected. The binocular camera used for the negative should be fixed to a rigid board and register secured between negative and ground glass. The space between the objective and the negative holder should preferably be covered in with opaque material. The two images, as seen on the ground glass, will not be inverted, and will be in their proper positions as regards left and right, and consequently will not need transposition. The same rules as to identity of base-line and inclusion of subject must be observed as with prints, but you will easily see that they are considerably simplified. I myself use a special camera for the purpose. When the transparency is developed and dried, it is masked and bound up in the usual way, and, being viewed through its glass support, is backed up with either plain or ground glass.

For viewing slides and transparencies, a stereoscope of the familiar Holmes form will be found convenient, but it is very seldom found made in accordance with theory, as it should be so adjusted as to allow of the separation of the lenses to suit degrees of separation found in the eyes of individuals.

The Stereoscopic Revival.

I quote this oft-used term only to anathematise it. It is time we heard the last of it, for stereography is well past the revival stage. For a long time anterior to 1887 it was virtually moribund, but in The British Journal Photographic Almanac for 1887 appeared an article by the Editor which handled the subject in a succinct and instructive form, and was instrumental in rescuing stereography from neglect. Mr. Chadwick, of Manchester, subsequently devoted a great deal of attention to the subject. Some of his writings have been republished as *The*

Stereoscopic Manual, which, with the ALMANAC named, will tell a beginner all he need know at the outset. If he cares to dive into the profundities of the stereoscope and binocular vision, let him consult Brewster's *Stereoscope*. I conclnde with a question. Why do not promotera of photographic exhibitiona have classes for stereographs? A double end would be gained. Photographic exhibitions which stand sadly in need of novel attractiona would possibly secure one, and stereography among amateurs wonld receive an encouraging fillip. THOMAS BEDDING.

A SUGGESTED IMPROVEMENT IN THE CORRECTION OF LENSES FOR PHOTO-MICROGRAPHY, PHOTOGRAPHY, AND PHOTO-ASTROGRAPHY.

[New York Medical Journal.]

PRIOR to the time of the late Col. J. J. Woodward, M.D., surgeon of the United States Army, say twenty-five years ago, photo-micrography was in its infancy. It is true that photographs of microscopic objects had been made, but they were crude and unsatisfactory, and were all made with what we would call low-power objectives. Although the objectives then made were of excellent construction and well adapted to the revelation of the structure of minute objects to the eye, yet the photographs made with them were greatly inferior in clearness and sharpness to the virtual image appreciated by the retina. The cause of this was not far to seek, and was due to the lack of coincidence of the visual with the so-called actinic focus. At the period mentioned, the art of photography was almost exclusively practised with the aid of collodio-iodide plates, which were very sensitive to the blue, violet, and ultra-violet (more refrangible), and but feebly sensitive to the green, yellow, and red (less refrangible) rays. *Per contra*, these latter rays impress the eye so forcibly that the effect of the more refrangible rays is almost obscured, that is, when mingled with the others, as in ordinary white light. The practical outcome of this condition was that, when the ground glass of the camera was in a position that gave the sharpest image to the eye, this image could not be duplicated as to sharpness in the developed photographic plate occupying the plane previously occupied by the ground glass.

In order to obtain a sharp photographic image it was necessary either to shorten the anterior conjugate focus, which involved the veriest guesswork, and was practically unavailable, or else to move the plate to a point nearer the lens where the actinic rays came to their posterior conjugate focus. This was perfectly practical, and by repeated experiment the relation of the actinic to the visual focus in a given lens could be ascertained. Although practical, this method was hardly satisfactory.

In ordinary photography, the difficulty attending this difference in the natural positions of the actinic and visual foci had already been overcome by making the visual focus correspond with the actinic by constructing the lens so that it should be left in a state of moderate "under-correction," as it is termed by opticians.

Among the first to appreciate the value of this, as applied to photo-micrography, was Colonel Woodward, and the first opticians to give it practical form were, I believe, Mr. William Wales, of New York, and Mr. Ernst Gundlach, then of Berlin, but now for many years a practical optician in this country. This example was followed by Tol[illegible]s, of Boston; Powell & Leland, of London, and others.

Woodward was one of the most accomplished microscopists, so far as the manipulation of the instrument was concerned, that ever lived. His skill in securing the virtual image, and in projecting the real image, was at that time equalled by few and probably surpassed by none.

With Woodward'a skill, and the possession of lenses specially adapted to his purpose, the results obtained by him were the wonder of the scientific world.

Since his time, photo-micrography has, in the main, followed the paths he marked out, and the improvements in the art since then have simply kept pace with the gradual improvement of the objective, and especially in the direction of increased apertures. One notable advance in the technique, however, is Abbé's happy conception of the projection ocular.*

The collodio-iodide gave place some years ago to the gelatino-bromide plate, which, like its predecessor, is especially sensitive to the blue and more refrangible rays, and almost wholly insensitive to those which give the strongest visual impression.

In order to obtain the sharpest image on such a plate, the lens must of necessity be under-corrected, as already stated. In accomplishing this, however, there is a certain loss of visual excellence, which, however, is of little moment in ordinary photography. That this under-correction of lenses for photo-micrography results in an impairment of their visual excellence is well known to opticians, but has thus far received but little notice from the actual users of the lenses in question. A few recent writers, however, have directed attention to the matter.

Londe (*La Photographie Médicale*, Paris, 1893) says: "The first and most important question is the choice of objectives. These may be excellent for observation and more than mediocre for photography."

Mercer (*Journ. Royal Micro. Soc.*, June, 1892) in speaking of some of the objectives used by him in photo-micrography, says: "The Wales objectives are corrected spherically for the violet ray. The violet image is therefore somewhat superior to the visual, with which, however, it is coincident."

Czapski, in a letter published in Van Heurck's treatise on the microscope (London, 1893), says:—"In every case the objectives specially constructed by opticians for photography can never be advantageously employed for observations and inversely."

From the foregoing it will be clear that lenses which were best for visual purposes were not the best for photographic use, and it was necessary, therefore, when the most perfect results were sought in both departments, to have a double set of objectives, and many investigators did provide themselves with such an outfit.*

The inconvenience and lack of economy involved in this arrangement are manifest, but how to obviate it does not appear to have occurred to opticians or others interested in the subject.

Having been practically familiar with photography and photo-micrography for upwards of twenty years, I have had the opportunity in that period to become reasonably familiar with the inherent defects of their technique, but it waa not until the latter part of 1891 that I perceived that a way out of the difficulty might be readily found.

During the past five or six years the manufacturers of gelatino-bromide plates have placed on the market plates which are extremely sensitive to yellow light, and but feebly so to the blue, violet, ultra-violet rays of the spectrum.

If, now, the objective be corrected for yellow instead of for blue or violet light, the negative being made on one of these yellow-sensitive, or so-called "orthochromatic" plates, there should be an exact correspondence of the visual and chemical foci, and the resulting picture should be superior to the one that could be obtained by the ordinary procedures—that is, an under-corrected lens and blue-sensitive plate; and at the same time the objective would not have its visual excellence impaired, supposing, of course, that the optician performs his part with care and skill.

In order to test the practical value of this theoretical reasoning, I requested Mr. H. R. Spencer, now of the Spencer & Smith Optical Company, of Buffalo, N.Y., to calculate the formula and construct a lens which would fulfil the stated requirements. The result was a lens of one-sixth of an inch equivalent focus, and possessing a numerical aperture of 1·35. With this objective I have resolved and photographed the *Amphipleura pellucida* in lines, and have photographed both the *Navicula rhomboides* and the *Van Heurckia crassinervis* in lines and beads.†

In ordinary histological work, with amplification ranging from 200 to 400 diameters, the results with this lens have been very much more satisfactory than I have been able to obtain by any other combination of lenses or plates.

With a quarter-inch objective of the same construction, made by Spencer & Smith on the order of Dr. J. A. Fordyce, of this city, I have resolved the *A. pellucida* with white light, and have demonstrated the resolution to him and to others. With a one-fifteenth of an inch of the same construction, the property of Dr. J. H. Kellogg, of Battle Creek, Mich., I made the photograph of the podura which accompanies this paper (see plate).

In order to further test the correctness of the principles involved, I requested Mr. Turner, of the Gundlach Optical Company, Rochester, N. Y., to make a three-quarter inch lens of moderate aperture (N. A. 0·33). Considering the power, aperture, and price ($12), the lens gave very satisfactory results, and wholly confirmatory of the theoretical demand.

* Peculiar advantages have been claimed on behalf of objectives constructed according to the so-called "apochromatic" system. These lenses, however, possess certain disadvantages, which restrain me from giving them unqualified commendation.

* It must be admitted that some of the apochromatics of short focus (2 mm.) obviate in a measure this difficulty; but those of longer focus have not, at least in my hands, proved satisfactory.

† As regards the last-named object, it has been previously photographed in beads, so far as I am aware, only by Van Heurck with the aid of a lens of higher power, one-eighth of an inch and much larger aperture (N. A. 1·60).

In using these lenses with yellow-sensitive plates, there is a distinct gain in definition and purity of image, both visual and photographic, if the object be illuminated with light of corresponding refrangibility (λ 5892). This may be obtained absolutely by employing a sodium flame, or approximately by intercepting the white light with a medium capable of absorbing the rays of short wave-length.

For the greater part of photo-micrographic work, and especially that which deals with histology, I unhesitatingly recommend the technique here described, which, briefly stated, consists in the use of objectives whose correctness shall be adjusted to the D instead of the G or H lines, and in connexion with plates specially sensitive to D light, and having the object illuminated as near as may be with rays of the same refrangibility.

If, however, we have to deal with objects in which we must resolve or optically separate particles, whose approximation to each other is less than, say, $\frac{1}{125000}$ of an inch, the foregoing statements do not apply.

The studies of Helmholtz and of Abbé have placed us in possession of a formula which appears to be theoretically and practically true, and may be expressed as follows:—

$$\text{R.-p.} = \frac{\text{n. x sin u.}}{\lambda}$$

"R.-p." here indicates the resolving power of the objective; "n." the refractive index of the medium lying between the cover glass of the object and the front lens of the objective (be the same air, water, glycerin, or oil); "u." the semi-angle of the aperture of the objective; "sin" the natural sine of said semi-angle; and "λ" the wave-length of the light employed. Now, the "numerical aperture" of the lens is equal to n. x sin u., and the equation becomes simplified into—

$$\text{R.-p.} = \frac{\text{N. A.}}{\lambda}$$

From this it will be seen that, if we desire to obtain extreme resolution, it is necessary to employ objectives of the greatest numerical aperture, and employ in connexion therewith such visible rays as possess the shortest wave lengths. For the photographic reproductions of such images blue-violet sensitive plates, with under-corrected lenses and approximately blue or violet illumination (Woodward's technique) will give the best results. At the present time Mr. E. M. Nelson, of London, is devoting special attention to the development of this branch of photo-micrography.

It will be noted that the formula above given does not take into account the equivalent focus or magnifying power of the lens; in other words, that this factor has no influence on the resolving power of the objective. This is correct. A well-connected 1-inch objective will resolve exactly as well as an equally good ¼-inch, provided the factors N. A. and λ remain the same. I here allude to this matter, as every few years some one imagines that he is on the verge of great discoveries, to be brought about by the simple feat of increasing the amplification of the image. Let us assume that a photograph be made with an amplification of 3000 diameters, with N. A. the greatest and λ the least possible. This photograph may then be further enlarged to 30,000 or 300,000, but the enlarged pictures will not show any finer or more intimate structure than was delineated on the original smaller picture.*

Although orthochromatic or isochromatic plates have been regular articles of commerce for several years, they are used by practical photographers to a limited extent only. This is due to the fact that, despite the acknowledged superiority of the plates themselves the negatives made on them with the lenses ordinarily at command, have not yielded as satisfactory results in some respects as were obtained on the older blue-sensitive plates. The reason of this is almost self-evident. All ordinary photographic lenses at present constructed are under-corrected, and intentionally so, in order to make the visual image agree with that formed by the shorter wave-lengths, to which alone the old-style plates are sensitive.

If, for any reason, the photographer desires to use orthochromatic plates, either for copying, for portraiture, or in general landscape work, the only rational procedure is to use lenses that are specially corrected for them. To carry out this idea, the Gundlach Optical Co. kindly constructed an 8 × 10-inch "rapid-rectigraph" lens of 13-inch equivalent focus, corrected for the D instead of the G line of the spectrum. The performance of the lens has fully justified the induction that led to its construction.

When orthochromatic plates first came into general use, the astronomers seized on them with avidity; but it was not long before they became dissatisfied with the results. At a recent astronomical congress in France, the sentiment of the majority of those present was that more faithful and satisfactory images of the heavenly bodies were obtained on the blue than on the yellow-sensitive plates.

Little of value had been done in photo-astrography until the late Mr. Lewis Rutherford, of New York, produced some photographs of the moon which greatly surpassed any of the sort that had been previously accomplished with the refracting telescope.* Rutherford used a telescope with the objective so extremely under-corrected that it was almost useless for visual purposes. This lens, it is almost needless to say, was specially corrected for the shorter wave-lengths, to be used in connexion with wet-collodion blue-sensitive plates, the only ones at that time available. Some astronomers employ a telescope corrected for best visual definition and a duplicate specially corrected for photography, and it is the latter that they have usually employed with the orthochromatic plates. The reason, then, that these plates have fallen into disfavour with many of them is due to the fact that they have used the wrong lenses with the right plates.

One of the principal advantages connected with yellow-sensitive plates is their ability to record the details of distant objects in a more satisfactory manner than is possible with the ordinary ones. Some four years ago the writer called attention (*Anthony's Photographic Bulletin*, February 9, 1889) to the *graphotelic* properties of these plates in connexion with landscape photography. If this special attribute of yellow-sensitive plates is of value in connexion with distances limited by, perhaps, a score of miles, it certainly seems that it should not be overlooked by those who work their lenses with the anterior conjugate focus many millions of times greater than the posterior.

HENRY G. PIFFARD, A.M., M.D.

*Some months ago a friend, who is a sub-chief in one of the principal bacteriological laboratories of this city, remarked to the writer that the height of his ambition was to possess and work with a Zeiss $\frac{1}{12}$-inch apochromatic. I replied that, if he fancied Zeiss lenses, he had better select a $\frac{1}{12}$-inch, as with it he would be able to do more and better work in the line of research and discovery than with the $\frac{1}{18}$-inch. My reply was evidently received with extreme incredulity. If we refer to Zeiss' catalogue, we shall find that the numerical aperture of the $\frac{1}{18}$-inch is given as 1·18, but the $\frac{1}{12}$-inch of the same maker has a N. A. of 1·30. He makes still another $\frac{1}{12}$-inch, N. A. 1·40. Applying these figures to the equation above given, and assuming for white light λ 5269, we shall find that the $\frac{1}{18}$-inch will resolve or differentiate particles that approach each other as closely as about 114,000 to the inch, while the $\frac{1}{12}$-inch of N. A. 1·30 will resolve particles as close as about 125,000 to the inch, and the $\frac{1}{12}$-inch, N. A. 1·40, will take optical cognisance of lines of particles that approximate each other to within about $\frac{1}{125000}$ of an inch.

*I am not unmindful of the magnificent work done by Dr. Henry Draper with his reflecting telescope.

PHOTOGRAPHY FOR ILLUSTRATING THE PRACTICE OF MEDICINE AND SURGERY IN A GREAT HOSPITAL.†

THE photographer in charge of the illustrative department of a great hospital should at all times be attentive to his duties. He should be respectful, and command respect from others. He should remember the responsibilities of his position, and maintain the dignity of his profession. Patients should be received in a quiet, respectful manner, and if in any way reluctant to be photographed, which is seldom the case, they should be led to understand that all is being done for their own and others' good. They should be kindly and gently instructed how to do their part as to position and immobility. In their treatment, age, disease, and personal traits must be considered. In some cases where a time exposure is required, it is advisable to momentarily suspend respiration, especially if the part under treatment involves the chest or abdomen. With proper instruction to the patient, and the use of a good pneumatic exposure device under strong light, this is quite easy to accomplish. The acquaintance of the photographer with peculiarities of various diseases will enable him to produce better results than he is likely to obtain through optics and chemistry alone. Hence his less crowded hours may be profitably spent in study somewhat outside of the ordinary photographic curriculum. No little part in the successful illustrating of many cases devolves upon the physician or surgeon having them in charge. His opportunities for their study enable him to point out to the photographer the especial features of greatest interest to be shown in the illustration. He should at all times accompany to the photographical department, or send with the patient an instructed assistant who knows something about the subject. All patients should be accompanied by a written statement, giving name, age, nativity, occupation, disease, date of admission to the hospital, number of ward or bed, and page of hospital history book where the record of treatment is entered. Upon this statement the photographer should place date of making negative, size of

†Concluded from page 626.

plate used and its serial number, for future reference. The accompanying form shows the method followed at Bellevue :—

Appointments should be made with the Photographer one or two days in advance of sending patients to the Photographic Department.

REQUISITION FOR PHOTOGRAPH.

BELLEVUE HOSPITAL.

.....189

Ward No.....Medical Division No.....Hospital History Book, Page No.....Name.....Age.....Nativity.....
Occupation.....
Date of Admission.....
Disease.....
Date of Operation.....
Operation, by whom performed.....
Visiting Physician.

NUMBER OF EXTRA COPIES WANTED.....
House Physician.

Visiting Physician's or Surgeon's Copy (to be) mounted on Cardboard ?

House Physician's or Surgeon's Copy (not to be) mounted on Cardboard ?

☞ One copy of the Photograph made on this requisition will be furnished FREE to the *Visiting Physician or Surgeon* of the division whose autograph it bears. Also one copy to the *House Physician or Surgeon* whose autograph it bears, and one copy for the *Hospital Record Book*, which copy is to be fastened in the book, with the History of the case.

All further copies made are classed as Extras, and must be paid for when ordered.

Properly filled out and signed requisitions must be sent in advance or accompany each patient.

The physician, assistant, or nurse in charge should prepare the patient for photographing. Removing bandages, dressings and cleansing wounds is *not* a part of a photographer's work; all this should be done, as far as may be, before taking the patient to the photographer. It is important that patients who have been photographed before and during treatment be again photographed before their discharge from the hospital. Thus a comparison may be made of the condition at the two or more periods. The hospital staff should be instructed that the preparation of pathological specimens in any fluid of non-actinic colour is detrimental to their illustration by photography. Most such specimens submerged in fluids of proper density are more successfully treated than in the open air. The essentials to successful photographical work in hospital service are suitably constructed and lighted operating, chemical, and printing rooms, ample apparatus, order, and system, and a photographer who is prompted in his work not alone by the small pecuniary reward which it may bring. He should have an interest in the progress of science and the relief of human suffering.

O. G. MASON.

THE CAMERA AND THE PULPIT.

Read at the Congress of Photographers.]

THE art of writing or recording by means of light, which we understand by "photography," has come to be recognised as one of the most valuable instruments of modern civilisation. There is scarcely a line of human achievement which has not found in it a servant whose assistance has become indispensable in bearing old burdens and in assuming new ones. Especially is this the case in the wide field of education. Intellectual culture and moral culture both have found it profitable and necessary to lay tribute upon the photographic camera and upon its necessary adjunct, the optical lantern.

In all education the true method is to proceed from the concrete to the abstract—from the objective to the subjective. This is true not only in school life, but in the large education of the masses of the people. It is interesting to notice the vast development of the illustrated material now presented to the public in the periodical press as well as in the stately volume. Hardly a daily paper do we find which does not boast of its special artist, and every subject must have its appropriate woodcut, engraving, or photogravure. This has been brought about, to a great extent, by the use of the camera, by which the vast majority of this illustration is made possible.

General science, the fine arts, commerce, the secular school, have all invoked the light of heaven to shine upon them. Why should not the teacher of religion also invoke the aid of this servant of God to render vivid and clear spiritual truth ?

The camera has received a hearty welcome into the studio, the manufactory, the school-room, the lodge-room. It has also received a like welcome in recent years into the Church. Religion has its basis in history. It expresses its symbols in art. The earliest forms of architecture, as well as the highest expressions of art, are religious in their motive. The temple became the repository of all that was most glorious in sculpture and painting. The history of the religions of mankind cannot well be studied without a knowledge of the monuments of past civilisations.

In recent years there has been a great advance in the study of archæology. Here the camera has come in as a large factor. The growth of the study of history has been very great, and the study of comparative religions has been a part of the general historical movement.

In the teaching of the life and history of the Church, the pulpit cannot do without the camera. Christian art and archæology go hand in hand. The inscriptions are best copied now by the camera. Many places there are where the use of the squeeze paper and brush are indispensable; but in most instances photography saves labour and accurately preserves the record. In the study of the remains of the early centuries of the Church, the religious teacher finds that the picture made on the spot is the best means of rendering clear and vivid the thought he wishes to present. The work done by the Palestine Exploration Fund and the Egyptian Exploration Fund within the past twenty-five years has brought to light a vast lot of material whose richness and importance as contributions to the study of the religious life of these countries is simply inestimable. Thus the study of the Christian evidences, from the standpoint of archæology, the study of the religions of antiquity as preserved in their monuments, the study of the development of Christian art as found in the catacombs and elsewhere, is rendered possible and exceedingly valuable by the rich fruits of the camera.

The Christian missionary to foreign fields now goes to his work armed with his camera and optical lantern. He has found that the masses of the people are attracted by the pictoral presentation of Bible themes. In the great "melas," or fairs held in various parts of India may often be found, in the midst of the thronging thousands, the tent of the missionary, who attracts the attention of the people by his screen projections and gains audience for the truth, which is thus carried through the eye to the heart.

The teacher in the modern Sunday school has likewise added to his maps and charts the aid of photography to educate his fellow-workers. To reproduce a map, to illustrate the life of our Lord or the journeys of His apostles, to bring before the people the manners and customs of Bible lands, the beam of light as a swift-winged messenger comes to his aid. In studying recently the book of Nehemiah and his great reform, during which he built up the diamantled walls of Jerusalem, discussion turned upon the course of the walls and the general topography of the city. From views taken on the spot with my own camera a few months ago it became possible to illustrate the subject in such a manner as to invest it with the utmost reality and vividness.

In the ordinary ministrations of the pulpit the camera is coming to be recognised. Under certain circumstances, and on given occasions, the use of the screen projection is assuredly a powerful adjunct. Its use may, of course, degenerate into a mere spectacular performance which is only a common show; but, in proper hands, beneficent and lasting results must certainly follow. A pastor in England affirms that, through one of his illustrated sermons, delivered at various places, over three hundred persons have been roused to lead a better life. The illustrated sermon may have as real dignity and effectiveness as the illustrated volume, and be more impressive because of the added element of personality.

The existence in England of what is called the "lantern service" is well known. Illustrated themes are published and slides are rented. Considerable space was given to this subject some months ago in the *Review of Reviews*, the article being from the energetic pen of Mr. W. T. Stead. In this country the interest in this kind of work has greatly augmented within the last ten years. Some of our churches are now provided with apparatus for this purpose. One church recently built in Chicago has a laboratory for the manufacture of the gases, and the pastor, who, it is needless to say, is a thoroughly live man, has great success in presenting the truth thus illustrated to his people. Another church, in Minneapolis, I believe, is provided with a screen, stereopticon, &c., all at the control of the pastor by means of electric communications. If he desires while preaching to illustrate his subject, he may, by pressing the respective buttons, unroll the screen, turn out the lights, and signal the operator for the picture. What is more, in many of our theological schools may be found a complete optical outfit for the purpose of teaching Christian art, architecture, paleography, and the latest results in exploration and discovery in Bible lands.

All this serves to illustrate the statement that "science is the handmaid of religion," and none are so ready to acknowledge this as the Christian teacher. Many clergymen are expert amateur photographers, and are finding the camera a valuable adjunct in their work. It must not be understood that the illustrated sermon is in any sense to supersede the ordinary service of the Church, but to find its place in specific lines, as above indicated. The Church is more and more to use the camera: (1) To teach Christian art and archæology; (2) in work in the foreign mission fields; (3) in the Sunday school and normal work; (4) in special services to children; (5) in evangelistic services among the masses; (6) in providing a high class of instruction along the line of art and history.

REV. DR. A. W. PATTEN.

SENSITIVENESS OF PHOTOGRAPHIC PLATES.

THE extensive use of photography in science, art, and industry makes it desirable to know something regarding the sensitiveness of the plate employed for any specific purpose. The subject, however, is one of great difficulty, owing to the fact that we have not been able hitherto to secure a satisfactory standard of light with which to compare plates.

The method now in use by the makers of commercial plates to indicate sensitiveness is far from satisfactory, since there is no direct relation between the numbers used by the same maker, and still less when the plates of different makers are compared. The No. 25 of one maker may indicate greater sensitiveness than the No. 50 of another; and, in general, the numbers do not convey any definite information as to the time of exposure required. It seems to me that it would be an important step in advance if the makers of commercial plates would at least adopt a uniform system in indicating the sensitiveness, so that the numbers (even if arbitrary) would in all cases have the same meaning.

It appears now well-nigh impracticable to use sunlight as a direct standard for illumination, unless a standard plate is adopted for comparison. But I think it is not impracticable to employ artificial light which will give an absolute measure of sensitiveness for the light employed. Artificial light, however, whether it be from the burning magnesium, the electric lamp, or the flame of a candle, does not have the actinic properties of sunlight, and hence different brands of plates, which have the same sensitiveness for any particular artificial light, may be quite different for sunlight.

It seems to be tacitly assumed, however, by most writers that the standardising of a plate in one particular artificial light is all that is necessary. On the contrary, the problem is only partially solved.

During the past ten years I have made hundreds of experiments on the relative sensitiveness of plates in candlelight and daylight, from which it is concluded that the plates of different makers do not necessarily hold the same relation of sensitiveness for the two kinds of illumination. In the standardising of plates, where the minimum visible is used as the measurement of sensitiveness, we meet with a peculiar phenomenon, which may greatly impair, if not entirely vitiate, our results. I refer to the effect of extraneous light received by the plate in its manipulation.

When the wet-collodion plate was in general use, it was imagined by many that the plate became more sensitive if subjected to preliminary or supplementary exposure. In 1884 I experimented on an emulsion plate, and found no change in sensitiveness due to preliminary exposure, and hence inferred that the only effect was simply fogging, which would cause the collodion or emulsion plate to start more quickly in development. I subsequently found that this view of the subject requires some modification. The reason why no difference was noticed in 1884 in the case of preliminary exposure was undoubtedly due to the fact that the plate had already received, in the process of manufacture, all the preliminary exposure it would stand. In the early days of commercial emulsion plates, they were frequently fogged so badly before they reached the consumer as to be greatly impaired, and sometimes practically valueless.

Last year, in making experiments on the actinic effect of ordinary red glass used for dark-room illumination, employing a 10-candle lamp, I found such discordant values for different pieces of the same plate when exposed and developed under similar conditions as to call for an investigation of the cause. The statement has frequently been made that the same plate, in its different parts, indicated great variations of sensitiveness. This idea is so directly opposed to every-day practical work in landscape and portrait photography as to seem well-nigh incredible. In fact, if it were a common occurence, one could not make a correct negative. It occurred to me that the abnormal results which I obtained were in some way connected with the manipulation of the plate during the exposure and development. I accordingly made the following experiment: A Seed No. 26 4 × 5 plate was cut in three strips, using a very feeble light during the operation. Strip No. 1 was kept in the dark; No. 2 received a preliminary exposure of two seconds in the dark room at one foot distance from the red glass window; No. 3 received a supplementary exposure of two seconds in the same way. The three pieces of plate were successively exposed in the sensitometer to the light of a candle for ten seconds, placed at ten feet distance. They were then developed together in total darkness. Strip No. 1 printed the figure 40; Nos. 2 and 3, 8 and 10 respectively. This experiment indicated that, when a plate received a preliminary or supplementary exposure, it appeared to be about five times more sensitive.

I had observed a similar phenomenon in the case of wet collodion in October, 1891, but attached no importance to it at the time.

The most sensitive wet-collodion plate which I have used requires an exposure of 2·5 seconds for a naked candle at one foot distance to make a legible impression; but, by a suitable amount of preliminary or supplementary exposure, the time may be reduced to 0·3 second, indicating an apparent increase in sensitiveness of eight times. A great many experiments have been made with various kinds of emulsion plates in candlelight, feeble daylight, and through red glass, all giving similar results. In order to get the maximum effect, the plate should receive all the preliminary exposure it will stand without producing dense fog. If there is too much fog, the numbers will be buried under it.

This peculiar behaviour of photographic plates in light of feeble actinic energy explains very clearly why experimenters have got such discordant results in attempting to standardise them. The phenomenon probably disappears when strong daylight is used, for we know by experience that preliminary exposure does not make a plate more sensitive when used for a landscape negative. The subject may, however, have an important bearing in astronomical photography where the light has very feeble actinic energy, as in the case of stellar photographs.

The following appears to me to be the explanation of the apparent increase in sensitiveness, due to preliminary exposure. A photographic plate may receive a certain amount of light, and when placed in the developer show no visible blackening of the film. This fact is apparent in using a slow plate like wet collodion. A plate, therefore, which has had a certain amount of preliminary exposure, may be under such strain that a small amount of additional exposure will enable the developer to reduce the bromide of silver. Under this conception the actinic effect should be measured by the intensity of the light multiplied by the time, plus a constant, the constant being a function of the original sensitiveness. In landscape photography the constant would be such a small interval of time as to be entirely lost.

In view of what has just been stated regarding the behaviour of plates in light of feeble actinic energy, it is readily seen that our present method of standardising plates, by using the minimum visible, is open to very serious objections, owing to the difficulty in manipulating plates in the dark room. With the more rapid commercial plates a single second exposure before the developing lamp is sufficient to materially modify the result.

After considerable thought on this subject, it has occurred to me that we can most readily get a uniform system for designating the sensitiveness of plates by adopting an arbitrary plate as the standard of reference, and making our compositions by daylight as well as artificial light. The wet-collodion plate has frequently been suggested as a standard of reference; but it has been objected to on the ground that the sensitiveness would not be constant. As a matter of convenience, I presume a slow emulsion plate would answer the purpose better, since such a plate could be interchanged among the makers of commercial plates. By adopting such a method we would at least have a homogeneous system.

I have at different times determined the sensitiveness of nearly all well-known brands of commercial plates for daylight, candle-light, and for red glass. My normal collodion plate is used as the standard of reference for daylight comparisons.

The following are some general results for sensitiveness in daylight:—

Wet collodion	1
Slow lantern-slide plate	10
Rapid emulsion	120
Most rapid plate examined	220.

For candle-light, or any other artificial light, the absolute time required to make a legible record can be ascertained. For a naked candle, at one foot distance, the following are some of the results:—

Normal collodion	2·5 seconds.
Slow lantern-slide plate	$\frac{1}{10}$,,
Rapid emulsion	$\frac{1}{120}$,,
Most rapid isochromatic	$\frac{1}{300}$,,

PROFESSOR GEORGE W. HOUGH.

THE PREPARATION OF TABLETS FOR VITRO-ENAMELLING.

BEFORE the members of the London and Provincial Photographic Association on Thursday, September 28th, Mr. A. Haddon read a paper, accompanied by a demonstration, on this subject. He hoped, he said, to show that plaque-making was not a formidable undertaking. With a little care, plaques could be made quite as good as the best that could be purchased, and cheaper. It was surprising that so few photographers prepared vitrifiable images, as they were permanent, and would stand any amount of magnification without loss of detail. Many amateurs never heard of a vitrifiable image; some fancy that it required a life of study to produce passable results; others would like to try their hand at it, but they had been told that the wet-collodion process must be used for it. No good book in the English language had been published on the subject, and, if one had to buy all the plaques required in one's early experiments, it required a long purse, so that to many mere expense is a powerful cause for not taking up the subject. He would endeavour to remove the last reason by demonstrating the preparation of plaques. Whatever method of preparing the positive image was employed, a muffle was necessitated. Any one could build a small furnace at a cost which need not be a serious item. Fire bricks could be purchased at about 3*d.* each.

Enamel was nothing more than very fusible glass with some oxides in it, in order to make it black or white, as occasion demanded. White enamel was not worth making when it could be obtained commercially at a low figure. Mr. Guilbert Marten, of Monkwell-street, sold it for 6½*d.* a pound for a bag of twenty pounds, 7*d.* for a single pound. The enamel he (Mr. Haddon) had used was given him by Mr. Bolas. If he had had to purchase all the plaques he had used in his experiments, it would have cost him over 20*l.*, whereas it had only cost him a few shillings for copper foil. A plaque 1¾ × 1¾, making allowance for the copper basis, held forty-three grains of enamel. Ten plaques of the size named could be made from one ounce of copper, and 150 from one pound. If one used a pound of enamel (7*d.*) and a pound of copper (2*s.* 6*d.*), one would be able to produce 150 plaques for that small sum; and, if they sold 1*s.* each, they would cost 7*l.* 10*s.* The enamel should first of all be reduced to a certain consistence by being pounded with a hardened steel pestle in a wooden mortar. It is then sifted through a sieve of a certain size of mesh, the coarse particles being again subjected to pounding. The enamel powder is then soaked in a solution of nitric acid 1 : 4 for from three to twelve hours; this removes all metallic impurities, particles of wood, &c. After further treatment, the coarse particles of the powder are separated from the fine by placing it in water and then separating it into two solutions. The particles

will have subsided in two hours, when the water is poured off, and the deposits washed a third time to remove any acid left.

As to the basis of the plaque Mr. Haddon said copper was found to be the best, as the enamel adheres to it more firmly than to other metals. Virgin copper was best, and it was recommended to use it only recently rolled, but he found that age made little or no difference to its properties. Having remarked that the thicknesses of the copper varied with the size of the plaque, he said the copper foil should be annealed and then cooled, and next freed from oxide with a nail-brush dipped in a one per cent. solution of nitric acid and brush charged with powdered flagstone. Deprived of all dirt, it presents the appearance of pure metallic copper.

In determining the size and shape of the copper plaque a piece of zinc or brass the exact size of the shape required must be used. The copper must be a little larger than the zinc or brass, and the shape traced on the copper by means of a small steel tool that has been previously hardened and tempered. It is better to work to about one thirty-second larger than is wanted. The copper plaque being trimmed, the edges are turned up all round, so that it has the appearance of an oval tray. The shape is then placed on the copper, and both shape and form are gripped between the jaws of a small hand vice, burnished over and the edge raised up. Burnishing enabled the plaque to resist deformation in the vitrification; if the edges were not raised, the enamel would run off, and the curved copper would not remain true in shape. If placed on a flat piece of wood, and the excess of edge filed off with a fine cut file (a coarse cut file would indent the edges). Generally the copper plaques are filed on box wood; copper filings should not be allowed to get in the enamel, as black of green specks result.

As many boxwood shapes will be required as forms of plaques are wanted, the shape being imparted by the use of curving tool, resembling a spatula, being pressed over the back of the copper when in contact with the shape. The copper plaques are pickled to remove oxide, &c., from the surface, in sulphuric acid solution 1:5; then thoroughly rinsed in cold water, passed through sawdust, wiped carefully, and dried.

The enamel powder having settled, the water is poured from the two vessels. The copper shape is now placed with its concave surface upwards on some concave support. The fine enamel is applied to the concave surface by means of a hog's-hair brush. It should be of a creamy consistency, and should be spread uniformly. The water is got rid of by the application of blotting-paper. The coarse enamel is applied in a similar manner to the front or convex side of the copper form, and finally, when the desired evenness of surface has been obtained, the moisture remaining is removed by evaporation over a Bunsen burner. The plaque is then placed on a suitable support for firing, some recommend a refractory eathenware, the latter being treated with a coating of kaolin or rouge to prevent fusion. He did not know were this earthenware could be obtained in thin sheets. He had tried platinum, nickel, and iron for the purpose, and preferred the latter.

Muffles were of two kinds, open and closed. Generally speaking, enamellers preferred the open to the closed; these were made of very refractory clay, and open at both ends. When using white enamel, retort carbon is preferable to ordinary coke, as it is much denser, and less likely to throw off particles of carbon. He had had no experience with the open muffle; it was practically more difficult to use, in consequence of black specks being thrown off. Prefatory to the introduction of the plaque, the muffle should be placed in a gas furnace and raised to a cherry-red heat. To guard against black oxide of iron being thrown on the surface of the plaque, he recommended the inside of the muffle being smeared with red lead and water, red lead combining with the silicates present to form fusible glass. The plaque must not be pushed in the muffle suddenly. When in the muffle, and the temperature is sufficiently high, the first thing observed is that the surface of the plaque resembles that of a ploughed field. It fuses in contact with the copper first; then the little globules gradually coalesce until a smooth surface results. If the temperature is not high enough, mottling results, but if raised high enough the enamel acquires a perfectly glossy surface. If continued too long, oxide of copper will enter into combination with the silicate, and a green colouration will result. Generally speaking, there was one point in the muffle where the temperature was highest, and the plaque should be turned accordingly. The best tool for the purpose was one of thin steel, with the end turned over and having a wooden handle. Unevenness in coating can be remedied by rubbing down with flagstone powder and water. The plaque should then be refired. Black specks are removed with a steel tool used tangentially. The holes are then filled up with powder, and the plaque re-fused.

ECONOMY IN PHOTOGRAPHY.

[Anthony's Bulletin.]

The most economical, and, at the same time the safest, mountant I know of is simple starch well boiled, and not kept over from day to day. The best way to make it is to rub the lumps of starch into a very thin cream with cold water, and slowly bring to the boil, stirring all the time.

When large amounts of the ferrous-oxalate developer are used for bromide printing, the saving of the oxalate of potash might be worth while. The spent developer may be collected in a glass jar, and greenish crystals will be seen to fall to the bottom. The jar and its contents are warmed about as hot as the hand will bear, and the green crystals re-dissolve by stirring. A strong solution of caustic potash being ready, it is added to the spent developer until there is no more precipitation of oxide of iron. The warm solution is then filtered to separate the iron, and sufficient dry oxalic acid added to neutralise the alkalinity of the excess of potash. A ready means of ascertaining the strength is to use an hydrometer or "silver meter" which has been previously gauged by the standard oxalate solution employed for developing. This operation is neither troublesome nor mussy.

Though foreign to the purpose of thia article, I will say that, in spite of all the new and fancy developers for negativea, there are many points of advantage about ferrous oxalate. I saw proof of this in the work of one of my most expert friends who made an extended tour in the North-West. He told me that all the photographers who saw him expose platea laughed at him for the long time he gave. He knew his plates, however, and timed them for ferrous oxalate. His negatives, including subjects of the most varied character, are marked by a wonderful uniformity and absence of stain, many of them resembling wet cellodion, which I believe to be the highest compliment I can pay to a photographic negative.

But our modern rapid gelatine plates have introduced one very important element of economy into the art. Formerly, certain kinda of difficult work could only be attempted with very expensive lenses, and lenses of commener kinds could not be used at all. But now it is possible (though not advisable) to use almost any kind of lens, and depend upon "stopping down" to get sharpness. The stops may easily be cut to the required size out of thin lead or vulcanite, and, the centre having been accurately located, the opening is bored with a countersink. All diaphragms or stops should thus present a mere sharp edge to the entering rays of light, and not a surface more or less bread, as would be the case if not countersunk. If the lead, when cut, reflecta too much light, apply a little lamphlack mixed with spirit varnish. The sharpnesa of the photograph, however, will depend upon other things than mere focussing. If the achromatic corrections of the lens have not been specially made with a view to the actinic or photographic action, it may very well happen that no sharpness can be obtained in the negative, even if the image on the ground glass appears perfectly focnsaed. Should any one possess such a lens, whose visual and chemical foci are non-coincident, it will be an easy matter to rectify things. Set up a pile of boeks with printed titles on their backs in an incline before the camera, as if on a flight of steps. Focus on the central one, and, having developed the negative, examine with a magnifier, to see which title is sharpest. This being ascertained, carefully mark the position of the ground glass on the tailboard of the camera, and then rack it in or out until the title appearing sharpest on the negative is sharpest alao upon the ground glass. Note the distance the ground glass has had to move; then, removing the ground glass from its frame, insert or remove a thickness of wood equivalent to this distance, and replace the ground glasa. The ground glass and the plate-holders are thus thrown out of regiater by the exact distance which represents the separation of the visual and the chemical foci of the lens, and the pictures will be sharp. In the early days of photography this expedient was frequently resorted to.

Stereoscopic negatives are most conveniently made with a pair of lenses of matched foci; but the two lensea are by no means a necessity. Stereoscopic work of excellent quality can be made with one lens mounted on a small camera, the whole being arranged on a board two or three feet long, so that the camera can be shifted laterally a distance of twelve to twenty inches. The farther off the subjects photographed, the greater should be the separation between the points where the camera is situated at either end of the board. Before exposing, the view is carefully focussed, and the camera directed ao that the centre of the field is occupied by the same object, no matter at which extremity of the board the camera may be. Both positiona of the camera are then distinctly marked, and two plates are exposed for the same length of time, one from each position. The two negatives, after being dried, are trimmed down to the proper size, *i.e.*, three and a quarter inches between centres, and mounted on a piece of glass. When landscapes are photographed in this manner there is much greater relief and natural effect in the picture than when the regular form of twin-lens camera is used. If groups or portraits be attempted with the single-lens camera, the separation between the exposing points should not exceed four inches at the maximum.

It is to be regretted that paper in the form of *papier-mâché* is not more made use of. The French have numerous articles like developing traya made of this substance, and they are both cheap, clean, aud durable, as are also the large dipping-baths sometimes seen. The idea of constructing a dark room in any conveuient place with walls of stout pasteboard squares let into light wooden frames, made of laths by the edges, is quite an old one, as also is the idea of an entire portrait studio suitable for a lawn or garden made of the same cheap material. By setting the studio (which would also contain the dark room) in a proper position, no skylight is needed, the opening to the north blue sky serving the purpose instead. A mat, to keep dampness from the sitter's feet, and a bucket of water with a "siphon-tap" in the dark room, would pretty well complete the list of necessary articles for such a useful help to outdoor portrait-making.

Ellerslie Wallace.

News and Notes.

CENTRAL PHOTOGRAPHIC CLUB.—October 6, Lantern slides, 13, Smoking Concert, Mr. J. Traill Taylor in the chair. Musical members are requested to bring up music.

SIR CHARLES RUSSELL opens the Hackney Exhibition on the 17th inst. at thirty minutes past seven.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.—Tuesday, October 10, 1893, Ordinary Monthly Meeting.

WEST LONDON PHOTOGRAPHIC SOCIETY.—The opening meeting of this Society takes place at the School of Arts and Crafts, Chiswick (near Turnham-green Station), on October 10, when intending new members will find it a good opportunity for sending in their names for election.

THE Infallible Exposure Meter Company, Wrexham, are preparing a new edition of their book of instructions, and would be glad to receive two or three plates of each of the different kinds manufactured to test the present speeds for their revised list of speed numbers. They will pay cost and postage.

LEYTONSTONE CAMERA CLUB.—October 7, Along the River Roding (third section), starting at George-lane. Leader, Mr. Tom Symmons. The Club will proceed by the train leaving Liverpool-street (G.E.R.) at thirty-five minutes past two p.m., calling at Leytonstone at fifty-two minutes past two, arriving at George-lane at fifty-nine minutes past two. This will conclude the excursions for the season. Open Special Evening at headquarters at eight o'clock.

DEATH OF MR. JOHN HOMERSHAM.—A once-active member of the Field Club and for some time a contributor to our ALMANAC has passed away at the ripe age of eighty-one. For several years Mr. Homersham had retired from living in London, in favour of Dover, the climate of which better suited his declining years. He was of a genial, although retiring, disposition, and his demise will be regretted by many photographers of a bygone period.

THE Hon. Secretary of the Hackney Photographic Society writes: "I have to ask if you will be good enough to correct an error made in your issue of two weeks ago in one of our reports. Mr. Sodeau was made to say that, as 'caramel is slow in drying, he would advise a piece of slightly greased paper to be applied to the back of plate before applying the backing.' This is wrong. It should have been 'to apply the backing first and the greased paper after.'"

ASHTON-UNDER-LYNE PHOTOGRAPHIC SOCIETY.—October 11, *Demonstration on Lantern-slide Making*, by Mr. J. T. Lees. Members are requested to bring negatives in printing frames. Chairman, Dr. Hamilton. 18 and 19, Instructions will be given to beginners in *Lantern Slide-making in the Dark Room* by several members. 25, Lantern Exhibition of members' slides, each member to be limited to twenty slides. Chairman, Mr. William Greenwood; Delineator, Mr. Jos. Hutchinson.

WE have received the prospectus of the Borough Polytechnic Institute, together with the programme of the winter session of the Photographic School held in connexion therewith. The lecturer in photography is Mr. A. W. Dollond and the instructor in retouching Mr. George Elliott. The syllabus comprises Photographic Technology and Practice. The lectures will be illustrated by experiments and demonstrations, and will be given on Friday evenings from eight to nine. The course commences on October 6, and is continued until the last week in April.

CROYDON CAMERA CLUB.—October 18, Lantern Night, exhibition of Mathew's hand lantern. November 1, *Various Methods of Making Lantern Slides*, illustrated with slides on the screen, by J. H. Gear. 15, *National Prize Slides*. 29, *Modern Developers*, by Mr. Leblanc. Meetings begin at eight. Members should bring examples of work. Council Meetings October 11 and 25, and November 8 and 22. Tickets for the Pall Mall Exhibition are now obtainable of Hon. Secretary at half price.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The Congress of the Photographic Society of Great Britain and affiliated societies will be held on October 10, 11, and 12. The meetings, a programme of which we have already published, will be held as follows:—Tuesday, October 10, eight p.m., at the Gallery, 5A, Pall Mall East. Wednesday, October 11, three p.m. and eight p.m., at the Theatre, Society of Arts, John-street, Adelphi. Thursday, October 12, three p.m., at the Theatre, Society of Arts, John-street, Adelphi; eight p.m., Special Lantern Night (admission by ticket only), at the Gallery, 5A, Pall Mall East.

AMATEUR PHOTOGRAPHIC ASSOCIATION FOR GREAT YARMOUTH. — At a meeting held at the Two Bears Hotel, Southtown, Great Yarmouth, on Tuesday, September 26, it was proposed and seconded that a club be formed for the study of photography, which was carried unanimously. It was further resolved that the club be called "The Great Yarmouth Amateur Photographic Association," and that only those who practise photography be eligible for membership. Subscription 5*s.* per annum, payable on election. The first meeting of the Association will be held on Tuesday, October 10, at eight p.m. sharp, at the Two Bears Hotel, when the subject of *Negative-making* will be fully discussed, and applications for membership considered.

"THE PROUD TURK."—It appears from a letter we have received from Mr J. S. Bergheim, the producer of the picture, that we were wrong in stating that it is made upon a textile fabric, as it is in reality a glass positive or transparency backed with blotting-paper of the nature and colour described. It follows, of course, as Mr. Bergheim says, that there is no colour from coolest green to warmest red that he cannot give the same picture by changing the backing. "The model," he observes, "is not a Mahomedan, but a Viennese who has never been to the East. I am gratified to know that the treatment has led your critic to believe my model was, in fact, what I wished the picture to represent." We, too, are gratified to find that the once much-used process of photo-crayon, so called, of the late Oliver Sarony, which has been so often described and recommended in these pages, is not quite dead, but has such an able exponent as Mr. Bergheim.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 9	Camera Club	Charing Cross-road, W.C.
,, 9	Darlington	Trevelyan Hotel, Darlington.
,, 9	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 9	Lantern Society	20, Hanover-square.
,, 9	Norfolk and Norwich	Bell Hotel, Norwich.
,, 9	North Middlesex	Jubilee House, Hornsey-road, N.
,, 9	Putney	Boys' Gymnasium, Charlwood-road.
,, 9	Richmond	Greyhound Hotel.
,, 10	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 10	Derby	Smith's Restaurant, Victoria-st.
,, 10	Great Britain	50, Great Russell-st. Bloomsbury.
,, 10	Hackney	206, Mare-street, Hackney.
,, 10	Manchester Amateur	Lecture Hall, Athenæum.
,, 10	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 10	Paisley	9, Gauze-street, Paisley.
,, 10	Rochester	Mathematical School, Rochester.
,, 10	Stockton	Mason's Court, High-street.
,, 11	Ipswich	Art Gallery, Ipswich.
,, 11	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
,, 11	Leytonstone	The Assembly Rooms, High-road.
,, 11	Munster (Annual)	School of Art, Nelson-place, Cork.
,, 11	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 11	Southport	The Studio, 15, Cambridge-arcade.
,, 11	Stockport	Mechanics' Institute, Stockport.
,, 12	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
,, 12	Camera Club	Charing Cross-road, W.C.
,, 12	Cheltenham	
,, 12	Glossop Dale	
,, 12	Hull	71, Prospect-street, Hull.
,, 12	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 12	Manchester Photo. Soc. (An.)	36, George-street, Manchester.
,, 12	North Kent	Gravesend.
,, 12	Oldham	The Lyceum, Union-st., Oldham.
,, 13	Bristol and West of England	Rooms, 28, Berkeley-sq., Bristol.
,, 13	Cardiff	
,, 13	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 13	Halifax Camera Club	
,, 13	Holborn	
,, 13	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 13	Maidstone	"The Palace," Maidstone.
,, 13	West London	Chiswick School of Art, Chiswick.
,, 14	Hull	71 Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 28,—Mr. T. Bolas in the chair.

Messrs. J. E. and R. A. Hodd were elected members of the Association.

Mr. F. E. Ives, who was present, was welcomed to the meeting by the Chairman.

A question from the box asked how the enormous amount of dust resulting from the use of a flash lamp for interior work could be obviated?

Mr. W. E. DEBENHAM replied that Schirm, with his ribbon lamp, used a tube immediately above the ribbon. Magnesium deposited very slowly when diluted with air, but when concentrated deposits very rapidly. The object should be to keep it undiluted with air as much as possible.

The CHAIRMAN stated that Mr. Warnerke had described a magnesium lamp which required a chimney.

Mr. Haddon gave a lecture on preparing plaques for vitro-enamelling [see page 643] which was accompanied by a practical demonstration of all points except the firing, which was highly appreciated, being made exceedingly plain to those present.

The CHAIRMAN said it was always interesting to follow a workman like Mr. Haddon. It was a treat to listen to him, and note the careful and thoughtful way in which he had gone to work.

In reply to a question by Mr. R. L. Kidd, Mr. HADDON said fusion usually took about one and a half minutes.

Mr. P. EVERITT suggested that Mr. Haddon should undertake to give practical instruction in the subject to those desiring it.

Mr. J. S. TEAPE had recently attempted the preparation of plaques according to Mr. Haddon's instructions, and showed several results.

After a short discussion, a cordial vote of thanks was passed to Mr. Haddon for the paper and demonstration.

Northern Photographic and Scientific Association.—Ordinary Meeting, September 28, the President (Mr. Robins) in the chair.—The following alterations in the constitution of the executive were made, namely, Mr. Coghill resigned the Vice-Presidency, and was elected Secretary; Mr. Murrow resigned the Secretaryship, and was elected Treasurer; and Mr. Beagley resigned the Treasurership, and was elected Vice-President. Mr. COGHILL then explained the making of lantern slides by the wet-collodion process, and was assisted in the practical portion by Mr. Simmons. The greatest interest was taken throughout the whole proceedings, and the PRESIDENT, after thanking these gentlemen on behalf of the meeting for their services, said he was authorised to state that those members who wished to co-operate for the purpose of obtaining chemicals, &c., at a low rate and of uniform quality, might send in their names at once. He also requested those who wished to join the beginners' class to send in their names at their earliest convenience. The address of the new Secretary, Mr. D. P. Coghill, is 252, Whiteman-road Hornsey, N.

Hackney Photographic Society.—September 26, Mr. Puttock presiding.—Members' work was shown by Mr. BENTLY, and asked members' opinions as regards exposures. These seemed fairly correct, but pictures could be greatly

improved by better lighting and a little fuller development. Question was asked whether any member had had any experience with toning Nikko paper with hypo and alum. Mr. SMITH said he had used the bath and found it much easier to work after a few prints had been toned. Mr. ROBERTS had used it for an hour and a half, and found no difference in tone. Mr. MAGNUS showed a print with a red stain, and asked for a reason. Mr. BECKETT, jun., said that its appearance seemed to be due to contamination with other chemicals. Mr. Beckett then gave a paper upon *Bromide Enlargement by Artificial Light*, which was appreciated very much by the members. He dealt with the various lenses, lights, &c., which might be used in the process, and described the whole procedure in a very lucid manner. With regard to negatives which were a very important thing to bring about good results, he advocated a negative of medium density with a slightly yellow stain as producing good results. Thin negatives gave fair results, whilst ghosts were useless. A demonstration was given by Mr. Beckett, jun., in which amidol was used as a developer, and some splendid results were obtained. There were numerous advantages given in favour of enlargements, amongst them being alteration of character of prints, which was sometimes needed, and larger pictures showing to more advantage than small prints. A vote of thanks to the lecturer and demonstrator brought the evening to a close.

West London Photographic Society.—The following are extracts from the Annual Report for 1892–3:—"The membership has increased, by the absorption of the Chiswick Camera Club and partly by the accession of new members, and it now stands at seventy-three as compared with sixty at this time last year. This result appears in the face of several resignations. A change in the Hon. Secretaryship has occurred, owing to the resignation of Mr. Lionel Bennett, whose services, always performed with hearty good will, had earned him a well-deserved popularity. It was with universal regret, therefore, that the news of Mr. Bennett's enforced resignation was received. His place has been filled by the promotion of the Assistant Hon. Secretary, Mr. Rogers, whose place in turn has been taken by Mr. Stein. The work of the last Session comprised eight papers, of which four were technical and practical, two descriptive (with lantern slides), and two dealing with the artistic side of photography. In addition, there were three evenings devoted to the Society's business, one Lantern Evening, and thirteen Technical Social Evenings. The Annual Dinner took place on May 9, and wound up the Session. The outdoor meetings were arranged in districts nearer to headquarters than last year, with a view to increasing the attendance, but this device has apparently made no noticeable improvement, the attendances remaining practically as before. The Fourth Annual Exhibition was held on January 10 and 11, 1893, at the Chiswick School of Arts, with very gratifying results. The number of pictures was 171 against 135 for 1892, and the number of slides was 128 against 76. The Judges' report, which has already been in your hands, speaks for the high standard of the exhibits, and it is hoped that the forthcoming Exhibition may show a still further advance in the quality as well as in the number of pictures. The Society sent a collective exhibition to the Crystal Palace Photographic Exhibition, and was fortunate in obtaining the Silver Challenge Cup against several strong competitors. The Cup will be on view at the Annual General Meeting. The Society decided to embark upon a Photographic Record of Objects of Historical and Archæological Interest within a radius of five miles from headquarters, and Mr. Whitear was appointed to organize the work. According to information he has laid before the Council, it appears that up to the present the interest shown in the matter is confined to very few members, and the Council hope that further attention will be given to this useful branch of work. Through the good offices of Mr. Winter the Society has become possessed of a dark-room sink and fittings, and the President has promised a set of dishes for use with the same."

Richmond Camera Club.—Extract from the report from the year ending August 31, 1893:—"The Club, which is steadily increasing, now numbers about fifty members. Three members have resigned during the year, and eighteen new members have been admitted. His Highness the Duke of Teck, G.C.B., graciously consented, in March last, to become Patron of the Club. During the winter session weekly meetings were held. There was a good average attendance, and the programme comprised a series of practical and instructive papers and demonstrations by members of the Club and friends, who kindly gave their services. In the summer meetings were held monthly, and were better attended than the weekly meetings of previous years; but the monthly excursions, which were also arranged, commanded only a very meagre attendance. The use which has been made of the Club library fully justifies its existence, but there is need of a larger assortment of books, and the Committee hope that members will supply them. The *conversazione*, given at the Theatre Royal on January 9, was very successful. The entertainment consisted of an exhibition of lantern slides, with musical interludes, and a show of members' work. Light refreshments were provided. Five hundred invitations were issued, and the room was well filled. The arrangements, including the catering by Mr. Mouflet, were very satisfactory. An exhibition of slides and pictures was also arranged in conjunction with the Lower Thames Valley Branch of the Selborne Society, at Matson House, Richmond, on January 25 and 26, and was well attended. The press notices of both entertainments were very eulogistic."

Bath Photographic Society.—The last of the summer outings took place on Wednesday week to Claverton. The sun shone forth in all its splendour for an hour or so after the start was made and some excellent pictures were secured. But those who did not avail themselves of the first opportunity soon found a change was taking place, and rain fell heavily, therefore the further progress through Warleigh had to be abandoned. For the information of tourist photographers it may be mentioned that the avenue from the top of North-road, entrance gate and lodge at the Manor, Claverton Church, the terrace and steps and the old cottages, were among the subjects photographed. At the first indoor meeting of the winter session, October 25, a discussion will take place on the most suitable method of mounting and framing photographs.

Liverpool Amateur Photographic Association.—September 28, Mr. Paul Lange in the chair.—The business included the election of four new members. Messrs. C. A. Rawcliffe, E. C. Lowe, John H. Burns, and R. F. Soper. The event of the evening was a lantern lecture by Mr. JOSEPH EARP, *A Holiday in Normandy*, illustrated by 160 slides from negatives taken by the lecturer and Mr. J. W. Swinden, both members of the Association. The excellence of the slides, and the really original description, enlivened by flashes of quaint humour, altogether made a most enjoyable evening, which was highly appreciated by a large gathering of members.

Nelson Camera Club, Nelson, New Zealand.—The Fifth Annual Meeting was held on June 21, 1893.—The report showed that the finances were in a satisfactory condition, and that the membership had increased to nine honorary and forty-two ordinary members. The usual monthly meetings have been fairly attended, and the monthly competitions have always been an interesting item in the proceedings. The Annual Exhibition was held on January 26, 27, and 28, 1893, and was in every way a success. Between 500 and 600 pictures were on view, and crowded rooms testified to the public appreciation of these exhibitions. A special interest attaches to this one, as it was the first held in New Zealand in which *three* Clubs took part, the Dunedin and Auckland Societies both sending fine collections of pictures to represent them. Lantern-slide Exhibitions were given each evening, and, as usual, proved very attractive. A marked improvement was visible in the work shown in this branch of photography, some of the Auckland Club's slides being specially good. Flashlight photographs of the audience were taken each evening and exhibited on the screen during the following one. Mr. J. R. Sigley was the lanternist. The general opinion of press and public seemed to be, "Not quite so large a show as usual, but better quality." In November, 1892, an exhibit of fifty frames was sent to the Dunedin Photographic Society's Exhibition, and in March, 1893, 108 prints and 108 lantern slides were sent to the Auckland Photographic Club's Exhibition; in both instances favourable comment was given to the work of the Club. It is to be hoped that the Wellington and Christchurch Clubs will combine those of Auckland, Dunedin, and Nelson in their Exhibitions for the coming year, as these friendly interchanges of work will, doubtless, be of great good to the cause of photography in New Zealand. The following officers were re-elected for Session 1893–4:—*President:* Mr. C. Y. Fell.—*Committee:* Messrs. H. Brusewitz, R. Jackson, A. Pitt.—*Hon. Secretary:* Mr. A. H. Patterson.

FORTHCOMING EXHIBITIONS.

1893.		
October 6–Nov. 15 ...		*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
,,	6-31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,,	6-14	Midland Camera Club, Botanical Gardens, Moseley, Birmingham. Hon. Secretary, C. J. Fowler, 4, Woodstock-road, Moseley, Birmingham.
,,	9–Nov. ...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
,,	17-19	*Hackney Photographic Society, Morley Hall. Hon Secretary, W. Fenton Jones, 12, King Edward-road, Hackney, N.E.
,,	30, 31	*East London Photographic Society, New Tabernacle, Old-street, E.C. Hon. Secretary, W. R. Gould, 61, Gibraltar-walk, Bethnal Green, E.
November 7-11		*South London Photographic Society. Hon. Secretary, C. H. Oakden, 51, Melbourne-grove, Dulwich, S.E.
,,	20–25.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December		*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,,	18–Jan. 22, 1894	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 17,957.—"A Stereoscopic Lens for Monocular Vision for the Examination of Photographs." C. M. BLADES.—*Dated September* 25, 1893.

No. 18,115.—"A New or Improved Electric Arc Lamp specially applicable for Projecting Purposes instead of the Limelight." F. J. BORLAND.—*Dated September* 27, 1893.

No. 18,224.—"Improvements in Saturators and Jets for Producing Oxy-hydrogen or Limelight." A. SUITER.—*Dated September* 28, 1893.

No. 18,233.—"An Apparatus for Exhibiting Photographs, Advertisements, and the like." W. R. BAKER.—*Dated September* 28, 1893.

No. 18,237.—"Improvements in the Process of Making Photographic Films." Communicated by R. Reissner and G. C. F. Hauser. E. EDWARDS.—*Dated September* 28, 1893.

No. 18,270.—"Improvements in Display Cabinets for Photographs." Complete specification. Communicated by T. E. Wood. W. P. THOMPSON.—*Dated September* 29, 1893.

No. 18,294.—"An Improved Stand or Rack for Displaying Cards, Photographs, and other Articles." H. C. HALL.—*Dated September* 29, 1893.

SPECIFICATION PUBLISHED.

1893.

No. 10,000.—"Achromatic Dispersing Lenses." RUDOLPH & ZEISS.

Correspondence.

ON PHOTOGRAPHIC PERSPECTIVE.

To the EDITOR.

SIR,—I adhere implicitly to all I have said, and I further say that, granted a dog kennel, for simplicity sake, square, box-shaped, and six feet each way, and, also, a square house (with flat roof), sixty feet each way, the kennel to be six feet distant and the house sixty, then, under no position conceivable, will the lines of the house photograph and the kennel photograph (the position of lenses being unchanged) coincide if superposed. If Mr. Debenham disputes this, will he please state accurately a case with a position of these erections where he believes the photographs would coincide, and then I will demonstrate where the error is. I criticise not his argument, but his opponent's version of it.

As to distortion, it is a question needless to discuss where disproportion ends and distortion begins. My remarks did not apply to anything either Mr. Debenham or any one in particular had written; they were intended to apply to the topic generally.—I am, yours, &c.,

FREE LANCE.

ALPHA PAPER.

To the EDITOR.

SIR,—You publish a letter in this week's JOURNAL relating to an enlargement on Alpha paper by Mr. Howson, which has induced me to write to you upon the use of this paper for enlarging purposes. I have, during the past eighteen months, made a number of enlarged prints on Alpha paper, which have proved very satisfactory to my friends and myself. The coldness of ordinary bromide enlargements is, to me, tiresome and depressing, and, judging from the number of workers who resort to uranium and other doubtfully permanent methods of toning, the feeling is somewhat general. The use of Alpha paper (which, I believe, is coated with a washed gelatino-chloride emulsion) offers a simple method of obtaining either warm or cold-toned enlargements. Its greatest drawback is its slowness. To those who are blessed with the use of the electric light I do not suppose this is a matter of very great moment, but an attempt to enlarge by means of an ordinary oil lantern is disastrous. The only remaining method—daylight enlarging—is, to my mind, by far the best; of course, the exposure is necessarily a long one. I have found that, with the enlarging camera pointing to the sky (north), using stop *f*-10, enlarging from quarter-plate (ordinary class negative), to 10 × 8 on a bright summer day, the exposure needed is fifteen to twenty minutes. I always aim at obtaining a red-brown image by development, from which, by toning, I can get any colour down to blue. I use the Ilford hydroquinone developer, as I find the acid bath, after ferrous oxalate, an abominable nuisance and a powerful reducer of the warm image.

Like most other amateurs, I like to do most of my enlarging in the winter, and, strange as it may seem, I find Alpha paper most suitable for that purpose. First, I may mention that I always aim at getting rather thin negatives for enlarging; I think I may say it is an absolute necessity for Alpha enlarging in the winter. Like most others, I have my business to attend to during the day, so, before leaving home in the morning, I erect my enlarging camera, and, having placed the paper in position, I leave it exposing for the whole day, using a small stop, say *f*-45, and if the day is fairly bright I find, on developing at night, a properly exposed enlargement. The paper has great latitude. I have, on one or two occasions, been unable to develop the same night, and the paper has been exposed two whole winter days, and still a good print has resulted; in fact, with some negatives, such a prolonged exposure is a necessity. Of course this, to a certain extent, is all guesswork, but I have arranged a small table (compiled from Dr. Scott's Light Table), by which I can gauge, to almost a certainty, the amount of exposure the paper needs or has received. This table I will forward if you think fit. I invariably fix and partly wash Alpha prints before toning. I do not much care for the toning bath published by the Ilford Company, it is so apt to tone too purple; but of course this is merely a matter of taste, and will, no doubt, prove a great attraction to some workers. I generally use an old Solio combined bath. With this I get nice sepia and brown tones, and the alum hardens the film. I feel sure that, if the Ilford Company could, or would, increase the sensitiveness of the paper, there would be a huge quantity used by amateurs. There is one point in relation to the packing of Alpha and also bromide paper to which I should like to call attention. The method of selling cut pieces is a good one so far as small sizes is concerned, but, when we get to 10 × 8, and over, I do not think it is a blessing. We do not always want to make a dozen 12 × 10 enlargements; but, if we buy a packet of that size, what must be done? We may wish to enlarge to 15 × 12, but that means another packet of paper. I think if these papers were sent out in two whole-sheet tubes, in the same manner as P. O. P., it would be a matter of great convenience for the would-be enlargers whose pockets will not stretch all at once to the price of a ten-feet roll. By this means any size enlargement may be made up to 24 × 17 (or whatever may be the size of the whole sheet) without a big preliminary outlay. I also think it would conduce to the increased sale of the paper.—I am, yours, &c.,

W. RIDLER.

13, *Brunswick-street, West Gorton, Manchester, September* 29, 1893.

PHOTO-MICROGRAPHY.

To the EDITOR.

SIR,—Mr. Ives's tiger seems to be gradually shrinking from his original handsome dimensions. We have now got to this from Mr. Ives: "Some achromatic objectives will certainly give better results with yellow light than any apochromatics will with the ordinary white light and ordinary gelatino-bromide plates." This is a new importation into the discussion, and, further, I very seriously question the accuracy of the statement. I have not made any special experiments to determine the point, but I have a strong impression that my apochromatics give better results on ordinary plates than any achromatics I have tried on colour-correct plates. I find the spherical aberration better corrected and the fields flatter with the apochromatics than with the achromatics, but I have not had the advantage of using the American achromatics referred to by Mr. Ives, my tests having been confined to a few of the best kinds of British and Continental objectives.

I do not propose to continue this controversy, which must be aimless, till I have seen the productions of Mr. Ives, on which he bases part of his argument. I consulted one of the references given by Mr. Ives in a former letter to you, the only reference on which I could easily lay hands, the *Photographic Times*, April 25, 1890. Finding that the productions by Mr. Ives there criticised were: Flea × 36, proboscis × 60, sting of Bee × 70, diatoms × 130, and sections of wood, I was not tempted to pursue my inquiry into Mr. Ives's achievements.

Several British and foreign microscopists have privately expressed to me a hope that Mr. Ives may be induced to give us the chance of seeing his productions with achromatic glasses, that we may compare them with results obtained with apochromatics. Personally, I should much like to see them, so that I may get to the bottom of the question, for I am quite open to conviction; it must be well worth a sheet of paper and fivepence in stamps to enlighten a whole hemisphere. Till I do see the photographs in question I can say no more.—I am, yours, &c.,

ANDREW PRINGLE.

"WARMING STUDIOS."

To the EDITOR.

SIR,—Under the above heading, you inserted some years ago, in THE JOURNAL, a note from me strongly recommending "George's Calorigen." I have had nineteen years' experience of them, and at present have four in use. Your correspondent in last week's number is wrong in one or two points. The agents are Messrs. Farwig & Co., 4, Upper Thames-street, London, E.C., and I have one put in an ordinary fireplace, the grate having been taken out. It has been in use for over eighteen years with perfect success. I advise your correspondent to apply to Messrs. Farwig for one of their descriptive papers about the stove. I enclose my card.—I am, yours, &c.,

L. M.

October 3, 1893.

THE UNILUX.

To the EDITOR.

SIR,—We notice in your description or reference to our new Patent Unilux Lantern, now on view at the Photographic Exhibition in Pall Mall, that you say "the light is directed on the screen by a rectangular prism or mirror placed at the *outer* end of each object-glass, in manner like to the lanterns of Beechy or Keevil.

Please allow us to correct this, as ours is different, and we think new.

In our lantern the *prism* is placed *inside* the object-glass, as it were, is *between* the two combination lenses of the objectives, and fills up the whole space between them. You can easily get at the prism for examination by unscrewing the cap, when the prism will be drawn out.

We shall esteem it a favour if you will kindly mention this alteration in your next, and oblige.— We are, yours, &c.,

ARCHER & SONS.

43 *to* 49, *Lord-street, Liverpool, October* 2, 1893.

GELATINO-CHLORIDE MOUNTANT.

To the EDITOR.

SIR,—A good deal has, from time to time, been written on the subject of mounting gelatino-chloride prints. The use of various mountants, the backing of the prints with some waterproof paper, the pasting of the prints around their edges only, and various other devices, have been in turn suggested, whereas, as a matter of fact, these prints are no more difficult to mount than are those on albumenised or any other paper.

With your permission, I submit to the reader of THE BRITISH JOURNAL OF PHOTOGRAPHY a mountant for gelatino-chloride prints, which leaves nothing to be desired. The formula is :—

Gum	2 ounces.
Glycerine	½ ounce.
Methylated spirit	1½ ,,
Distilled water to	8 ounces.

Dissolve the gum in 4 ounces of the water (cold), then add the glycerine, and lastly, gradually and with constantly stirring, the spirit, making the whole up to 8 ounces with water if necessary.

Gum arabic being at the present time very dear, its place may advantageously be taken by either Senegal or Ghatti gum, this last being very good for the purpose, and only about a shilling a pound or less.

The advantages of this mountant are as follows :—1. It keeps indefinitely. 2. It is always ready to use at a moment's notice. 3. It can be brushed *all over* the back of the print. 4. It does not cockle the mount. 5. It does not injure the print. 6. It is easy to use, cleanly in use, and dries quickly.

I enclose for your acceptance and inspection a print mounted with some of this solution, which has been made some five or six years, and I have prints by me mounted the same length of time which do not show any signs of deterioration.

Should any of the mountant accidentally get on to the gelatine surface of the print, either from the brush or the fingers, it may be rubbed off, *before quite dry*, with a clean cloth, without any mark being noticeable.—I am, yours, &c.,

J. H. BALDOCK, F.C.S.

St. Leonard's-road, Croydon, September 30, 1893.

HACKNEY, SOUTH LONDON AND LEYTONSTONE EXHIBITIONS.

To the EDITOR.

SIR,—To meet the convenience of exhibitors wishing to compete at our respective Exhibitions, arrangements have been made whereby the exhibits will be transferred at the close of each Exhibition on to the next Exhibition, saving the large expense of carriage (*i.e.*, they will be sent from Hackney to South London and from thence to Leytonstone) upon payment of 1*s.* 6*d.* for every three frames and 6*d.* for each set of lantern slides in addition to the entry fees to the Secretaries of the last two Exhibitions, by whom they will be received and carriage paid.

W. FENTON-JONES, Hon. Sec. Hackney Photographic Society.
CHAS. H. OAKDEN, Hon. Sec. South London Photographic Society.
ALBERT E. BAILEY, Hon. Sec. Leytonstone Camera Club.

Answers to Correspondents.

PHOTOGRAPHS REGISTERED :

Abraham Flatters, Openshaw.—*Sixteen photographs of sections of Cotton.*
Jabez Greenwood, Carlisle.—*One photograph of Coniebrough Castle.*
George Watmough Webster, Chester.—*One photograph of Rev. Canon Acheson.*

J. BISHOP & CO.—Price-list received.

GELATINE.—Take a negative of the plaster cast on an ordinary gelatine dry plate.

E. MILLHOUSE.—The spot on the negative has not been caused by the lens, but by a drop of ammonia.

E. D.—1. There is a varnish consisting of celluloid dissolved in amyl acetate which will answer for the purpose. 2. Unable to account for it.

COLLOTYPE.—There is, we believe, a class for collotype at the Polytechnic Institute, 309, Regent-street. Write to Mr. E. H. Farmer at that address.

EXPERIMENTALIST.—Surfaced paper, suitable for collotype printing, may now be had from most of the houses that supply enamelled paper for lithography.

JAMES LETT, JUN. (Harrisburg, Pa.).—No articles on lens-making have recently appeared in our pages. There is a series running through the *English Mechanic* just now.

J. H. P.—Both the selecting and the judging have this year given rise to an unusual amount of dissatisfaction. Your figures are admirable, although we should have preferred them with fewer accessories.

LIVERPOOL.—The cause of the majority of the stains produced in intensifying negatives is incomplete washing between the different operations. There is no doubt whatever that it is the cause of them in the negative sent.

R. O. S.—If you are in any doubt as to whether the mounts cause the fading of the pictures, why not test them by the method described in an article a few weeks ago. It would be much better to do so than write asking if a certain maker's mounts always cause prints to fade.

F. G. S.—The only difficulty in copying maps is to get the lines clear. As the time of exposure is no object, use the slow plates supplied for photo-mechanical work. Avoid rapid plates under any conditions. It is needless to say that a non-distorting lens must be employed.

R. LODER.—If the negatives are so thin that they will only yield grey and flat prints in platinotype, try printing them on gelatino-bromide paper. By this means you will, doubtless, be able to get vigorous prints, and, with a little experience, of a tone very similar to those of platinotype.

NOTTE.—Pyroxyline suitable for the purpose may be obtained of Messrs. Hopkin & Williams, Hatton Garden, E.C.

W. H. HORTINOTON.—We should think that, in addition to the lights in the hall, arrangements would have to be made whereby extra lights of, say, eight to ten thousand candle power would have to be directed on to the platform; in that case, on the data you give, an exposure of about two seconds would probably suffice.

C. A. S.—To make a solution of indiarubber, get some of what is known as masticated rubber, and dissolve it in benzol to the consistence desired. The easiest way to get a solution of rubber is to take the solution as sold at the indiarubber shops, and dilute that with benzol. This is much less trouble than dissolving the rubber in the first instance.

T. MALONY.—In all probability, and from what you say we have very little doubt about it, the transfer ink is at fault. It should not be used as received from the warehouse, but thinned down, and this has not been done sufficiently. Try the effect of further dilution with an equal bulk of turpentine, and do not print the transfer so deep.

"STOBARS" would be much obliged if any of the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY could tell her the best amateur club to belong to, where the photographs are criticised, and exhibitions with prizes held now and again.—See the Society pages of our ALMANAC. Possibly the Postal Photographic Society would meet the first requirement of our correspondent.

C. C.—As the mounts are lettered with bronze powder, it is more than probable that it is the cause of the spots on the pictures. Should they be the source of the evil, you have no remedy against the one who supplied the mounts, as you say you contracted for bronze lettering, and bronze powder, it is well known to all photographers, is liable to have an injurious action on the silver image.

M. H.—Unless you are going to work with the camera near the Franco-German frontier, a passport is not necessary, and, even if you are going to, a passport will not give any advantages, except, if you get into trouble, it will be of assistance in helping you out of it. Our advice is, when travelling anywhere on the Continent, to be provided with a passport, even in countries where one is not required.

R. A. H.—As a rule, what are termed "Ordinary" plates are not rapid enough for hand-camera work, with the lens with which the majority of them are fitted, except in an unusually good light. At this time of the year, in the streets of London, rapid plates must be employed, also a lens of large angular aperture. With a lens *f*-11 and the plates mentioned good-quality negatives must be expected with a hand camera.

W. SYMONDS.—In order to obtain deep, rich, purple-black tones, the paper must be rich in silver, and what is of equal, if not greater, importance is, that the negative must be of a strong and vigorous character, that is dense in the lights and very clear in the shadows. With these conditions fulfilled, if the print be somewhat over-printed, no difficulty will be experienced in obtaining rich deep tones with any of the recognised toning baths.

A. X. Z.—Makes a general complaint of the cutting of dry plates. He says: "Sometimes in the same packet one or two may be too large to go into the rabbet of the dark slide, while others will be so small that they cannot be retained in it; and the nuisance is still greater when a changing box is used." This complaint used to be common enough at one time, but now it is one we seldom hear of. Makers are now particularly careful in this matter. We think our correspondent's experience is somewhat exceptional.

T. BURGEN.—From the description, the camera is evidently a very old one, made for the Daguerreotype process. The lens, being by Voigtlander, is probably a very good one, but it is more than likely that it does not work to focus, that is, the optical and chemical foci are not coincident. However, it is none the worse for that, if the necessary alteration be made after the image has been focussed optically. It is very doubtful if the camera and slide are sufficiently light-tight for the modern dry plates.

ROBIN asks if plates, orthochromatised according to a formula in the ALMANAC and used with a yellow screen, are supposed to give true colour values because he has found that they render the yellows perfectly white and the blues nearly black? He says: "The effect produced is too great. The plates are too orthochromatic." This is precisely the effect that will be obtained by using too deep a yellow screen. This has been pointed out many times in these columns during the past few years. In the choice of a colour screen regard must be paid to the subject and the method by which the plates are prepared. In working orthochromatic photography, three or four screens, of different depths, should be at hand, to be employed as occasion may require. Our correspondent should repeat his experiments, with the same plates, on the same subject, but using a much lighter yellow screen. It will be a good object lesson.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1745. Vol. XL.—OCTOBER 13, 1893.

We are now engaged in the compilation of the Almanac for 1894, and will welcome short articles on practical topics from those who have formerly contributed the results of their experiments and experiences in photography to its pages. This invitation we also extend to the younger readers of The British Journal of Photography and its Almanac.

In order to avert the chance of our having to omit any articles from the Almanac on account of their lateness of arrival, we would suggest that intending contributors send us the copy of their articles at the earliest possible moment.

Secretaries of Societies, and especially of those established since the appearance of the last Almanac, if they have not already done so, will oblige us by at once forwarding lists of officers and other details for inclusion in the directory of Photographic Societies, in order that the list may be made complete.

The Publishers desire us to inform intending advertisers that copy for their advertisements cannot be received after Monday, October 16, on which date they intend closing up the announcement pages of the Almanac.

PHOTO-CRAYON.

The fact that there is a photographic printing process capable of proving such a "sell" as did that by which Mr. J. S. Bergheim's medalled picture, *The Proud Turk*, was produced, is warrant sufficient for giving some account of its history, capabilities, and *modus operandi*.

In 1869 the photographic world had its interest roused by an announcement that the then well-known photographer, the late Oliver Sarony, of Scarborough, was about to introduce quite a novelty in portraiture, one by which excellent and wonderful effects could be obtained by a minimum of trouble and expense; not only so, but that portraits which might fairly lay claim to be artistic could by its agency be produced by photographers devoid of art culture. In due course specimens were shown to the public, and were everywhere greatly admired. They were vignettes of 15 × 12 inches in dimensions, were delicate in gradation, and surrounded or partially so by crayon hatchings, which merged from the figure into the coarse drawing-paper on which they appeared to be produced. In brief, there was a singular charm about these photo-crayons, as they were designated, and, as the process had been patented, many photographers obtained licences for making them, in most instances to their financial advantage.

These pictures were nothing but enlargements produced by the wet-collodion process on plates of glass. They were, of course, transparencies, but so thin and delicate were they that the half tints could scarcely be seen until the glass had been dried and a sheet of paper brought in close contact with the image, which then appeared as if it were on the material placed behind it. In truth, so deceptive were they in this respect, that the most minute examination failed in establishing the fact that the image was not on the drawing-paper employed as the backing. If what we have now to say aids in resuscitating this process, improved as it may be by greater knowledge than prevailed a quarter of a century since, we feel sure that it will conduce to the pleasure of many, and possibly to the profit of not a few.

We have said that the photo-crayon of the past epoch was an enlargement. It was made by placing an ordinary *carte* negative in a lantern, and projecting the head and shoulders upon a large plate of collodionised glass. The exposure was brief, a strip of magnesium ribbon being usually employed as the source of illumination, although any other light might be used. The glass was prepared by coating it with bromo-iodised collodion, and, after allowing it to set, laying it face upwards in a flat dish containing a solution of nitrate of silver of about the strength of thirty-five grains to the ounce of water. While this was becoming sensitised, which occupied two or three minutes, and a cover placed over the dish, the portrait was being adjusted and focussed on a plate similar to the one which was to bear the picture, but faced with white paper. This was supported in a vertical position, a simple easel, in our own case, sufficing for this purpose.

The lens is covered with a cap in which is fitted a disc of yellow glass, the sensitive plate made to take the place of the paper-covered one, and any final adjustment effected by the yellow cap, the removal of which permits of the exposure being made, which, with a single strip of magnesium, requires thirty seconds more or less. But, during exposure, it must be vignetted by the interposition, immediately in front of the sensitive plate, of a large sheet of cardboard, having in it an aperture about the size of the head and shoulders of the enlargement; and this must be kept gently moving all the time in order that the vignette shall have a very soft margin.

The image is developed by—

Pyrogallic acid	2	grains.
Citric acid	2½	„
Water	2	ounces.

This ought to be poured on in such a way as not to wash off the solution of nitrate of silver with which the surface is still covered. If it does not flow smoothly, the addition of a few drops of alcohol will impart this needed property. The development will proceed slowly, but on no account must it be allowed to proceed beyond the formation of an exceedingly thin image. Those who try this process for the first time invari-

ably make the mistake of carrying the development too far, producing a heavy, black-looking picture. It is fixed in hypo-sulphite of soda, washed and dried.

The image is examined by pressing the film side against a white sheet of paper. The margins and high lights ought to be quite white, or as white as permitted by the interposition of clean glass. If there is any degradation of tone, it indicates fog, which with such a developer ought not to be present. This fog may be prevented by using an older or riper collodion, or by adding to it a few drops of tincture of iodine. This, in almost every instance, will ensure the absence of fog. Should the half-tones be heavy and smudgy, over-development and possibly over-exposure are indicated.

It is in the mounting that the effect which gave the special name to the process is produced. Instead of backing with plain paper, Sarony employed drawing-paper on which had been printed by lithography peculiar, sketchy, crayon-like lines which, intermingled with and extended beyond the soft outlines of the vignette, gave it the appearance of freedom and artistic effect. In many instances, the photographer produced these hatchings himself by a blacklead pencil; but, in any case, it was impossible to say by examination that they were not highly finished and artistic crayon portraits executed by skilled artists. They created a *furore*, and the journals and societies of that period devoted much attention to the process.

Why, then, did they fail to secure lasting recognition? The public had not in those days been educated to relish black tones, preferring those of warm tint; and the fatal mistake was made of toning them with bichloride of mercury, followed by hyposulphite of soda; and, while by these agents the most beautiful tones were obtained, the photograph itself faded to an unpleasant light yellow colour, but as the crayon hatchings still maintained their original darkness, the ultimate effect was most incongruous. Hence the decadence of the photo-crayon.

Tastes have changed since the days when the photo-crayon reigned with such supremacy, and we know that, if untampered with in the way indicated, there is no reason why it should not be permanent. Again, the backing of the transparency may be of any material and of any colour. If one of dark colour be selected for the sake of a special effect, touches of high lights may be put in by the crayon or otherwise.

There is a question of optics involved in this process, into which we cannot now enter, beyond saying this, that it is not only necessary, while there is the closest possible mechanical contact of the backing paper with the transparency—which, by the way, must have been varnished—that they should not be placed in optical contact, else will the whole effect be lost. A film of atmospheric air must intervene.

We own our indebtedness to Mr. Bergheim for affording us an opportunity of directing attention to a nearly forgotten but excellent process.

SUPPLEMENTARY EXPOSURES.

Our article in last week's issue on *Reflected Light in the Camera*, has drawn forth two communications from correspondents who seem to be of opinion that the presence of a small amount of extraneous light is not altogether disadvantageous, inasmuch as it plays the same part as the supplementary exposures that were at one time recommended for the purpose of shortening the time of pose in portraiture. One of our correspondents also alludes to the remarks of Professor George W. Hough, reported in the same issue, which go to show that supplemental exposures, under certain conditions, increase the rapidity of a plate some five times.

Looking back to the days when such supplementary or auxiliary exposures were, if not fashionable, at least seriously looked upon and carefully tested, it is very doubtful whether any real benefit can be said to have been derived from them. There were instances, undoubtedly, where a close examination of a negative that had been subjected to this treatment exhibited, perhaps, faint traces of detail in the deeper shadows that did not exist in the corresponding plate similarly treated, except for the auxiliary lighting; but, in all such instances, it was claimed by the opponents of the system that the advantage was more apparent than real, that the additional detail was of no practical or printing value.

This was in the days of wet collodion, when the supplemental lighting was performed in a variety of fanciful ways, such as exposing the plate to the feeble light reflected from black velvet or to that transmitted through a coloured translucent screen. Some, again, coloured the interior of the camera, so that it might reflect light of a feebly actinic character, which acted simultaneously with the camera exposure proper, while others applied a certain amount of what was termed "judicious fogging" by directly exposing the plate to the action of a feeble artificial light. In one and all of these methods the result was practically the same, namely, the production of a slight veil over the whole of the plate.

But the supporters of the supplemental lighting theory claim something more for the system than a mere general veil. That, we can well understand, can be applied in a variety of ways, by staining the negative film, by the application of a matt varnish, or by printing through tissue paper and similar media. But none of these are capable of doing more than, perhaps, slightly alter the ratio of gradation and prolong the time required in printing, while the true supplementary lighting is claimed to bring out more detail.

Some years after the first agitation in favour of supplementary lighting, the question was studied by Messrs. W. K. Burton and W. E. Debenham amongst others, and this time in connexion with gelatine plates and the sensitometer. The fanciful and uncertain methods of lighting by means of coloured glasses and reflected rays were relinquished in favour of direct exposure for a determined period to feeble artificial light. By careful and repeated trials the minimum time was ascertained in which a visible fogging of the film could be produced by exposing it at a distance of several feet from an ordinary candle; and, this period having been found, it was easy to graduate the preliminary exposures in such a manner as to bring about the supposed action of light that precedes the formation of a visible image.

The theory of the supporters of this system—and it is a reasonable one—is that the light must act upon the plate or film for a certain time, in order to, so to say, overcome its *vis inertiæ* before it can produce a developable impression; and that the function of the supplemental exposure is to just overcome that *vis inertiæ*, and leave the film in a condition to form a developable image, with the briefest possible exposure in the camera. The theory, we repeat, is reasonable enough, and is in accordance with what actually occurs when a sensitive surface is exposed to light, since, unless the latter be very powerful, an appreciable time elapses before any palpable effect is produced.

Working upon this theory, Messrs. Burton and Debenham, in the experiments we have referred to, showed that, when

carefully and judiciously applied, the auxiliary exposure did undoubtedly conduce to the production of an increase of sensitiveness to the extent, if we remember rightly, of two or three numbers of the sensitometer. But they also showed most conclusively that it ended there, and was of no practical value in camera exposures.

Some fifteen or sixteen years ago the preliminary sunning of albumenised paper in order to hasten its printing power was recommended in America; in other words, the application of the system of auxiliary lighting to the formation of a visible image, as distinguished from a developable one, was made. Here it is possible to follow more closely and accurately the working of the system, for with the comparatively slow-printing surface the paper may be exposed for a very considerable time to a weak light without the production of any visible change. If, we will say, a piece of albumen or gelatino-chloride paper be exposed to feeble diffused light for a period of one minute without any visible change, and two or three seconds later a change becomes visible, it is impossible to believe that that capacity for change has sprung suddenly into existence. It is most certainly the result of some invisible change produced by the first sixty seconds of the light's action, a preliminary change that must precede the formation of a visible impression.

If we ascertain the period which is required under certain conditions of light to set up the first sign of a visible change, and then expose a piece of paper for three-fourths or seven-eighths of that time, a portion of it being protected by an opaque mask, we may expect that paper to be in a condition to form a visible image more rapidly on one portion than on the other, and such in practice proves to be the case. If a piece of paper so partially exposed be placed behind a negative, and re-exposed for a few seconds in a good light, the image will, in all probability, make itself visible on the exposed portion before it does on the other. But—and here comes the practical point—the difference is so slight, and the second portion of the image follows the other so quickly, that, before the printing can be said to be fairly started, any distinction between the two portions is completely lost.

The experiment may be instructively varied by exposing a piece of paper under a star, or other shaped mask, in the feeble light of an ordinary room for a period short of that found to be necessary to produce a visible impression. If, now, the mask be removed, and the exposure continued, we ought presently to see an image of the mask in white upon a faintly tinted ground; but, as in the previous case, the very greatest care and the closest observation are needful, and even then it is very often much a case of individual eyesight. We have often, when trying this experiment, found perhaps one individual claim to be able to recognise an image that was invisible to ourselves and others. A graduated sensitometer screen forms perhaps a better mask for use in such trials as these than one of opaque paper.

The result of a series of experiments of this kind, if carefully conducted and closely studied, will be to convince the inquirer that, although there may be an apparent advantage in the preliminary or supplemental exposure, it is so slight in comparison with the total result as to be practically inappreciable. In fact, in order to secure any apparent benefit at all, the auxiliary exposure must be of the very shortest, otherwise the general action or fog will be sufficient to hide any partial action that might otherwise be there.

Turning back, then, to the suggestion that reflected light in the camera can be of any practical use in shortening exposures, we most strongly deny it. In fact, as we have endeavoured to show, the evidence is all against the practical utility of auxiliary lighting in any form, but especially with gelatine plates. All who have had practical experience in rapid work are well aware that better results are obtainable by careful and prolonged development than by rapid forcing. Every plate has, more or less, an inherent tendency to fog, which is only brought into stronger prominence by increasing the energy of the developer whenever it may lie dormant for a long time under a weaker solution, and so permit of the gradual development of the feeblest impressions of the lens. By purposely exposing the films to light, however feeble the inherent tendency, it only heightened, and the prospects of success from protracted development correspondingly decreased.

How slight an auxiliary exposure is necessary is shown by the figures quoted by Professor Hough in his article in last issue. Plates that were exposed for only two seconds to the red glass window of the dark room were said to be increased in *apparent* sensitiveness five times; that is to say, the sensitiveness by the sensitometer showed five times greater, though, as Messrs. Burton and Debenham showed years ago, such readings are utterly fallacious. If, however, the "red window" is anything like those in ordinary use, the result should set us thinking on the subject of the importance of shading our negatives during development.

As a practical test of the value of preliminary lighting for shortening the camera exposure, a plate was placed in the dark slide and the shutter partly drawn, when it was exposed for a fraction of a second to the light of a common Swedish paraffin match at the distance of about eight feet. The exposure made in the camera, as usual, was purposely curtailed, and the development was conducted on the slow-and-sure principle, with the view of getting out as much as was possible from both portions of the plate. So far from the preliminary exposure proving beneficial, it was, in every case where an ordinary plate was used, the reverse. At no stage of the development did the supplementary exposure place that portion of the plate in front of the other; on the contrary, very early in its progress the image became veiled, and long before the unassisted half was completed the remainder of the plate was hopelessly fogged.

The experiment was repeated several times with slight variations of the exposures, both supplemental and in the camera, but with practically the same result, except when a double-coated film was used, and then a novel feature of the multiple-coating principle made itself apparent, inasmuch as in this case the supplementally lighted portion of the plate began to show its image several seconds before the other; but after a very short time all difference between the two portions disappeared, and at the finish there was no distinction whatever, the remarkable point being that the fog that accompanied preliminary exposure in the other cases was entirely absent from the double-coated film.

PHOTOGRAPHING HIGHLY POLISHED SURFACES.

Reverting to the previous article (see page 618, *ante*), we shall here describe some of the methods or dodges frequently resorted to by those who make a feature of the above class of work, premising, however, that what was said a fortnight ago with re-

gard to the method of illuminating the objects to be copied will be borne in mind.

Taking first by way of example a silver or gold vase of the usual hypo—highly burnished in parts, and in others frosted. One very excellent way of dulling the surface for photographic purposes is to take a lump of tolerably firm putty and lightly dab over the burnished portions with that. This, if carefully done, will not be at all perceptible in the photographs. After the negative is secured the putty can be cleaned off with a plate-brush, whiting, and benzol. Another method is to place a piece of ice in the vessel, this by cooling the metal quickly causes moisture to condense upon it and thus dull the surface without at all interfering with the finest detail in the chasing or engraving. To be successful with this plan, one or two precautions have to be taken. The ice should not be put into the vase until everything is arranged and the plate is ready for exposure, and it should be taken out directly after it is made, the reason for this being that the moisture will continue to condense on the cold metal and soon run down as tears, which would be reproduced in the photograph. If a second negative has to be made, then the ice can be replaced. If the atmosphere is very dry, it may be requisite to sprinkle the floor of the studio with water to provide the necessary moisture. Another point in connexion with this system is that the temperature of the room must be tolerably warm, for, if it be very cold, the condensation will be correspondingly slow, if at all.

Silversmiths, and others, who make a practice of having their goods photographed, generally have the negative taken before the things are finally polished. This materially aids the work of the photographer.

By taking advantage of the condensation of moisture the copying of china and glass articles can be greatly facilitated, and the same applies to jewellery; but it is obvious that ice cannot always be used in the manner just described. However, the difficulty may be got over in another way. The articles may be kept for some time previously in a cold place. Then, when they are brought into a warm atmosphere, moisture will condense upon the surface as dew, as is frequently noticed when cold tumblers or wine glasses are taken into a warm room where the air is moist. In the case of small articles they may be cooled by putting them for an hour or so in a refrigerator, or, if that is not at hand, a packing-case with a few pieces of ice at bottom will answer the purpose quite well.

Furniture should always be, and usually is, photographed before it is polished. The best start for our present purpose is when it is finally glass-papered ready for the polish. In this condition the surface is quite dull, though it does not show the grain of the wood; but this is fully developed by slightly oiling it, as the polisher does before commencing his labours.

Some persons are much surprised at the excellence of the photographs of machinery usually to be seen at most industrial exhibitions, and often wonder how they are done. The matter is very simple. The machines are painted over with flatting colour, of a slate hue, before the negatives are taken, as the lettering for the maker's name frequently is painted in black. In photographing machinery in factories this dodge should always be resorted to, otherwise it is next to impossible to clearly delineate many of the bright parts under some conditions of lighting. If the flatting be done with a mixture of turpentine, white lead, and lamp-black, the colour can be quickly cleaned off with a piece of "cotton waste" charged with benzoline. It is often important that the name of the maker of machine be conspicuously shown; a little chalk, if it be in an ill-lighted portion, rubbed over the letters, is all that is necessary to obtain this end. Distemper has sometimes been recommended for coating machinery prior to photographing it, but flatting is far preferable, as it "takes" better on the metal, which is always more or less greasy and repellent of water, while with benzoline it is quite as, if not more, quickly removed than distemper would be.

Among the many odd jobs a photographer is often called upon to do is to take a photograph of a grave or tombstone, when, of course, the inscription is one of the important features. This is not always an easy thing to do, particularly when the stone is of some coloured granite and the lettering is gilded. The best thing, under these circumstances, is to make a paste of whiting in water, and with it fill up the cut-in letters, using a palette knife for the purpose. It is easily done, and readily brushed out when the negative is obtained, and in no way injures the gold.

Recipients of medals who make use of them for business purposes frequently require them photographed, and, when they get the pictures, are sometimes disappointed with the result, owing to its not being equal to those frequently to be seen in the possession of numismatists and others. The reason for this will be obvious when it is mentioned that the photographs issued in the numismatic publications are not taken from the originals at all, but from casts of them made in plaster of Paris; and, to aid the photographer, the plaster is slightly tinted with a dark pigment, such as umber, for example, to take off the excessive whiteness. Most of the medals utilised for advertising purposes are reproduced by electrotyping, and, when this is the case, there will be no difficulty in obtaining plaster casts from the original moulds from which the electrotypes are made. When gold, silver, and bronze medals are to appear in the same picture, the plaster of Paris should be tinted according to the metal; for the silver a very slight tint, for the gold a shade or two darker, while for the bronze it may be somewhat deeply coloured. In illuminating the cast a strong side light should be used, as mentioned in the former article, so as to bring out the relief in the strongest manner possible.

It often happens in the case of presentation articles, such as clocks, inkstands, and the like, that the inscription is on a separate plate affixed to the article, and it is important that it should be distinctly rendered. When this is the case, the plate should be removed and taken to a copper-plate printer, who will ink it in—that is, fill up the letters with printer's ink, leaving the surface perfectly clean. By this means the lettering will be obtained perfectly clear and distinct in the negative. After a satisfactory negative has been obtained the ink can be cleaned out with either turpentine or benzine.

Photography on Mount Ararat.—Our readers may remember the details of a hoax, which was accepted as truth by many of our newspapers, some little while ago, to the effect that the remains of the Ark had been sighted and photographed; but at last it would appear a view of the mountain itself has been secured by the aid of the camera. Mr. H. F. B. Fynch, with his brother and a French guide, are credibly reported as having, after seven and a half hours' climb, succeeded in ascending Mount Ararat on the 19th ult. He has promised interesting information upon his return to England, and he states that he has taken some photographs.

Grinding and Polishing Lenses.—The usual explanation of the preliminary process of grinding lenses is that a series of "scratches" are produced by the abrading material, but Lord Rayleigh showed that this is an error. The normal process is the production of isolated detached pits, not scratches. The glass gives way under the emery, and at the same time the latter suffers abrasion from the glass. Our readers will be surprised to learn that an image seen through glass which has been finely ground, but not polished, has perfect definition. His Lordship stated that a glass lens finely ground gives very good definition, but there is a great loss of light by irregular reflection, and it is to avoid this that a lens is polished. He believed the process of polishing was not continuous with that of grinding, and that it consisted of the removal of a molecular layer from the glass surface. Grinding is easy and rapid, polishing tedious and difficult. By various interesting methods he measured the thickness removed, and found that, when a thickness equal to two and a half wave-lengths of sodium light was removed, the polish was sufficiently good. Four wave-lengths removed gave a perfect polish.

The Action of Light on Dyed Fabrics.—Among the singular results observed in connexion with the fugitiveness of eosine colours may be mentioned the fact, stated by the Committee lately referred to, that when there is added to an eosine dye such a colour as methyleosin, a particular phase of fugitiveness is destroyed. It does not prevent the fading as a whole, but, when the colour has faded to the "pale-faded tint," no further alteration occurs. That the conclusions of this Committee, however, must not be taken to be paralleled by pigments of similar origin is evident from the fact that they say "the number of very fast reds is extremely limited, but it includes both natural and artificial dyes, namely, madder, cochineal, alizarine," &c. Now, it is well known to artists and to the manufacturers of carbon tissue that cochineal pigments—crimson lake, for example—are, in the highest degree, fugitive, and the substitution of alizarine reds for cochineal reds marked a distinct advance in the permanency of the general colour of purple-hued carbon prints.

British Association Memoranda.—The photography of interference and diffraction phenomena has been rendered easy of accomplishment by a new and simple apparatus devised and exhibited by Mr. Croft. No bench is used, and the various pieces of apparatus are mounted on the usual stands employed for holding lenses, &c. One of these contained a thin aluminium plate with a needle hole, or the slit of a spectroscope, on which the light of a lamp was focussed by means of a lens. The eyepiece of a Beck microscope was used for observing, and was placed about two feet from the slit or point, the object being introduced between. The stands are to be adjusted in such a manner that the light proceeds straight into this eyepiece. The whole special apparatus required need not entail an expenditure of more than a few shillings. It is suitable for showing or photographing the usual diffraction phenomena, and of Fresnel's bi-prism, sharp edges, perforated zinc, &c. Mr. Croft proved the value of this simple apparatus by exhibiting a series of curious phenomena, including an example of the bright central spot in the shadow of a small opaque spot (shot) photographed by its aid.

Lord Rayleigh's Substitute for Telescope Object Glasses.—Considerable interest continues to be exhibited in this suggestion (explained in these columns a few weeks ago). Letters over the signature of "H. F. Newall," and "Robert S. Ball," have appeared in response in the columns of *Nature*. The latter says, "Accepting what Lord Rayleigh says as to the present possibilities in the preparation of plates, I fail to see where any considerable saving is to be effected in the cost of the apparatus, as he appears to suggest." Also, "It is certainly easier to test the qualities of an objective corrected for visual than for photographic rays (if I may still use language which Lord Rayleigh has pointed out as incorrect). On this account it would, therefore, be desirable to have plates such as he refers to rendered available for astronomers engaged in photographic work." Professor Newall does not speak so strongly as Sir Robert Ball, but dwells on the advantages of violet refractors (*i.e.*, refractors corrected so that the minimum focus is for violet light). He sums up by saying that still greater advantages would accrue if a means of avoiding the difficulties of supporting, adjusting, and maintaining a mirror could be devised.

THE PHOTOGRAPHIC SALON.

The Photographic Exhibition known as "The Photographic Salon" was opened to the public, at the Dudley Gallery, on Monday last. The circumstances surrounding its inception were of such a remarkable piquant character that it is only the bare fact to say that its opening has been awaited with great curiosity. The popular belief, not altogether unsupported by weighty evidence, is that the Salon has been started in opposition to the old-established Exhibition of the Photographic Society of Great Britain, and, despite all the sophistry and special pleading that may be adduced to prop up the somewhat thin contention that it is intended to supplement rather than to rival the display in Pall Mall, we believe that it could only be with difficulty that an impartial judge would lean to the former view. There is, of course, the odd plea that the Salon affords scope for the Exhibition of purely "art" photographs which the older Exhibition does not; but the irony of fate opportunely intervenes to demolish any such fantastic theory, for at Pall Mall just now there may be seen on the walls medalled exhibits as strange, as bizarre, and as wishy-washy as the most conscientious Salonist could possibly desire. If, then, the Photographic Society has proved itself willing to recognise the special variety of photographic production which it is the aim of the Salon to nurture and encourage, the *raison-d'être* of the latter institution inevitably rests on the most slender support, and the continuance of a second Exhibition, either in a rival or supplementary capacity, is out of the question.

There are nearly 300 pictures on the walls at the Dudley Gallery, over 480 having been rejected by the committee of selection. The 300 exhibits are the work of about 110 persons, nearly half of whom, singular to tell, are also exhibitors at Pall Mall. These figures indicate that there is not, after all, a very large number of people anxious to demonstrate the necessity of a second Exhibition, otherwise it is difficult to account for such an even-handed support of the two. It would probably be near the mark to assume that, except in the cases of about half-a-dozen gentlemen whose names the reader can supply for himself, nobody cares two straws for the Salon as such, save and except that it gives him an additional opportunity of challenging a verdict upon his powers from the critical public; and a cheap opportunity, to boot, as the Salon does not charge for wall space.

Coming, however, to the Exhibition itself, we must admit that the promoters have done remarkably well, and have succeeded in getting together what is, on the whole, an undoubtedly fine collection of pictures, judiciously chosen and well hung. Indeed, we go further, and say that, in the department of portrait work, there is on view a number of examples we have never seen excelled, and the merit of which is a revelation. Of what are known as composition subjects and figure studies there are some capital examples, and in the way of land and seascapes some really good efforts. But not all the pictures are of the fuzzy kind; far from it, thank Heavens! A good proportion of them would delight the soul of even a photographic optician. With some, however, there is a strong need of what the Marchioness described to Dick Swiveller as "make-believe" before you can be tolerably sure that the producers of such low-toned, depressing, blurry libels on Nature are not having a game with you. For the rest, the appearance of the Exhibition is decidedly agreeable, warm and sepia tones abounding, rough papers and fabrics being plentiful, and, with few exceptions, great taste being shown in the framing. The catalogue does not vouchsafe any particulars as to the printing methods employed but most of the pictures are priced, and for eight of his characteristic views Mr. Davison asks the modest sum of forty guineas, which, area for area, is less than half what Mr. H. P. Robinson wants. On the whole, we should prefer Mr. Robinson's.

We have already made the acquaintance of many of the pictures at other Exhibitions, although their inclusion here is probably due to a lack of omniscience, such as even committees of selection may be expected to suffer from.

Songerie (No. 11), by M. Hector Colard, is the first noticeable frame; it is that of a well-posed female figure in classical robes; the face is half in shadow, and the deep sepia tone helps the effect, which is most artistic. Mr. Calland has *An Orchard in June* (No. 14), in which he is uncommonly successful with his fruit-blossoms. Such subjects are generally disappointing. In *A Still Delight steals o'er the Earth* (No. 16) Mr. J. B. B. Wellington has a richly toned study of a bland landscape with the rays of an evening sun striking athwart it; there is depth, sparkle, and crispness in the treatment of the work, which is probably as good as anything Mr. Wellington has done. *Only a Fisher-boy* (No. 19) is the name Mr. Sutcliffe gives to a jolly laughing lad, the best of the artist's exhibits, unforced and natural. Mr. Lewis Cohen, in *A Sultry Day* (No. 21), successfully shows us a rider on horseback pausing at a pool amid umbrageous surroundings, and Mrs. Francis Clarke, in *A Study* (No. 25), has a good old man's head. This kind of thing is getting a little overdone, since everybody has found out what capital subjects old men's heads make. A word of praise is distinctly due to Mr. F. W. Gauntlett for *We Parted in Anger my Love and I* (No. 27*), as it tells a story which is easily understood. Have we not all had sweethearts, and have we not al quarrelled with them? Two young people have evidently just had a tiff, and are going their several ways half regretfully, a rustic bridge separating them. There are not many touches of nature in this austere Salon, and this is one of them. Mr. Henry Van der Weyde shows several of his familiar studies, such as *Cardinal Manning* (No. 31), *Hypatia* (Nos. 32 and 33), *A Study* (No. 34) of a pretty lady looking up at a caged bird, and a costume portrait of the handsome *Lady Helen Vincent* (No. 35).

Homeless (No. 36) is a woman's head with a sorrowful expression It is a warm-toned picture, and its producer, Mr. G. M. Wane, is to be congratulated on a sound piece of work. Mr. F. Hollyer, in *Millicent and Daniel* (No. 37), has a charming unforced study of a girl with a dog. *The Foster Mother* (No. 42), a young girl caressing a lamb, by Mr. T. C. Hepworth, is exceedingly good, but the lady's foot looks uncommonly big. This is the kind of thing Mr. Van der Weyde would probably consider as coming within the scope of his photo corrector. Mr. H. P. Robinson has seven large pictures in his best style. In *Preparing for Shrimping* (No. 54) the figures are happily disposed, and the lighting is good; in *Stormy Sunset* (No. 56) the artist successfully quits his favourite pastorals for striking cloud effects. In *Coming Boats* (No. 61) a woman is looking out to sea, while there is a boat with a man in it in the foreground, the effect with the sea and clouds being bold and striking. *Morning Mist* (No. 64) is a sunrise picture with sheep in the landscape, and *Declining Day* (No. 71), another exceedingly fine evening effect. Perhaps the most striking of Mr. Robinson's pictures is *Wild Weather* (No. 67), a woman on the seashore battling against a strong wind. The veteran's hand has not lost its cunning. Mr. Shapoor N. Bhedwar sends two pictures, one *In commune*, a weird portrait of probably a Fakir, and another, *The Voice of Silence*, a blind Fakir apparently in the act of blessing his daughter. The latter is an extremely powerful study.

Two companion studies by Dr. Hugo Henneberg, *Midsummer* (No. 62) and *An Evening in Autumn* (No. 68), catch the eye by reason of a certain charm of naturalness, the former in particular, with a lady in summer attire admirably assisting the effect aimed at in the view.

Nos. 73, 74, and 81 are delightful little Italian bits by Mr. J. A. Sinclair in his own bright, incisive style, and close by them are six exquisite views by Colonel Gale, of which *A Roadside Pond* (No. 79) is a simple theme handled with masterly effect. *The Dreamy Milldam* (No. 82), with a man pursuing the gentle art thereat, and the groups of cattle in *After a Summer Shower* (No. 83) are also choice examples of Gale's style. It is always a pleasure to contemplate work like this. Hard by is *Toccata* (No. 85), by Mr. Maskell, in quite another vein. Perhaps Colonel Gale has spoiled us, but when we were contemplating Mr. Maskell's picture we were induced to say, with the man in Mr. W. S. Gilbert's ballad, that "we know it's very clever, but we do not understand it." It is a landscape with a melancholy tint, and it is out of focus, with the high lights looking as if they were put in. *A Fair Wind* (No. 87), a tiny yacht study by Tom Bright, is capital; but *On the Danube* (No. 90) is an ordinary river view, out of focus, dirty, yellowy-brown in tone, and by Herr Watzek. Is it supposed to be after an old master, or is it a "gosk?' Dr. P. H. Emerson shows a soft and pleasing *Portrait of a Lady* (No. 92); Mr. T. Manley (No. 93), a delightful study of child life in *It takes such a Lot of Thinking over;* and Mr. Lintott, a miniature view, *Off Greenwich;* and (Nos. 95–104) Count Gloeden, some more of his nude *Figure Studies*, perfect in modelling and lighting, although not perhaps always so in the grouping.

Mr. Ralph Robinson has ten exhibits, in which, however, he hardly does himself justice; certainly they do not come up to his Camera Club work of last year. Probably the best are, *Cooling Stream* (No. 112), some cattle in a stream; and *A One-sided Chat* (No. 127), a lady talking to a dog, the expression on the animal's face being cleverly secured. Mr. J. Craig Annan is also a generous exhibitor. In his *Fishers' Wives* (No. 117) several women are busy at work, while a lout of a man looks on with his hands in his pockets. One feels inclined to cuff him. *The Beach, Zandvoort* (No. 119), a long narrow view of the seashore, with numerous Dutch fisherwomen crowding round a fishing boat, is one of the best of Mr. Annan's exhibits, *the* best being probably *A Utrecht Pastoral*, a flock of sheep passing up an avenue of leafless trees. There is not much in the subject, but it is handled with rare skill, the winter chill being cleverly suggested, and the whole effect being most realistic. This must rank as one of the best landscapes in the room. Mr. Bernard Alfieri has two realistic studies of *A Winter Landscape* (Mo. 125), and *Silver Birches* (No. 126), as well as a large water piece with a mouldering *Derelict* (No. 129), enveloped in gloom and dismalness. *Wind* (No. 130), is another of Mr. Alfieri's, the play of the reeds and rushes being highly suggestive of atmospheric disturbance. A fine *Head of a Painter* (No. 132), by A. Buschbek; a richly toned farm scene, by Dr. Julius Strakosch, *Children Playing* (No. 138); a clever *Twilight* (No. 142), a sombre scene of craft on a river (query the Yare near Yarmouth Bridge), by Mr. Arthur Golding, all deserve mention and notice. Mr. J. S. Bergheim is represented by twelve pictures, chiefly large portrait studies, designed to suggest various effects and schools of painting. They include *Gipsy Queen* (No. 143), a portrait full of force; *Gazalleh* (No. 144), a charmingly soft engraving-like female head; *Sybil* (No. 147); *Beatrice* (No. 148); *Helen* (149); *Listening to the Voices* (153), a simple study of a girl seated at a window in a very natural, unconstrained, listening attitude; *La Juive* No. 154), and *Penserosa* (No. 155), a lightly draped lady, designedly taken considerably out of focus, so as to avoid a too realistic sharpness. Space will only permit us to speak in general terms of Mr. Bergheim's exhibits, many of which, aside of what they aim to be, are undoubtedly very fine from an ordinary photographic point of view. Good portrait work is shown by Mrs. Myers, although, in a *Portrait of Mr. Gladstone* (No. 165), as well as in her *Boy's Head* (No. 1), she makes her high lights uncommonly prominent. Mr. Karl Greger is successful with large work, and we like two Burnham Views (Nos. 165 and 184) by Mr. A. Horsley Hinton, as they are plucky and striking, but we altogether fail to appreciate others of Mr. Hinton's landscapes here; they have far too much "breadth" for such unregenerate mappists as ourselves. Mr. W. Crooke's portraits, *Miss Gratton* (No. 160); *Professor Blakie* (No. 178); and *David Bispham, Esq., as Comte de Neven*, are strikingly good, particularly the latter, which is got up to resemble a fine steel engraving. Two night views of *The Thames Embankment* (No. 192), and *The Eiffel Tower* (No. 193), by Mr. G. Loppe, show the lamps and lights, and are clever *sui generis*. We leave them to take a prolonged plunge into a bath of "pinhole," "astigmatic," "broad" and "diffused" effects by Messrs. Charles Moss, Rowland Briant, and others, to emerge for a moment at an ably treated view of *Carthagena* (No. 206), by Mr. A. E. Oakes. Then comes Mr. George Davison with fourteen studies mostly printed on fabric. Of these *Dedham Pool* (No. (213), and *A Seashore Pasture* (No. 223), arrest our fancy, as, while undeniably "broad" in treatment, they do not appear deficient in some kind of definition. Most of the others show the master of selection and composition, and exhibit Mr. Dawson at his best, or worst, as the reader

pleases; one picture, *The Hedger* (No. 235), being honourably entitled to receive the entire contents of a confectioner's shop for "breadth of effect."

Mr. Thomas Manly's *Naughty Bow-wow* (No. 219) is an amusing dog and child piece, and skilful withal, and the same exhibitor has other work of a like kind (Nos. 225 and 232). Mr. Henry E. Davis shows three small views shrouded in an intolerable deal of frame, *Fretful Spring* (No. 239) a realistic little bit; *Breaking Storm—Moonlight* (No. 240) and *Bisham* (No. 241) the last a delicate little river view which would bear enlargement. Mr. F. Hollyer's portraits, *Walter Crane, Esq.* (No. 258), *The White Frock* (No. 260) being the full-length portrait of a lady; *Rev. Stopford Brooke* (No. 263), *Albert Moore* (No. 277) are just what Mr. Hollyer has long accustomed us to. In *H. E. Davis, Esq.* (No. 277) the characteristic expression and attitude of the original are well secured, and the portrait is a highly successful one. Mr. H. H. Hay Cameron's portrait of *Master Harry Hetherington* (No. 262) shows the young gentleman's arm at right angles with his head, but Mr. Cameron succeeds better with *Henry Irving as Beckett; Mrs. H. E. Hoare*, a graceful piece of work, and *Master Wellesley*, a softly, harmoniously lighted portrait. *Sweet Kitty* (No. 271), by Mr. Arthur Burchett, is the picture of a smiling girl in a delightfully natural and easy attitude, and Mr. W. A Cadby's portrait of a girl in *Setting Sunlight* (No. 267) has some daring but striking effects of lighting. Lastly, the effect of Mr. Rowland Briant's *Mellow Mists of Autumn* (No. 272) is decidedly more convincing than that of this gentleman's other contributions to the Exhibition. We have only space now to add that in addition to those named excellent work is shown by Rev. F. C. Lambert; Miss Farnworth, Baron Rothschild, Messrs. R. Keene, C. Patterson, T. M. Brownrigg, A. R. Dresser, Viscount Maitland, Messrs. Seyton Scott, W. Thomas, H. Tolley, Major Nott, Messrs. Clarence Moore, F. H. Evans, B. Gay Wilkinson, H. W. Bennett, and others.

The Exhibition remains open till November 11, and is well worth visiting, as it contains something to suit all photographic tastes. But take it all in all, the Salon does not differ in essence from a really good Photographic Society's Exhibition except in its surrounding circumstances and its possession of perhaps a larger percentage of pictures having a "more subtly suggestive style of treatment," which is Salonic for badly focussed photographs. *Ainsi soit-il!*

JOTTINGS.

I AM sad at heart! The most unhelpable individual is the man who won't help himself, and nothing is more galling to one than to find that one's outlay of time and trouble on behalf of a friend who needed assistance has been rendered nugatory by a mixture of stupidity and wilful blindness. Throughout all its recent troubles I have been doing battle for the Photographic Society of Great Britain, denouncing its enemies, exposing their tricks and manners, indicating the traps and difficulties before it, solely with the object of helping the old Society to profit by my warnings and emerge from its crisis triumphant and successful. The Society's Exhibition is the very pivot of its existence, and, if that goes wrong, the Society's prestige is seriously shaken. This year, in the face of determined opposition, it behoved the Society to put its best foot forward and have an Exhibition which should be worthy of the occasion and of itself. But what do we find? Certain trifling improvements in the direction of sumptuary detail, selection of apparatus, &c.; but, for the rest, failure and *fiasco*. The Exhibition, designed to be small and good, is successful in the first regard alone; and as for the judging——!!!!!! The notes of exclamation must supply what my language cannot possibly convey, for, like the habitually profane waggoner, the tail-board of whose waggon gave way at the top of a steep hill, thus releasing a heap of potatoes which rolled away down the hill, "I ain't ekal to it!" Then, on top of the Society's humiliation, I am told that the Salon Exhibition is an extremely good one. Credit where credit is due, of course, but for the sake of the old Society, which is just now suffering from its own blunders, I am sad at heart. So, strike the banjo's sweet and tuneful string, and let me soothe my wounded feelings with a little music!

Rumour says that a new photographic paper is shortly to appear and rumour also says that it will eclipse anything of the kind now in existence, that it will have a lot of money behind it, that it will, in a special sense, take art photography under its wing, that it will, in short, play up Ancient Nicholas, and break things. The names associated with the enterprise are not unknown to the photographic eye, and are witnesses to the ingenious manner in which the gentle art of advertisement can be practised upon an unsuspecting public under all sorts of innocent but impenetrable disguises. I wish the new venture (if it appears) all the success it may deserve, but in the present state of the photographic trade, coupled with the fact that the journalistic ground is said to be already fully covered, I am not very sanguine of its chances of setting the Thames on fire.

Are outings a failure, and is the excursion played out? I notice in one or two annual reports of the Photographic Societies lately published that a falling off in the attendance of members on the occasion of the Societies' outings is recorded. As the weather during the past summer was above reproach, the explanation cannot take the old familiar shape, so I suppose that the outing fever is on the wane. This is rather a pity, inasmuch as to those who do not care for the violent delights of cycling there are few more enjoyable ways of passing a Saturday afternoon than with a camera amid beautiful natural surroundings. Have all the show-places near the large towns been exhausted by the older photographers, and are there no young ones to take their places? The reply to the last part of the question would seem to be in the negative. I fancy, too, that just now the growth of Photographic Societies is not so rapid as it was three or four years ago. I don't know whether such small facts as these can be taken as an indication of a lull in the spread of amateur photography, but they are certainly significant of possible changes coming over the spirit of our dreams.

May I ask whether it is the function of Judges at photographic exhibitions, when sending in a report, to append criticisms of the pictures they have judged, giving, by implication, their reasons why awards have been bestowed or withheld; if so, I would recommend such Judges to be quite sure their reasons will stand the microscope of common sense before making them public. Personally, I agree with you in your remark of September 29, "that a wise Judge always withholds his reasons." On this showing, the Judges of the Falmouth Exhibition, whose report on the Exhibition is published in your pages of September 22, run the risk of being called the reverse of wise. Of one exhibit, to which they gave a bronze medal, they say the pictures "are cleverly told stories, *but are somewhat too suggestive of the shop show-frame.*" To stigmatise work as of the shop-show-frame kind, and give it a medal, is rather contradictory, isn't it? Again, to say of an *At Home Portrait* that "it should have stopped there" is very unjudicial, and savours of the partisan. Then Mr. F. W. Edwards' interiors of Westminster Abbey are called "perfect work, printed in a most unpleasant colour." Is this loose writing, or do the Judges know what they mean? I don't. They first call a thing perfect, and then proceed to discount its perfection, which, to say the least of it, is a nonsensical proceeding. On the whole, the judging at Falmouth seems to have been about as funny as that at Pall Mall. Where, oh, where was my old friend Mr. William Brooks?

How many more times, I wonder, are we to have the suggestion that boxes of plates and packets of sensitive paper should have the date of manufacture stamped on them, so that the photographer might know whether he was buying old or new material? Your correspondent who wrote the other day, and those who write so glibly on the subject, cannot be aware of the difficulties surrounding it. The principal one is the old one of supply and demand. If a manufacturer knew that for certain brands and sizes of his goods there was a constant and steady demand, which obviated the necessity of the distributor holding them in stock beyond a given length of time, the thing would be simple enough; but this is a state of affairs never, under any circumstances, likely to happen. A dealer is largely at the mercy of the capricious laws I have named. An article may go

off with a rush, or it may hang fire, there is no telling. Hence there is only one thing that will prevent sensitive preparations from remaining in stock—say, for more than three months—and that is the willingness of manufacturers to take them back and cast them into the waste tub, which is an idea altogether too Utopian for further reflection.

I do not know whether the Kew Lens Testing System is much availed of by opticians, but I have often thought that an institution which could officially certify as to the good qualities of photographic preparations generally would "fill a long-felt want," and be exceedingly useful to producer and consumer alike. Selecting one instance out of many that occur to me, what trouble, loss, and vexation are caused to the poor photographer by his mounts, the quality of which he always has to take on trust, only too often to find that they develop all sorts of ruinous markings on his prints. Could the manufacturer sell the photographer his parcel of mounts with an expert's guarantee of their purity, much loss and acrimony would be spared all parties. Here is an opening for a clever chemist to start in business as an expert in the analysis of photographic preparations Don't all speak at once! COSMOS.

MATT EFFECTS ON ALBUMENISED PAPER.

ALTHOUGH for the production of matt-surfaced pictures, which are now becoming very popular, there are plenty of specially prepared papers, it may occur to others, as it did to me recently, that none of them are at hand or readily available when wanted. Under such circumstances, the method I adopted may prove equally useful to others. The plan is not my own, but was introduced upwards of twenty years ago, by whom I really forget, but I know that I tried it when it was first proposed, and got some results that satisfied me very well in days when everything must have the albumen gloss. The method consists in printing on the reverse side of the paper. Well, not that only, because, if any of my readers try it on ready-sensitised paper they will be disappointed. The paper must be *sensitised* on the reverse side—that is, it must be floated with the albumen surface uppermost. If this be not attended to, there will be no picture at all, or very little on the surface at least, although a strong image will be formed in the body of the paper.

The sensitising solution is prepared in the ordinary way, though, if strong, black tones are required, to resemble platinotype, it is desirable to use a rather stronger bath than usual (certainly not less than sixty grains to the ounce), and to have it neutral, or it may be slightly alkaline; the paper must be floated for a longer period than in the ordinary way, as the solution has to penetrate through to the albumen, and draw the soluble chlorides to the opposite surface. The albumen is coagulated in the same manner as if it had been in contact with the solution, showing that the latter must penetrate completely.

The printing goes on about as quickly as under ordinary circumstances; if anything, perhaps, a little more slowly, and should be carried to a good depth, as it comes down more in the toning and fixing than when on the proper surface of the paper. The washing, toning, and fixing are conducted just as usual, and for platinotype tones I use either carbonate or phosphate of soda. Better still, perhaps, for that colour would be the old lime toning bath.

Prints made in this manner, if the tone is good, are difficult to distinguish from platinotypes, especially when got up on "plate-sunk" mounts.

Another useful application of the method of sensitising from the back of the paper is in the production of paper negatives. It very often occurs that a negative has to be reproduced, and a very simple way of doing it is to make an albumen print, and from that a paper negative, the only difficulty being in getting sufficient density and contrast for printing purposes when the image is wholly in the albumen. By sensitising from the back this difficulty disappears.

For this last purpose gelatino-chloride paper may be used, for, although it might be supposed the image would be confined to the emulsion surface, it will be found that, if the reverse side of the paper be put next the negative, there will be little or no image on either surface, but a very strong one between the two. W. LINDSAY.

GELATINO-CHLORIDE PAPERS.

[Brixton and Clapham Camera Club.]

IN 1865 Wharton Simpson devised a process of silver printing in which the sensitive salts were held in suspension by collodion, and the process was called "Simpsontype." For some reason or the other this process died out in favour of albumenised paper; but in 1882 Captain Abney suggested a chloro-citrate or citro-chloride emulsion, which contained chloride of silver and citrate of silver emulsified in gelatine. This was the first mention of a gelatino-chloride printing paper (Woodbury).

In 1885 J. B. Obernetter, of Munich, introduced, commercially, a gelatine emulsion paper, and was followed, in 1886, by Liesegang, of Düsseldorf; but it was not till 1890 that the manufacture of gelatino-chloride papers was commenced, commercially, in England.

Gelatino-chloride emulsion paper is a paper coated with an insoluble film of gelatine and either sulphate of baryta, chalk, &c., the purpose of this film being to prevent the subsequent coating of emulsion of sensitive salts from sinking into the pores of the paper, and thus forming a white or coloured impermeable support for the sensitive emulsion (Woodbury).

It will keep for months under proper conditions. I have obtained first-class results on paper two years old (specimen). It can be obtained cut to sizes or in sheets for cutting. Great care must be taken to handle the sensitised surface as little as possible.

It will suit almost all kinds of negatives—a thin negative in a weak light, or a piece of tissue paper pasted over the printing frame, or a piece of ground glass laid over the frame. The paper is able to give good prints from such weak negatives better than can be obtained by any other means, and also weak negatives can be made to give good prints by printing under green glass (signal green, procurable at Defries', in Houndsditch), for the emulsion contains silver chloride and silver citrate. The action of the light upon chloride of silver is almost entirely confined to the ultra-violet rays, while the citrate of silver is altered by the blue rays and some distance into the green, which have hardly an effect upon the silver chloride. The silver chloride gives more gradation than the citrate; so, by printing through green glass, we prevent the action of light upon the chloride, and confine it almost entirely to the citrate, which gives much greater contrasts.

For dense negatives, print as quickly as possible, exposed to direct rays of sun; the blank whites can be softened down afterwards by exposing to the action of the light after removal of print from printing frame. Some strongly recommend varnishing negatives for use with gelatino-chloride paper, as it contains so much free nitrate of silver, and, therefore, very liable to silver-stain the negative. I am glad to say I have found no such necessity.

The paper is more sensitive than albumenised paper, and care should be taken to examine prints (whilst printing) in a weak subdued light. Print much darker than is required for the finished print, especially if to be toned with platinum, for great loss takes place in all after-operations; but, if the combined bath (toning and fixing) is used, it is not necessary to print so dark—no rule can be laid down; each operator will be able, by experience, to gauge, tone, &c., for himself.

After removal from frame, and if about to tone, be sure and give the prints a good washing, running water preferred, to remove all free silver tested by looking through some of the last washing water placed in any glass vessel, all the milkiness disappeared, all is well for next part. Some place salt in final washing water, but I have never found any such necessity. If the combined toning and fixing bath is to be used, no preliminary washing is required. After last washing, transfer print to solution of chrome alum, one ounce to ten ounces of water, for three or four minutes; remove and wash well again. To ensure even toning, do not buy cheap gold chloride; get the best, and make up into solution, fifteen grains to fifteen drachms water—equals one grain to the drachm.

TONING FORMULÆ.

A.

Sulphocyanide of ammonium	1 drachm.
Gold	2½ grains.
Water (distilled).....	5½ ounces.

B.

Soda acetate	88 grains.
Gold.....	2½ ,,
Water	5½ ounces.

For use, 3⅓ B to 1 part A.

ALL TONES FROM FOX-RED BROWN, TO BLUE BLACK.

Soda phosphate	20 grains.	Will not keep.
Gold	1 grain.	
Water	12 ounces.	

Gives purplish tones.

Carbonate lime	38 grains.	Extravagant, keeps fairly.
Gold	7½ „	
Water	10 ounces.	

Gives purple tones.

Soda acetate	1 ounce.	Keeps well.
Water	20 ounces.	
Soda bicarbonate	40 grains.	
Gold	15 „	

Gives rich purple-black tones.

To make this bath, dissolve the the soda in 18 ounces water, gold in 2 ounces water; mix, stand for 6 hours. For use take 1 ounce of solution to 10 ounces of water; after use filter and use to dilute next bath when required.

SEPIA TONES.

A.

Sulphocyanide of ammonium	1 ounce.
Sat. Sol. Carb. Amm	15 to 20 drops.
Water	50 ounces.

B.

Gold	1 grain.
Water	20 ounces.

Mix together until red colour disappears, then ready, not before; tone to deep purple, wash well, immerse in hypo. Result:—rich sepia black, suitable for rough or matt surface.

BLACK TONES.

Eastman's Formula.

Acetate of soda	30 grains.
Gold	1 grain.
Water	4 ounces.

Immerse, print, and tone just to a chestnut brown, remove at once, and immerse in combined toning and fixing bath, and allow to remain with rocking, till desired tone is reached. Without rocking gives grey tones.

COMBINED TONING.

Fixing Bath (Eastman's).

A.

Hypo	1 ounce.
Alum (potash)	¼ „
Soda sulphate	¼ „
H_2O	10 ounces.

B.

Gold	2 grains.
Lead acet.	8 „
H_2O	1 ounce.

For use, take two ounces of A to two drachms of B, mix. Allow to clear if necessary before use.

PLATINUM TONING.

Eastman's.

Potass chloroplatinite	5 grains.
Citric acid	40 „
Salt (common)	40 „
Water	20 ounces.

Welford's Bath.

Gold	4 grains.
Soda bicarbonate	90 „
Water	6 ounces.

Make when wanted. Over-toning is impossible. Easy to make.

All toning baths to work A 1 must be sufficiently saturated with chloride of silver, obtained by placing strip of unused paper in bottle containing toning solution.

TUNGSTATE-PHOSPHATE.

Ammonium sulphocyanide	140 grains.
Sodium phosphate	140 „
Sodium tungstate	100 „
Water	24 ounces.

When dissolved put scraps of untoned paper (a weak fixing bath is advisable for this bath), 10 per cent. only, into bottle, filter, and add 15 grains gold dissolved in 4 ounces water.

ORDINARY FIXING BATH.

Hypo, 2 ounces, to water, 10 ounces. Prints appear darker dry than wet.

After fixing wash well. I have found three-quarters of an hour ample. If for glazed surface, pass prints through alum solution again then wash finally; matt surface do not need second lot of alum; for glazed prints absolutely clean glass is necessary, and not too heavily squeegeed.

For matt surface clean ground glass or celluloid is necessary; if glass is preferred, a focussing screen is recommended, the grain being so fine. Ordinary ground glass is of not much use, too coarse, and gives shiny specks on dry prints.

Let all squeegeed prints get bone dry before stripping. I have never found the necessity of waxing glass surface before squeegeeing, as is recommended by some. Should any shiny specks show in finished print, caused through the print not having come into contact with ground glass or celluloid, the same can be removed by gently rubbing with a little fine pumice powder. Trim in ordinary way.

MOUNTING.

If for matt surface, ordinary stiff starch paste, removing all traces of brush marks which may show through finished and mounted print with fine pumice.

For glazed prints: Whilst drying on plate glass, paste with mountant a piece of waterproof backing paper; allow both to dry, then trim and paste (whilst on glass) on to the mount, allow to get bone dry, then detach; or, whilst print is drying on glass, paste a piece of stout cartridge paper (smooth) on to the print, when both are dry strip from glass and paste on mount with gelatine mountant, as follows:—

Gelatine	2 ounces.
Water	2 „
Alcohol	4 „
Glycerine	½ ounce.

Made thus: Soak gelatine in water for five or six hours, dissolve by gentle heat, then add glycerine, and lastly the alcohol in small quantities, stirring.

Or mount glazed prints by means of cut out mount, just touching edges of print with adhesive, lay down on card, pasting cut-out mount into card.

Paper used in manufacture of chloride papers is generally Baryta paper or Kreidé (German chalk, Woodbury). I have tried the following makes and found all thoroughly satisfactory; Aristotype (Liesegang), Cellerotype, Obernetter (Gotz), can be had either glossy or matt, Eastman's Solio.

I now purpose giving you a list of defects met with, and their causes, which are soon got over by perseverance, care, and cleanliness.

Degradation and Darkening of High Lights.—Examining prints whilst printing in too strong light.

Uneven Tones. — Paper damp, printing in damp atmosphere, acetate bath being acid.

Yellow Prints.—Exhausted bath, bath too warm, excess of sulphocyanide.

Greenish Half-tones.—Too long washing after fixing.

Loss of tone in Fixing Bath.—Insufficent printing and toning, hypo bath too strong.

Red Stains on Toned Prints.—Traces of hypo on fingers or in dishes, touched print before toning.

Rosy tints in Half-tones.—Weak gold bath.

Last advice, to get satisfactory prints is to exercise care, strict cleanliness in all manipulations, and do not spare the alum washings between each operation.

E. DOCKREE.

TO-NIGHT (Friday, October 13) the Central Photographic Club will have a smoking concert by way of housewarming at its rooms, Coleman's Hotel (late Ashley's), Henrietta-street and Maiden-lane, Covent Garden, W.C. Visitors will be welcomed.

THE HACKNEY EXHIBITION.—This Exhibition will be opened by Sir Charles Russell at Morley Hall, Triangle, Hackney, on Tuesday next, October 17. The awards will be presented by Captain Abney on the following day. Pictures will be exhibited by, amongst others, Messrs. Warneuke, Thomas Fall, Marshall Wane, F. W. Edwards, Birt Acres, J. B. B. Wellington, Dresser, Brooker, Gottlieb, Elliott, Mrs. Catherine Weed Barnes Ward, &c., &c.; and in the apparatus section there will be exhibits by Messrs. Marion, Wray, Watson, Platt & Witte, Powell, Hannam, Park, Fuerst, Doublet, Morris, Rawlings, &c. There will be concerts and lantern displays at intervals, orchestra, organ, &c.

THE ROCKET PLATE.

Under this name a new plate has been introduced by Messrs. Elliott & Son, Barnet, who claim for it the proud position of being the fastest plate made. The cut here shown is a reproduction from a negative obtained

by its agency in the middle of September last, and will show its great sensitiveness. The stop was *f*-11, and the indicated exposure a six-hundredth of a second. The plate gives a soft image, and will stand considerable forcing in development, while the grain is so fine that it bears enlarging to many diameters. Some other prints submitted show horses in the act of jumping fences.

A PORTABLE STAND.

In this stand three things will be observed from an inspection of the cut. First it packs up in a small space, being, in fact, of walking-stick form; secondly, it is extensible, as the legs can draw out; while, thirdly, the legs are permanently attached to the triangle or top, which is so constructed as to fold when being packed up, as shown in the figure on the top right-hand corner of the drawing. Some degree of ingenuity has been displayed in its entire construction, and there seems nothing to prevent it from being quite rigid when opened for use. Messrs. George Houghton & Son are the makers of this handy and portable camera stand.

Our Editorial Table.

The Art of Projection and Complete Magic Lantern Manual.

By An Expert. London: E. A. Beckett, Kingsland-road, N.E.

In this Manual we have a very complete account of the various inventions, discoveries, and manufactures of Mr. W. C. Hughes, the well-known lantern-maker of Brewster House, Kingsland, N.E.

In the course of his brief historical *résumé* we are glad to find that "Expert" gives credit to Marcy, of Philadelphia, for effecting the revolution in mineral oil lamps, which he undoubtedly did. Several pages are devoted to the construction, fitting up, and working of the Pamphengos, both singly and in pairs. Biunial lanterns, triple lanterns, and oxyhydrogen lime jets receive a considerable degree of attention; while the directions for registering effect slides are very full and complete. Gas cylinders and bags, pressure gauges, ether saturators, opaque and transparent screens, reading lamps and desks, all find a place. The application of the electric light to the lantern; the higher departments of projection, such as by the polariscope and microscope, not to speak of the preparation of slides by photography, are all highly suggestive to the student of the lantern. In the account of Mr. Hughes's mammoth Aphengescope for Prince Town College, New York, it is stated that "there is a loss of *eighty per cent.* of the light by reflection." When we consider that the loss of light by reflection from a well-polished silvered-glass mirror has been estimated at only five per cent., it is possible that there may be some mistake in the figures, unless the object from which the light is reflected on to the screen is a very absorbent one. The book throughout is well illustrated with diagrams.

Pictorial Effect in Photography.

By H. P. Robinson. London: Piper & Carter.

The fact of this work having gone through several editions (this is the fourth) shows the extent to which it is appreciated by those who take more than a merely technical interest in photography. It is the first work that was devoted to the art aspects of the art science, and it has taken its place as one of our classics. Since the work was first written (in 1868, if we mistake not) much has happened in pictorial photography. "Two events are" (we quote from the preface to this last edition), "however, of chiefest importance—the introduction of very sensitive dry plates, and the almost universal employment of mat papers of different kinds and various degrees of surface, from smooth to very rough." Mr. Robinson, in a few supplementary essays, brings his original teachings up to date, and amplifies subjects referred to in the body of the work. We confine ourselves at present to merely enumerating these essays, which are—"In Search of the Picturesque," "The Enjoyment of Photography," "Wind," "The Qualifications of a Portrait Photographer," "Without a Camera," "So Natural!" "The Use of Nature and Idealism in Art," "Originality." As all interested in this department of photography will be certain to procure copies of the work for themselves, we refrain from either describing or quoting. We may, however, observe that in the main work certain illustrations which have long done duty have been superseded by others. No one can read the work without being, if not instructed, at least much interested.

News and Notes.

The address of Miss Eardley, formerly of Dalston, is desired by Mr. R. Stewart, Photographer, Elgin, N.B.

London and Provincial Photographic Association.—On Thursday, October 19, Mr. T. C. Hepworth will show his slides.

South London Photographic Society.—October 16, Members' Lantern Night. Testing slides previous to being sent in for exhibition.

Central Photographic Club.—October 20, Open Night; experiments, results, &c. 27, Carbon Demonstration by Messrs. Elliot & Son.

The Judges at the South London Photographic Society's Exhibition will be Messrs. F. P. Cembrano, jun., W. E. Debenham, and Leon Warnerke.

Croydon Microscopical and Natural History Club Soirée.—The twenty-fourth Annual *Soirée* will be held on Wednesday, November 22 next

Widnes Photographic Society.—October 25, Open Meeting. November 8, *Flashlight Photography*, by Mr. W. Priestnall. 22, Open Meeting. December 6, *Chemistry of Photography*, by Mr. H. Wareing.

Mr. E. M. Nelson writes that the formulæ given by Dr. Piffard, in the course of his paper on *A Suggested Improvement in the Correction of Lenses for Photo-micrography*, &c. (page 641), should be "$R. - p = \frac{2n \times \sin u}{\lambda}$," and "$R. - p = \frac{2\ N.A.}{\lambda}$" respectively, and not as stated by Dr. Piffard.

MESSRS. NEWMAN & GUARDIA announce that they have opened new premises comprising offices, show-rooms, stores, dark room, &c., at 92, Shaftesbury avenue, London, W. This change has considerably increased the space available at their factory, which, for the present, remains in Farringdon-road. But they are also making arrangements for removing their plant and machinery to larger premises as soon as possible.

LEYTONSTONE CAMERA CLUB.—October 14, Inauguration of the New Hall and Studio.—There will be a cold collation served at half-past six, followed by the opening address by the President. The remainder of the evening will be devoted to music, and it is particularly requested that all members with vocal ability will assist in the success of the evening. 18, Demonstration of the Simplicity of Dr. M. Andresen's *Developing, Fixing, and Tone-fixing Cartridges*, by Mr. Eugene A. Leblanc. Chair taken at eight o'clock.

MR. W. J. STILLMAN writes: "In my reply to Mr. Blair, as printed in the JOURNAL of September 29, there are two misprints, which make nonsense of the sentences in which they occur. I am made to say, in the end of the first paragraph, 'as I did the other dry plates for glass,' &c., where I wrote 'for years;' and in the third paragraph, 'What have you and your fellow professionals attributed,' &c., where I wrote 'contributed.' I take the opportunity of saying 'Amen,' with all my force, to the note of Mr. Debenham in the same issue of the JOURNAL with mine.

THE second Annual Exhibition and Competition of the Leytonstone Camera Club will be held at the Masonic Hall, High-road, Leytonstone, on Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday, November 20, 21, 22, 23, 24, 25, 1893. The Veronese Band, under the direction of Signor Constantine Baga, has been engaged, and will play each afternoon and evening. There will be lectures, demonstrations, lantern displays, and other entertainments at intervals during each evening. The Judges are Messrs. F. P. Cembrano, jun.; Colonel J. Gale; Andrew Pringle; and twenty medals are offered for competition. Extra entry forms and all further information can be obtained from Albert E. Bailey, Hon. Secretary, Rose-bank, South-west-road, Leytonstone.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 18,412.—"Improvements in Detective Cameras." J. MARSH.—*Dated October 2*, 1893.

No. 18,436.—"Improved Photographic Camera for Automatically Exposing, Changing, and Storing Celluloid Films." E. H. FITCH.—*Dated October 2*, 1893

No. 18,595.—"Improvements in Folding Photographic Cameras." H. HILL and A. L. ADAMS.—*Dated October 4*, 1893.

No. 18,618.—"Lucidotype, an Improved Process of Photo-lithography." G. H. WRIGHT.—*Dated October 5*, 1893.

No. 18,685.—"Improvements in or in connexion with Photographic Cameras for Use with Flexible Sensitive Surfaces." H. HILL and A. L. ADAMS.—*Dated October 5*, 1893.

No. 18,742.—"Improvements in Apparatus for Exhibiting Stereoscopic, Panoramic, or Magic Lantern Views in Series." Communicated by E. Scheitlin. J. WETTER.—*Dated October 6*, 1893.

No. 18,823.—"Improvements in Apparatus for taking Photographic Pictures." A. A. FOIRET.—*Dated October 7*, 1893.

PATENTS COMPLETED.

IMPROVED MEANS FOR REGULATING THE RAYS OF LIGHT PASSING THROUGH PHOTOGRAPHIC LENSES.

No. 13,373.—JAMES WILLIAM FAWCETT, "Berthanga," 15, Argyle-street, St. Kilda, near Melbourne, Colony of Victoria.—*August 26*, 1893.

WITH the means at present in use for regulating the rays of light passing through photographic lenses, it has been usual to make the apertures in the stops and shutters in a line or concentric with the optic centres of said lenses. With this construction, however, the major portion of the rays of light pass on to the sensitive plate from the sky or upper portion of the landscape, whilst only a small portion pass from the foreground, the effect upon such plate being unequal, so that it has been found to be impossible under ordinary conditions to correctly photograph clouds and other aerial effects at the same time as the foreground or main part of the land or seascape.

Now the object of this invention is chiefly to enable these results to be obtained, and partly to impart a stereoscopic effect to the photograph.

It consists in arranging the apertures in the diaphragms, stops, and shutters of photographic lenses so that their larger area is below the optic centre of the lens, thereby allowing a greater proportion of light to pass from the foreground on to the sensitive plate than from the sky, thus tending to equalise the effect upon the plate, as will be well understood by photographers.

According to my invention, I make the lens aperture of triangular or approximately triangular shape, with the base arranged horizontally, and I cut a similarly shaped opening in a horizontally sliding plate or shutter, which may be actuated by hand or by any other convenient means.

By forming the aperture in the horizontally sliding plate or shutter, as just described, and by sliding it horizontally, a stereoscopic effect is given to the finished photograph by reason of the light being allowed to enter first at one bottom corner, then gradually being allowed to pass through the whole of the lens aperture, and finally through a small opening at the opposite bottom corner, thus as it were to a certain extent photographing the object from two different points of view, and so producing the desired effect.

In order to reduce the size of this lens aperture, a plate having a triangular or approximately triangular hole or notch cut in its lower end, may be arranged to slide vertically through a slot in the brass mount of the lens in the same way as the ordinary stops, said plate being capable of adjustment to any required position so as to cut off more or less of the upper part of the lens aperture.

I prefer to make the lens aperture in the form either of an equilateral, or else of an acute-angled isosceles triangle, and arrange it so that two-thirds of its height is below the optic centre.

The principle of construction above described can be applied to detachable instantaneous, or other shutters, such as are usually fitted upon the forward part of the lens.

IMPROVEMENTS IN ACHROMATIC DISPERSING LENSES.

No. 10,000. PAUL RUDOLPH, Carl-Zeiss-strasse, Jena, Grand Duchy of Saxe-Weimar, German Empire, and CARL ZEISS, of the same place.—*September 9*, 1893.

IN optical systems (such, for instance, as the Galilean telescope, and the so-called tele-objective which has of late been used for photographic purposes) which contain, besides the achromatic objective, and distinct therefrom, an achromatic dispersing lens of a shorter focal distance than the objective, the dispersing lens has hitherto always been achromatised in the same way as an objective consisting of single lenses cemented to each other is achromatised in order to correct the spherical aberration at the same time with the dispersion of colours. Analogously the main lens (which in this case is negative) of dispersing lenses of this kind, has been made of crown glass of low refractive power, and the correcting lens to be cemented to it (which in this case is positive) has been made of flint glass of considerably greater refractive power. This difference or graduation of the refractive power is actually as necessary and indispensable in a dispersing lens as it is in a collecting lens, if the dispersing lens is to be not only chromatically but also spherically corrected, and consists at the same time of single lenses cemented to each other; for it is only through the surplus or excess of refractive power of the positive constituent or element over that of the negative constituent or element that the inner surfaces of a dispersing lens obtain a spherical aberration contrary to and compensating for that of the outer surfaces.

In combinations of lenses of the class described it is not advisable, however, as we have found by theoretical and practical experience, for obtaining a good total effect of the combination as a whole, to correct the diapersing lens by itself or separately with regard to spherical aberration as has heretofore been done either intentionally or otherwise.

If, as is the case with the aforesaid combinations of lenses, the focal distance of the dispersing lens be considerably smaller than that of the objective belonging to it, and if the distance of the said dispersing lens from the objective be at least equal to its focal distance, its spherical aberration can always be easily neutralised or prevented from injuring the total effect by intentionally leaving a small amount of uncorrected spherical aberration on the part of the objective. In the usual arrangement for correcting these systems the surplus of the refractive power of the positive element of the dispersing lens invariably involves an objectionable increase in the degree of curvature of its outer surfaces, which is necessary in order to obtain a given focal distance. Moreover, this surplus of refractive power causes at the cemented inner surfaces of the lens (which have a comparatively great degree of curvature) effects of aberration which render it difficult to obtain an accurate adjustment of the total effect of the combination, especially outside the axis.

These considerations have led the inventor to the discovery of means for effecting the achromatisation of such optical systems by an arrangement different from, or contrary to, that heretofore employed, namely, an arrangement in which no compensation or great reduction of the spherical aberration is connected with the achromatisation of the dispersing lens, but this lens, although perfectly achromatised, retains, as regards spherical aberration, the character of a simple uncorrected dispersing lens.

This result is obtained by forming the positive part of the cemented system of flint glass having a refractive power equal to, or only slightly greater or less than, the refractive power of the negative part, but having a relative dispersion of colours presenting a sufficient surplus over that of the negative part to admit of the achromatisation, whilst retaining convenient degrees of curvature of the surfaces of the two parts.

The chief advantages accruing from the employment of achromatic dispersing lenses of this novel description in the optical combinations or systems hereinbefore referred to are as follows, viz.:—(1) for any required focal distance a considerably smaller degree of curvature of the outer lens surfaces is obtained than is required with the arrangement heretofore employed, and this degree of curvature is enabled to be even further reduced in case of need; (2) the positive spherical aberration (being of the same nature as that of a single convex lens) which takes place at the inner cemented surfaces of the lens can be reduced or transformed into a negative spherical aberration (which is of the same nature as that of a single dispersing lens).

The first-named advantage is made evident by the following comparison:—

In all achromatic dispersing lenses heretofore employed the refractive index n D of the crown glass is between 1·51 and 1·52, the refractive index of the flint glass n^1 D is between 1·60 and 1·63. The surplus $(n^1 - n)$ in the refractive index of the positive element over that of the negative element is consequently between 0·08 and 0·12. Under these circumstances, complete achromatisation —if the most favourable kinds of glass as regards dispersion of colours are selected—requires a total degree of curvature K of the outer surfaces of the

lens (K = algebraic sum of the reciprocals of the radii of curvature of both surfaces) at least equal to 2·4 times the reciprocal of the focal distance $\left(\frac{1}{f}\right)$ of the lens, viz. :—

$$K = 2{\cdot}4 \times \frac{1}{f}.$$

But if the aforesaid surplus or difference $n^1 - n$ is reduced to a smaller amount, say 0·03 for example, at the same time retaining as great a difference as possible in the relative dispersion of the two parts (from which follows indirectly that the cemented lens, in the practically applicable forms, retains a spherical aberration of the same nature as that of a concave lens) complete achromatism can be obtained with the following kinds of glass, viz. :—

Crown : n D = 1·574 ; n F − n C = 0·01005.

Flint : n^1 D = 1·603 ; n^1 F − n^1 C = 0·01576 with a degree of curvature of the outer surfaces.

$$K = 1{\cdot}9 \times \frac{1}{f}.$$

If $n^1 - n = 0$ be taken, the required degree of curvature is reduced to—

$$K = 1{\cdot}67 \times \frac{1}{f}.$$

Again, if $n^1 < n$ be taken (for which the kinds of glass available leave ample margin without the complete achromatisation of the lenses being affected) the proportion of $K\frac{1}{f}$ may be reduced as may be required so that the external form of the dispersing lens may be brought near to the plano-plate or to the watch-glass shape without the radii of curvature of the inner surfaces (if a triple cemented lens is admissible) becoming excessively small in comparison to the focal distance.

The following kinds of glass :—

Crown : n D = 1·6112 n F − n C = 0·01068

Flint : n^1 D = 1·5366 n^1 F − n^1 C = 0·01102

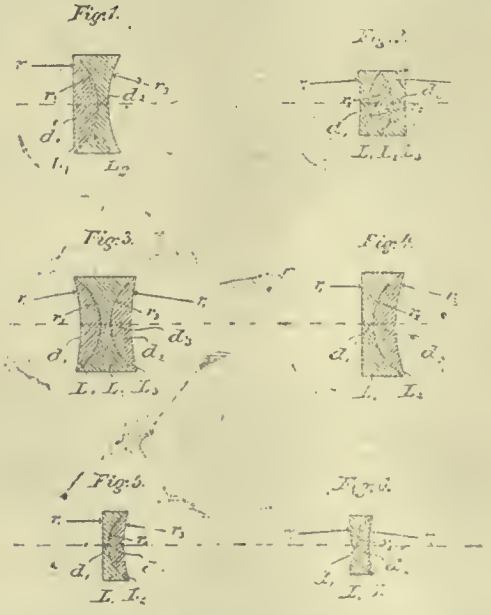
give for instance,

$$K = 0{\cdot}34 \times \frac{1}{f},$$

while the radius of the inner cemented surfaces of a symmetrical triple lens of these kinds of glass with the flint glass situated inside is

$$r = 0{\cdot}094\, f.$$

As regards the second advantage mentioned, namely the reduction of the spherical aberration at the inner cemented surfaces of the dispersing lenses, or the transformation or conversion of the character of this aberration, it is evident that in the same degree as the indices of refraction n^1 and n approach conformity, the effect of refraction of the inner cemented surface or surfaces, and in connexion therewith the spherical aberration, ceases more and more, that is to say, greater degrees of curvature of these surfaces can be selected without causing irregularities in the correction. If $n^1 = n$ be taken, the cemented achromatic dispersing lens considered apart from the achromatism acts as a simple dispersing lens. Of special practical importance, however, is the power of employing (in dispersing lenses of the kind in question) a positive element (flint glass) whose refractive index is smaller than the refractive index of the negative element (crown glass), and thereby obtaining, in addition to the aforesaid great reduction of the degree of the outer curvature, a conversion of the character of the spherical aberration of the inner surfaces being a different effect to that obtained with the constructions heretofore employed for achromatic dispersing lenses. This conversion is extremely advantageous in the lens combinations now under consideration (Galilean telescopes, tele



objectives, and the like), for obtaining correcting effects outside the axis through the dispersing lens which cannot be obtained with the ordinary composition of the latter.

According to the special requirements of the purpose for which it is to be employed, the new dispersing lens is composed of two or three single lenses cemented together, the said lenses being composed of two, or in some cases three different kinds of glass, and may be constructed either as a symmetrical or as an unsymmetrical lens.

The selection of the several separate elements of the combination must (if the best effect possible is to be obtained) be governed by the construction of the objective with which they are to be combined, taking especially into consideration its aperture and its spherical correction.

In order to more clearly explain the practical effects of the invention, we will now proceed to describe, by way of example, several types of lenses suitable for different constructions of objectives, and for various purposes of application, the said lenses being represented in section in figs. 1 to 6 of the annexed drawing. The signs or letters of reference in the formulæ hereinafter given, correspond with those marked on the figures, and the kinds of glass are determined by the indices of refraction n D n C and n F for the Fraunhofer lines D, C, and F.

All the figures given refer to an undetermined focal length which is regarded as the unit of length. The radii of thickness and diameter which are required for a lens of a given or determined focal length f are then obtained in inches or millimetres by multiplying the figures given in the formula by the number f expressed in inches or millimetres.

(1) Unsymmetrical double achromatic dispersing lens for Galilean telescopes with achromatic objectives of ordinary construction represented by fig. 1 for the focal distance of 50 mm. The part L is composed of flint glass, and the part L_2 of crown glass.

The following formulæ correspond with a focal distance of 1·0 referred to a focal distance of +1 of the objective lens, this factor, −1·0, being omitted from the formulæ.

Radii.	Thickness of Lenses.	Diameter of Lenses.
$r_1 = 0$	$d_1 = 0{\cdot}151$	0·54
$r_2 = 0{\cdot}3303$	$d_2 = 0{\cdot}063$	
$r_3 = +0{\cdot}6126$		

Kinds of Glass employed.

	n D	n C	n F
Flint L_1 =	1·61201	1·60729	1·62383
Crown L_2 =	1·61230	1·60912	1·61990

Degree of the Outer Curvature.

$$K = 1{\cdot}63 \times \frac{1}{f}$$

2. Symmetrical triple achromatic dispersing lenses for Galilean telescopes with objectives of relatively large aperture. Focal distance of −1·0 :

(*a*) Flint glass L_2 (fig. 2) between two glass lenses L_1 and L_3 for the focal distance of 50 mm.

Radii.	Thickness of Lenses.	Diameter of Lenses.
$r_1 = -1{\cdot}8753$	$d_1 = d_3 = 0{\cdot}055$	0·36
$r_2 = +0{\cdot}2816$	$d_2 = 0{\cdot}137$	
$r_3 = -0{\cdot}2816$		
$r_4 = +1{\cdot}8753$		

Kinds of Glass.

	n D	n C	n F
Crown : $L_1 = L_3$	1·57276	1·57017	1·57891
Flint : L_2 =	1·52294	1·51094	1·53022

Degree of the Outer Curvature.

$$K = 1{\cdot}17 \times \frac{1}{f}$$

(*b*) Crown glass L_2 between two flint glasses L_1 and L_3 represented by fig. 3 for the focal distance of 50 mm.

Radii.	Thickness of Lenses.	Diameter of Lenses.
$r_1 = -1{\cdot}0247$	$d_1 = d_3 = 0{\cdot}117$	0·53
$r = -0{\cdot}3233$	$d_2 = 0{\cdot}052$	
$r_3 = +0{\cdot}3233$		
$r_4 = +1{\cdot}0247$		

Kinds of Glass.

	n D	n C	n F
Flint : $L_1 = L_3$ =	1·53486	1·53169	1·54257
Crown L_2 =	1·52094	1·51871	1·52617

Degree of the Outer Curvature.

$$K = 2{\cdot}0 \times \frac{1}{f}$$

3. Double negative lenses of various focal distances for a photographic combination, and which may be employed with any photographic objective, but are especially adapted for use with an achromatic objective of three cemented lenses of which the elements of construction are for the focal distance of 1·0, as calculated for the focal length of the positive lens employed.

Radii.	Thickness of Lenses.	Diameter of Lenses.
$r_1 = +0{\cdot}5474$	$d_1 = d_3 = 0{\cdot}016$	0·26
$r_2 = +0{\cdot}2573$	$d_2 = 0{\cdot}055$	
$r_3 = -0{\cdot}5474$		
$r_4 = -1{\cdot}9433$		

Kinds of Glass.

	n D	n C	n F
Flint : $L_1 = L_3$ =	1·57740	1·57338	1·58734
Crown : L_2 =	1·51708	1·51456	1·52305

Elements of construction for the accessory negative lenses :

(*a*) Dispersing lens of a focal distance = −1/2 and composed of one crown

glass L_1 and one flint glass L_2 represented in fig. 4 for the focal distance of 75 mm.

Radii.	Thickness of Lenses.	Diameter of Lenses.
$r_1=\infty$	$d_1=0{\cdot}022$	0·20
$r_2=+0{\cdot}1128$	$d_2=0{\cdot}044$	
$r_3=+0{\cdot}2655$		

Kinds of Glass.

	nD	nC	nF
Crown: L_1	1·57420	1·57124	1·58129
Flint: L_2	1·60310	1·59858	1·61434

Degree of the Outer Curvature.

$$K=1{\cdot}9\times\frac{1}{f}$$

(*b*) Dispersing lens of a focal distance $=-1/3$, and composed of one crown glass L_1 and one flint glass L_2 represented in fig. 5 for the focal distance of 50 mm.

Radii.	Thickness of Lenses.	Diameter of Lenses.
$r_1=\infty$	$d_1=0{\cdot}014$	0·13
$r_2=+0{\cdot}0752$	$d_2=0{\cdot}029$	
$r_3=+0{\cdot}1770$		

Kinds of Glass.

(The same as in the preceding formula.)

Degree of the Outer Curvature.

$$K=1{\cdot}9\times\frac{1}{f}$$

(*c*) Dispersing lens of a focal distance $=-1/4$ composed of one crown glass L_1 and one flint glass L_2 as represented in fig. 6 for the focal distance of 37·5 mm.

Radii.	Thickness of Lenses.	Diameter of Lenses.
$r_1=-0{\cdot}8065$	$d_1=0{\cdot}011$	0·12
$r_2=+0{\cdot}0699$	$d_2=0{\cdot}024$	
$r_3=+0{\cdot}1851$		

Kinds of Glass.

Crown:	L_1=1·60954	1·60639	1·61707
Flint:	L_2=1·62020	1·61531	1·63240

Degree of the Outer Curvature.

$$K=1{\cdot}7\times\frac{1}{f}$$

"Having now particularly described and ascertained the nature of our invention, and in what manner the same is to be performed, we declare that what we claim is:—In cemented achromatic dispersing lenses employed in combination with a collecting lens of longer focal distance than the dispersing lens obtaining the achromatisation by constructing the said dispersing lens with a positive constituent having a refractive power equal to, or but slightly greater or less than, the refractive power of the negative constituent substantially as hereinbefore described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 16	Camera Club	Charing Cross-road, W.C.
,, 16	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 16	Fillebrook Athenæum	Fillebrook Lecture Hall.
,, 16	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 16	Hastings and St. Leonards	
,, 16	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 16	Richmond	Greyhound Hotel, Richmond.
,, 16	South London	Hanover Hall, Hanover-park, S.E.
,, 17	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 17	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 17	Exeter	City Chambers, Gandy-st., Exeter.
,, 17	Hackney	206, Mare-street, Hackney.
,, 17	Keighley and District	Mechanics' Institute, North-street.
,, 17	North London	Canonbury Tower, Islington, N.
,, 17	Paisley	9, Gauze-street, Paisley.
,, 18	Brechin	14, St. Mary-street, Brechin.
,, 18	Bury	Club Rooms, 13, Agar-street, Bury.
,, 18	Leytonstone	The Assembly Rooms, High-road.
,, 18	Manchester Camera Club (An.)	Victoria Hotel, Manchester.
,, 18	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 18	Southport	The Studio, 15, Cambridge-arcade.
,, 18	Southsea	3, King's-road, Southsea.
,, 19	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 19	Camera Club	Charing Cross-road, W.C.
,, 19	Glossop Dale	
,, 19	Greenock	Museum, Kelly-street, Greenock.
,, 19	Hull	71, Prospect-street, Hull.
,, 19	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 19	Oldham	The Lyceum, Union-street, Oldham.
,, 19	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 20	Cardiff	
,, 20	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 20	Holborn	
,, 20	Leamington	Trinity Church Room, Morton-st.
,, 20	Maidstone	"The Palace," Maidstone.
,, 21	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

October 10,—Ordinary Meeting.,—The President (Captain W. de W. Abney C.B., in the chair).—The attendance, which was a large one, included several ladies.

Captain Hills and Mr. Grenville were elected members.

The medals awarded to them by the Judges of the Exhibition were presented by the President to Mr. Calby, Mr. J. A. Sinclair, and Mr. Charles Moss; the other medal winners were absent.

Photograph of Large Hailstones.

A photograph of hailstones, natural size, taken during a thunderstorm at Richmond, Yorkshire, on July 18 last, by Mr. Metcalfe, of that town, was passed round. The hailstones were, if anything, larger than hen's eggs.

President's Annual Address.

The President, in the course of his annual address, said the session just opening marked a new era in the history of the Society. As they were aware, a Photographic Congress was to be held on the two following days. There was an annual Photographic Convention held in different localities, and the Camera Club also held an Annual Conference, but the Photographic Congress was a combined movement of Societies affiliated to the Parent Society, which would have the effect of binding them to that Society. Referring to the opening of the Photographic Salon, he said he thought it a natural outcome of photographic art, and that there was ample room for two exhibitions. They (the Society) should make their standard as high as possible. A healthy rivalry was to be wished for. He wished good luck to their rivals and good luck to themselves. Touching on the affiliated Societies, he said he was pleased to find the movement successful, although at first he opposed it. There were forty-seven Societies now affiliated. He hoped soon the Society would be in new premises. For legal purposes the incorporation of the Society was to be desired, but he thought a Royal Charter unattainable. Having reviewed recent advances in heliochromy, Lippmann's "interference" photography, photographic optics, and MM. Lumière's experiments in printing with salts of manganese, cobalt, and cerium, the President concluded by remarking that he was glad to see collodion looking up once more. Any one who had worked with collodion still loved it. There was something in the very smell of the ether that was attractive.

A vote of thanks to the President for his address was moved by Mr. W. S. Bird, seconded by Mr. W. England, and carried unanimously.

Professor Marshall Ward, who was to have read a paper, being unable to attend on account of illness, the remainder of the evening was devoted to an exhibition of the lantern stereoscope.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

October 5.—Mr. Thomas Bedding in the chair.

Mr. A. Buchanan was unanimously elected a member.

Relative Quantities of Sulphurous Acid present in Potassium Metabisulphite and Sodium Sulphite.

Mr. A. Haddon observed that at a previous meeting Mr. B. J. Edwards had stated that potassium metabisulphite contained seven times as much sulphurous acid as sodium sulphite. This was wrong, as would be demonstrated by the following. The chemical formula for potassium metabisulphite was $K_2S_2O_5$, and, by ascertaining its molecular weight, the percentage of sulphurous acid contained in it could also be arrived at, thus:—

$$\left.\begin{array}{l}2K\,(39)=78\\1O\,(16)=16\\2S\,(32)=64\\4O\,(16)=64\end{array}\right\}=128\text{ weight of sulphurous acid.}$$

Molecular weight = 222

therefore the percentage of sulphurous acid = 57·6.

Treating sodium sulphite in the same way, the formula for which is $Na_2SO_3 + 7\,H_2O1$,

$$\left.\begin{array}{lll}2Na & (23) = & 46\\1O & (16) = & 16\\1S & (32) = & 32\\2O & (16) = & 32\\H & = & 14\\7O & (16) = & 112\end{array}\right\}\text{sulphurous acid} = 64.$$

Molecular weight = 252

and the percentage of sulphurous acid present = 25·4,

from which it would be seen that, instead of seven times, potassium metabisulphite contained a little more than twice the weight of sulphurous acid than sodium sulphite. Mr. Haddon also pointed out that, in buying the latter salt, one paid for more than half its weight of water.

Vitro-enamelling.

The following question from the box was read: "Does the powder, or the substitution process give the better result for making photographic enamels?"

Mr. Haddon said that a variety of tone could be obtained by the dusting-on process. The substitution process gave black tones.

Mr. J. S. Teape said that the substitution process allowed no retouching, the actual image having to be fixed as produced. The dusting-on process allowed artistic retouching, and an increase of brilliancy.

Mr. Haddon said retouching was possible with the substitution process, using vitrifiable powders ground up in oil of lavender, and refiring. In reply to another question, Mr. Haddon said that, in his experiments, he used a Fletcher gas muffle, which took a plaque a little larger than those he had made, viz., two inches square. Such a muffle cost between 2*l.* 10*s.* and 3*l.*

Lantern Society.—October 9, first meeting of the Session.—The Hon. Secretary announced the reduction of the subscription and the accession of ten new members. Mr. C. S. Scott showed his new lantern-slide printing-frame, an ingenious arrangement for printing slides by contact, and adapted for use with the new printing-out lantern plates. The set of slides being sent to America by the Society were then shown on the screen. Members subsequently inspected the new lantern purchased by the Society, which is fitted with one of Mr. E. M. Nelson's double-crown condensers, the front lens of which, on being reversed, enables parallel rays to be obtained, and a nine-inch Wray projection lens. The performance of the lantern left nothing to be desired, both as regards definition and entire absence of colours in the image. The lantern is adapted for scientific work as well as for the ordinary work of showing slides.

Northern Photographic and Scientific Association.—September 28.—The subject was the *Preparation of Lantern Slides by the Wet Collodion Process*, by Mr. P. D. COGHILL. The lecturer described in detail the various stages in the manipulation of the slides from the albumenising of the glass to the finished pictures, each step being minutely gone into, and the various formulæ for developing, clearing, toning, &c., given. Mr. Coghill also illustrated his lecture by preparing a lantern slide from a negative and finishing it off.

OCTOBER 5.—A lecture was given by Professor J. MACFAYDEAN, Dean of the Royal Veterinary College and Lecturer on Pathology and Bacteriology at that Institution, on the subject of *Pathogenic Germs and Disease*, Mr. J. G. Robins (President of the Society) occupying the chair. The lecturer said that bacteria were, in reality, minute vegetable life, and were the most common of all forms of life, abounding in enormous quantities. A great number were non-pathogenic, or incapable of producing disease, but others were of a pathogenic or disease-producing kind, and with these he proposed to deal. The lecturer then proceeded to describe the germs of anthrax, glanders, tetanus, tuberculosis, diphtheria, cholera, &c., photographs of the various bacilli being thrown upon the screen by the aid of the lantern.

Hackney Photographic Society.—October 3, Mr. R. Beckett in the chair.—Members' work was shown by Messrs. Barnes, Hudson, and Puttock. The following questions were asked:—"What exposure was necessary for printing in clouds on a lantern plate, nominal exposure for a negative being forty seconds?" Presuming the density of the negative to be the same as that which is to be printed from, it would require about fifteen to twenty seconds' exposure. Mr. S. J. Beckett used the cover glass to put the clouds upon. Mr. Fenton-Jones used a printing frame, shading portion upon which the landscape would come with a book. A similar question was asked as above for printing on clouds on bromide paper, the exposure would be about a quarter to half of what the negative would require. Mr. S. J. BECKETT asked the best way to remove amidol stain from lantern slide? Several members stated it could not be removed. As a trial, nitrate of soda was suggested. Mr. GRANT asked the reason of black spots upon a negative developed with pyro and soda? Mr. BECKETT stated it looked like an old plate. Mr. SMITH asked "whether any shorter exposure was required for bromide paper, developed with Dresser's formula?" Opinions seemed to be that it should be the same, only a weaker developer would take longer to obtain the same degree of density. With amidol, according to the strength of developer, so you can make it a quick or slow developer, density being obtainable with either. Mr. E. J. WALL then proceeded with a very instructive paper upon lenses, and dealt very largely with the subject, giving the various kinds, their uses, manufacture, faults, &c., illustrated with designs in coloured chalks. A vote of thanks to Mr. Wall for his paper concluded the evening.

Brixton and Clapham Camera Club.—October 3, Dr. J. Reynolds, F.R.G.S. (President), in the chair.—Four new members were elected, two of them being ladies. At the conclusion of the ordinary business, Mr. E. Dockree, one of the members, read a paper upon *Gelatino-Chloride Papers* [see p. 656]. Later in the evening the club decided to purchase an enlarging camera and it is expected that sufficient funds will be forthcoming to enable the Club to purchase the apparatus at an early date. Next meeting October 17, paper by Dr. Reynolds on *Diazotype Printing, i.e.*, printing in aniline dyes.

South London Photographic Society.—October 2, Mr. Maurice Howell (Vice-President) in the chair.—At the conclusion of the formal business, Mr. E. J. Lester gave an instructive and interesting address on *Outdoor Portraiture*. In his opening remarks he stated that the beginners' instruction books always made a point of advising photographic novices to leave portraiture severely alone until they had mastered, to some extent, the art of taking views. However good this advice might be, it was in nine cases out of ten wholly ignored, and the beginner, as a rule, commenced his photographic career by *attempting* to get pictures of his admiring relatives and friends. The speaker would, therefore, endeavour to show how portraiture might be undertaken out of doors with results that very often could hardly be distinguished from studio work. The background was the first obstacle to be overcome, when a large vignetted head was the desideratum. He found that a clean blanket, stretched across a line, and fastened with pegs, acted as the best medium in this respect. He always selected the wall of the house from the other side of which the sun was shining, and then fixed his background at an angle; the person whose head was to be taken was seated (and this was most important, as in this class of work long exposure was necessary, and, if the subject was made to stand, the head would be almost certain to move), and a side face arranged for, the tip of the nose was focussed, and the exposure made with an ordinary plate (about four seconds in a fairly strong light) at *f*-11, which stop will be most useful. All darkness which would otherwise be noticeable under the chin and at one side of the face was thus got rid of, and a nice shade on one side of the face substituted, which gave the finished print the appearance of studio work. If the eyebrows of the sitter were very prominent, the face should be slightly raised, and the camera tilted on a parallel with it. Heliotrope was the best colour for ladies to be photographed in. If a sitter was fair, light clothes should be worn, but, if dark-complexioned, the operator should see that only black, or very dark blue, clothes were put on. With regard to developing, he was in favour of pyro-soda. As to a background for a group, he advised his hearers not to attempt to improvise one, or it was almost certain to end in failure, and, if they must have an artificial background, they would have to get one made specially.

Croydon Microscopical and Natural History Club (Photographic Section), October 5, Mr. K. McKean chairman.—Mr. J. H. BALDOCK read a short paper on the treatment of "Nikko" paper, and demonstrated the process of development with the ferrous oxalate, Thomas's hydroquinone, amidol and metol developers, the two latter giving softer blacks than the former. The after treatment, in order to obtain a warm colour by means of uranium toning, was also shown. Mr. SPARROW then gave an account of his experiences with mezzotype, a rough printing-out silver paper, and exhibited a number of prints.

Croydon Camera Club.—The winter meetings were successfully inaugurated on October 4, when a large gathering assembled to hear the PRESIDENT (Mr. H. Maclean, F.G.S., give an address on *Photographic Novelties*. Multiple-coated films, lenses, developers, exposure meters, printing frames, "Nikko," and other things which were more or less new, formed the burden of a discourse which seemed to be very acceptable. Much discussion ensued. Amongst many points raised may be mentioned: Mr. PIERCE advocated metol for intensifying negatives; Mr. WHITE and others considered exposure meters "worse than useless, being misleading;" Mr. WRATTEN did not think any conclusion as to the amount of silver in a dry plate could be drawn by the quantity of pyro recommended by makers as most suitable for its development. Mr. George Carden showed a very complete series of about forty whole-plate prints of "Condemned Croydon." A large portrait of Mr. H. E. Neeves (a deceased member) was presented to the Club by Messrs. Isaac & Sladden. Messrs. Bowen, Miles, and Burrough were elected members.

Birkenhead Photographic Association.—October 3, Dr. W. H. Hunt in the chair.—The result of the Annual Outdoor Competition was announced as follows:—Silver medal, Mr. W. H. Davies (a new member); bronze medal, Mr. W. T. Briggs. The business of the evening was an excellent lecture by Mr. A. W. BEER (an ex-President of the Society), entitled *A Glimpse of Brittany and the Bretons*, which proved a most enjoyable and instructive entertainment. Mr. Beer's slides are almost all reductions from 10×8 negatives, and are, consequently, very perfect in their detail. His subjects are principally architectural, about thirty slides being devoted to Mont St. Michael alone. The PRESIDENT announced that the Society's ordinary meetings would be held on the first Tuesday in each month in future.

Birmingham Photographic Society.—October 3, Mr. J. T. Mousley in the chair. About fourty-five members present.—Mr. SMITH, of the Platinotype Company gave a practical demonstration of the working of the process in all its branches. Mr. Smith developed prints on the hot bath, cold bath, and for sepia tones, which latter were especially admired. Prints made on various textile fabrics were also developed, and some marvellously beautiful finished results were shown, all present agreeing that this was a remarkable application of the process. Mr. Smith also showed the working of the special printing lamp, a proof being ready for development in ten seconds. The lecturer having kindly answered numerous questions, a hearty vote of thanks was accorded to him and to his firm.

Leeds Photographic Society.—October 5, Mr. Godfrey Bingley in the chair.—After the ordinary business was concluded Mr. HERBERT DENISON read a paper on *Photogravure*. In a very lucid manner he described the whole process, from negative to the finished print. He passed round to the members negatives, tissues, and copper plates in the various stages of manipulation, and showed that this very beautiful and permanent process was within the reach of all. Mr. Bownes, one of the members who have taken up this process, also showed some very pretty pictures, also Mr. Ramsden showed one produced thirty-five years ago. Discussion followed, and questions were asked regarding cost, &c., which Mr. Denison answered. A hearty vote of thanks was given to Mr. Denison at the close.

Sheffield Photographic Society.—The Annual Meeting of the above Society was held at the Masonic Hall on Tuesday evening, Mr. B. J. Taylor in the chair.—After the election of two new members, the Treasurer presented his statement of accounts, which showed a very considerable balance in hand, and was considered satisfactory and duly passed. The Secretary gave a general report of the proceedings for the year, showing in detail the work which had been done each month. The excursions, although not numerous, had been well attended, and resulted in good work being done, especially the one to York. The Society was never in a more flourishing condition, and the proceedings were characterised by an amiable tone throughout, each member being anxious to promote the general good of the Society. The Secretary also announced several important fixtures for the ensuing year. The officers for the coming year were elected as follows:—*President:* Mr. Ernest Beck.—*Vice-Presidents:* Messrs. B. J. Taylor, Bradley Nowill, and George Bromley *Council*:—Messrs. J. Smith, W. T. Furness, T. G. Hibbert, T. Firth, and D. C. Brooks.—*Reporter:* Mr. E. H. Pearce.—*Treasurer:* Mr. W. M. Toplis.—*Secretary:* Mr. T. Camp.

Widnes Photographic Society.—September 27, Mr. V. C. Driffield presiding.—Mr. George Rae gave a limelight exhibition of a number of his slides, which were afterwards placed on the table for inspection and criticism. Mr. J. Neuburn brought a number of P.O.P. prints, and other members brought negatives, which were handed round and commented on. The meeting assumed a conversational tone, and topics of interest were discussed. Two new members were elected.

FORTHCOMING EXHIBITIONS.

1893.	
October 13–Nov. 15...	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
,, 13–31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 13, 14	Midland Camera Club, Botanical Gardens, Moseley, Birmingham. Hon. Secretary, C. J. Fowler, 4, Woodstock-road, Moseley, Birmingham.
,, 13–Nov. 11...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
,, 17–19	*Hackney Photographic Society, Morley Hall. Hon Secretary, W. Fenton Jones, 12, King Edward-road, Hackney, N.E.
,, 30, 31	*East London Photographic Society, New Tabernacle, Old-street, E.C. Hon. Secretary, W. R. Gonld, 61, Gibraltar-walk, Bethnal Green, E.
November 7–11	*South London Photographic Society. Hon. Secretary, C. H. Oakden, 51, Melbourne-grove, Dulwich, S.E.
,, 20–25.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18–Jan. 22, 1894	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

ALPHA PAPER.

To the EDITOR.

SIR,—It is with pleasure that I notice in your valuable paper a correspondence on "Alpha Paper." I think to users of this paper some practical information on the methods of working it will be of service to many.

Your correspondent (Mr. Ridler) seems to have been very successful in his work, whereas I, along with many others, have had just the contrary result. My first attempt at enlarging to whole-plate from quarter-plate with Alpha paper, using *f*-24 stop, giving eight minutes' exposure in bright light, developing with the Universal developer, and toning with Ilford's combined bath, proved successful with five papers in getting nice brown tints; but, alas! since then, no matter what exposure I give, I have been unable to obtain such results. I have written the makers, enclosing at the same time two prints, and they kindly replied, stating "over-exposure," although these two prints had only received seven minutes' exposure, about the same light as the others, same stop, &c. The prints came up after development nice red-brown cast, but as soon as soon as they were immersed in the toning bath they turned all colours but the right one.

I have tried again, this time using their advertised Alpha paper developer; but, alas! even with a good image after development, the picture left the paper after being in the toning bath about ten minutes.

Under such circumstances, I think those of our photographic friends who are successful users of this paper might let us poor benighted creatures into the secret of working this paper to a successful issue, and I am sure, amateurs, we should be very thankful for such information.

I like the paper, and, if I could only work it satisfactorily, I should use such in preference to bromide, which gives very cold tones.

I hope some of your readers who are users of this class of paper will not be afraid to divulge their system of working, as I think we should be glad to be of service to any friends who are trying to become thoroughly acquainted with this class of work for their own personal pleasure, not seeking to injure in the least their professional brother's position in a legitimate trade.—I am, yours, &c., G. H. STANSFIELD.

40, *Mountain-road, Bradford, October* 8, 1893.

ENLARGING FOR AMATEURS.

To the EDITOR.

SIR,—Mr. Ridler, in your last issue, hits the nail on the head. He has placed his finger, with unerring accuracy, on the sore point of enlargements by amateurs.

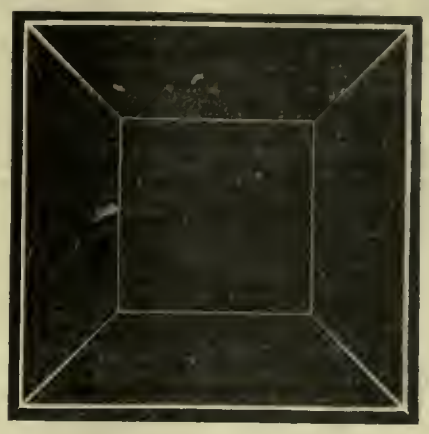
Why, Sir, we do not all possess rent-rolls of thousands a year coming to us through no fault of our own and at no expense to ourselves, so it can't be expected that our laudable desires to enlarge to all sorts of odd sizes can be gratified, unless his suggestion, and a reasonable one too, is acceded to. His suggestion of putting bromide paper up in two-sheet tubes is eminently practical, and should have been anticipated by the manufacturers.—I am, yours, &c., S. WILFRED BENSEN.

4, *Pembroke-villas, Richmond, Surrey, October* 9, 1893.

PERSPECTIVE.

To the EDITOR.

SIR,—In reply to the challenge of "Free Lance," let the accompanying diagram represent a shed with open end. The lines of the outer square are the bounding lines of the inside at the near end, which is in a plane sixty feet distant from the eye (or lens), and the inner square is the far end, which is at a distance of 120 feet, the shed having a depth of sixty feet. The eye is supposed to be at half the height of the shed, and



opposite the centre. The lines at the far end, representing equal magnitudes with those at the near end, and being at double the distance from the eye, they will—being in a plane parallel with those of the near end—come out as of half the length of these latter's, and form a square concentric with the outer square, and of half its linear measurement. The diagonals are the vanishing lines, whose positions are fixed by those of the squares.

Now, let the diagram represent the interior of a box, having linear dimensions one-tenth of those of the shed, and at one-tenth of its distance, *i.e.*, the front in a plane six feet from the eye, and the back twelve feet. The inner square will again be concentric with the outer square, and of half the linear dimensions, and the diagonals must connect their angles as before.

An interior is selected for simplicity of demonstration, but the same rules will apply to exteriors, and, indeed, the sides of the shed and box might stand for the exteriors of adjacent sheds and boxes.—I am, yours, &c., W. E. DENENHAM.

THE SALON.

To the EDITOR.

SIR,—In the preface to the catalogue of the Photographic Salon it is said, "That photographers do not use their process to the best artistic advantages may be true; but, if so, the fault is with the worker, not the method. . . . Perhaps the greatest curse of photography in the sense now under consideration is the fatal ease with which indifferent work may be produced by its means."

Accepting this as a truism, it gave me great pleasure to find that, in an Exhibition mainly promoted by our leading amateurs, no less than 145 of the frames hung are contributed by the much-abused class to which I belong.—I am, yours, &c., A PROFESSIONAL.

London, W., October 9, 1893.

MR. PRINGLE AND MR. IVES.

To the EDITOR.

SIR,—I am sure there is nothing in any of my letters to justify Mr. Pringle in saying, "Mr. Ives' tiger seems to be gradually shrinking," &c. My statements have been perfectly consistent from first to last, and the last claim I made is the strongest of all.

It is unfortunate that I have not got my references by me, because I am sure that I could readily furnish conclusive proofs of everything I have asserted; but the facts are so obvious, and have already been recognised by so many, that I do not feel justified in importing my library for the sake of obtaining these refereuces. Nor do I know how Mr. Pringle would undertake, with fivepence for postage, to fetch a lot of negatives which are now in a Safe Deposit in Philadelphia, and cannot be removed by any one at present in America.

For the present I am content to have called attention to facts which others may readily prove for themselves.—Yours, &c., F. E. IVES.

Charing Cross-road, London, W.C., October 8, 1895.

GAS COMPRESSORS.

To the EDITOR.

SIR,—In your LANTERN SUPPLEMENT to last week's issue of THE BRITISH JOURNAL OF PHOTOGRAPHY, there is a paragraph, in which such a serious charge is made against gas compressors that I cannot allow it to pass unanswered. Your contributor, "Radiant," states that "in the rooms of a well-known photographic society . . . . a *twelve feet* bottle of oxygen was found to contain *seventeen feet*."

If we are to read this statement in the light of the context, it means that a cylinder calculated to be filled to a pressure of 120 atmospheres actually contained 170 atmospheres.

There is no reason to assume that the cylinder was charged by a Brin Company, and, if the facts were as stated, there is every reason to conclude that it was not; but many of your readers will probably infer that we were responsible for it.

Your contributor states that . . . . "for the credit of the gas compressor, he is certain such a thing does not often happen, but it is neither impossible nor unknown."

As a matter, not of credit, but of justice to the Brin Companies, I beg to say that such experience, as far as they are concerned, *is* impossible. Our compressors are fitted with what are technically known as "dead weight" safety valves, which blow off at five atmospheres above the filling pressure, and there are other minor safeguards as well. I can therefore confidently assert that no negligence on the part of a workman, or inaccuracy of pressure gauges can bring about the overcharging of our cylinders, and no one would, I am certain, venture to attribute over-pressure to *deliberate intention*.

I feel sure you will admit the gravity of your contributor's statement from the gas compressor's point of view, and oblige me by inserting this reply—I am, yours, &c., KEN. S. MURRAY, *Manager*.

Brins Oxygen Company, Limited.

Answers to Correspondents.

PHOTOGRAPHS REGISTERED :—

Thomas Pringle, Edinburgh.—*One photograph of Queen Mary's Chair.*

Wm. Vick, Ipswich.—*Six photographs of Helmingham Hall Suffolk, showing Queen Elizabeth's Room, Drawing-room, Dining-hall, and the Library.*

Miss Sarah Angelina Acland, Oxford.—*Two photographs of Mr. John Ruskin; one photograph of Mr. Ruskin and Sir Henry Wentworth Acland, Bart., K.C.B.; one photograph of Mr. Ruskin, Sir Henry Wentworth Acland, and Mrs. Arthur Severn.*

PERPLEXED.—We have forwarded your letter.

H. A. A. (Basingstoke).—We know nothing of the firm named.

ALBERT LEVY (Paris).—Thanks for your interesting communication.

FELIX ST. CLAIR.—Rochelle salts are the double tartrate of sodium and potassium.

E. J. S.—Thanks; letter next week. We shall be pleased to have the article referred to.

F. B.—Sorry we cannot open our columns to a discussion on the Sunday opening of museums.

R. R. W.—In our volumes for 1891 and 1892 are numerous articles on toning bromide prints, to which we refer you.

H. JANCOWSKI.—The case is a bad one, but of course we cannot make public the man's alleged faults. We can only advise a legal remedy.

J. E. G.—The picture is extremely good. The stains are difficult to account for. Hypo, before toning, might perhaps cause them.

H. DEAN.—You evidently require some elementary instruction in gelatine emulsion-making. Consult an article on the subject in the ALMANAC for 1891.

R. CLEMENTS.—The engraving being copyright, it will be illegal to copy it, notwithstanding that it is not your intention to sell copies, but only to show them in the reception-room. A penalty is incurred by every copy produced, whether offered for sale or not.

S. F. J.—We are not at all surprised at your want of success. Although chrome alum will cause gelatine to become insoluble in warm water, it will still be softened by it; and, with a prolonged action of hot water, it will be rendered very soft and tender.

G. ARCHER.—The carbon print has the appearance of having dust enclosed between the image and the transfer paper. Probably the picture, after it was developed, was allowed to dry in some place where dust settled upon it, and that was not removed before the transfer paper was applied.

S. A. E.—You are certainly entitled to a week's salary in lieu of notice, or a month's if you are a monthly servant. Trade being exceptionally bad does not entitle an employer to discharge an *employé* without a proper notice. You can certainly recover what is due through the County Court.

DERBY.—The cause of the milky appearance of the solution of oxalate of potash is lime in the water used. The opalescence of the finished slide proceeds from the same cause—lime in the washing water. This, however, is readily removed by immersing the plate in very dilute hydrochloric acid.

N. W.—So far as we know, the friends of the lady cannot compel you to destroy the negative; but, as you obtained it surreptitiously, when the lady was in *déshabillé* in her own garden, by pointing the camera over the wall, it would be most ungentlemanly, not to say disreputable, not to accede to the lady's wish.

V. B.—It is very unfair for the paper to pirate your photographs, but we do not see how you can move in the matter, as you have no copyright in them, even though they were duly registered at Stationers' Hall. The reason there is no copyright is that the photographs were taken by an *employé*, who is the author of the work, and registered in your name, who had nothing to do with taking the views.

S. PRICE asks for a good medium with which to black the inside of a wooden camera, that will not rub off when the camera is dusted with a damp cloth. One of the best things for the purpose is lamp-black mixed with brown, hard varnish, thinned with methylated spirit. The proper portions can only be ascertained by trial—applying a little of the mixture to a board and letting it dry. It is advisable to use as much varnish as possible, but not sufficient to cause the work to dry glossy.

T. GILES.—The only way to obtain methylated spirit of the old kind—that is, free from the mineral naphthas—is to obtain the necessary permit from the Excise authorities. Without that, none of the vendors of the spirit will supply it. Any that may be obtained at the oilshops would assuredly contain the objectionable matter. Indeed, no other is allowed to be sold by them. When the requisite permit is obtained from the Excise, the spirit must be purchased from a methylator, not from the oilman.

Z. Y. X.—The plant for working the Woodburytype process is somewhat costly. The printing presses are not expensive, but the hydraulic press is, and so are the steel plates, if the size be large. Then there is a powerful rolling press required in preparing the paper and the polished plates to be used with it, unless the paper can be purchased ready for use, which we believe is not the case in this country. The cost of the necessary appliances for working Collotype will be far less, and this process, we imagine, will answer your purpose best if the prints are wanted as book illustrations.

T. A. B. says: "I have recently had supplied to me a lot of photographic mounts that are lettered in ordinary black ink. When the prints are burnished the letters become smeared over the mount, and, when they are rolled, the ink comes off on to the roller, and so soils the next mount that is rolled. Can anything be done to prevent this, as the thing is a great nuisance?"—This is not an uncommon experience with freshly printed cards. The ink is not dry. The only thing is to wait until it is. The drying may be accelerated by spreading the cards out in a warm and dry place.

F. CROFT says: "I often see it mentioned that more vigorous prints, and more permanent ones, may be obtained by printing from strong negatives on highly sensitised paper. Will you please tell me where this kind of paper is to be obtained? I have inquired at several shops, and am told they only keep one kind."—We imagine that, if our correspondent requires this sort of paper, he will have to sensitise it for himself, unless he requires it in sufficiently large quantities to make it worth while for the manufacturer to prepare it specially to his order. It should be borne in mind that, to obtain the full advantage of this kind of paper, it should be strongly salted, as well as being sensitised on a strong silver solution.

S. BENYON writes as follows: "Are the dark rooms, so obligingly supplied in some hotels, to be relied upon? I ask the question because on a recent holiday I availed myself of several of them for changing plates, and I found that all the plates I changed at two places fogged badly on development, evidently light fog, while all the others—the same brand and, in one case, from the same dozen—were perfectly right. It is very kind to provide tourists with dark rooms, but it is just the reverse if they are not safe to use."—Whenever we use a strange dark room, we always make it a rule—and most others do the same—not to expose the plates to the source of illumination more than can possibly be avoided. Following this course, personally we have nothing of which to complain.

A. A. A. says: "I was apprenticed two years ago for four years, at a small progressive salary, and a premium of 30*l.* was paid by my friends. There is another apprentice besides myself, and between us we do all the work—what little there is—that is, the printing, mounting, and spotting, and keeping show-case clean. Neither of us has received any instruction in the studio, as the principal takes what sitters there are, and they do not average one a day. It seems to me that when we are out of our time, and that will be in less than a year with my fellow-apprentice, we shall know very little of the business, except the printing. Ought we not to be instructed in studio work, which is the most important thing to learn?"—Certainly you ought. It is the old tale with apprentices. But a master can be compelled to teach an apprentice the whole of his trade. Those who paid the premium had better consult a solicitor on the matter. It is a great pity that friends should apprentice youths in establishments where such a limited business is done. What really practical experience can they acquire, particularly when there are two or three apprentices at a time?

*** Several articles, letters, answers to correspondents, &c., are held over till next week.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1746. Vol. XL.—OCTOBER 20, 1893.

EQUABLE TEMPERATURE.

The time of year is approaching when, as a matter of course, the photographer expects the various solutions he employs to have an average temperature much lower than in summer. To very many this variation, though it is felt to be the cause of some difference in working, is commonly disregarded, as "things come all right in the end." It is our purpose to endeavour to show that to attain, with the least expenditure of time and material, uniform and good results, it is most important to deal with temperature, and the temperature of solutions, in the dark room and laboratory.

These remarks will be less applicable to large establishments, where every convenience exists for keeping the premises at a fairly even temperature the year throughout, as they will be to those who may start a day's work with "everything cold;" although it may be said that, even here, there is room for improvement. We know of cases where the night temperature is considered of more importance than the day; and the difference in the mere question of comfort in handling bottles of solution—in the one case almost freezing, and in the other at as comfortable a temperature as in summer—has a strong bearing upon the chance of successful results.

Let us follow the various processes as they would occur in every-day working at times when low temperatures might be expected to prevail. First, there would be stock solutions of sulphite of soda, hydroquinone, &c., to be overhauled. It may be at once said that those who base their working on saturated solutions—made by keeping a surplus of crystals always in their bottle—will, when an equable temperature does not prevail, be wofully at fault in their formulæ in winter weather. Thus, hydroquinone crystals may be expected to be found shooting through the liquid, from the bottom of the bottle to the stopper, as the cold will have diminished the solvent power of the water; while sulphite of soda and other salts may be expected to form a solid crystalline mass at the bottom of the bottle, which will be exceedingly difficult of removal, so much so, that too often the bottle gets broken in the endeavour to disintegrate the mass. This argument alone, by the bye, is a strong one against the saturated solution principle altogether. It is often adopted in the endeavour to save trouble, but this is not achieved in the long run. A mark on a bottle to show a certain measure of liquid, and a definite weight of crystals put in, is simple and reliable. The effect of low temperatures on sulphite of soda solutions is very quickly seen, and, indeed, when the dark room is not kept heated, a twenty per cent. strength is the maximum permissible. Thirty or forty per cent. is often spoken of, but even where the temperature does not get low our advice is, a maximum of twenty-five per cent.

The solutions in good order, the next process to claim attention will be the development of exposed plates. We hold here very strong opinions upon the value of equable temperatures. One well-known successful photographer is reported to state that he places a number of negatives in the developing solution, leaves them exposed to its action five minutes, washes and fixes, and gives no more thought to the development. He is certainly an exception to a vast majority. Most photographers closely examine the negative as the image first appears, and then use accelerator or restrainer, or leave the solution unaltered, according to the indications of the first stages of the image production. We think the decision what to do with the solution is rather a matter of experience combined with the length of time the image takes in appearing and growing than an actual judgment formed upon the particular gradation of a negative under scrutiny. If this be so, the temperature of the developer is a matter of paramount importance. A plate placed in a developer at 40° will take a very considerably longer time for the image to appear, and due density to be reached, than would be the case with a developer at, say, 65°. These are ranges of temperature commonly experienced at this time of the year. Then, again, the mere loss of time, when many plates are to be developed, is a matter for consideration, either for amateur or professional. It may be said that to endeavour to work at a uniform temperature would entail too much trouble in practice; but we have recently seen in a large studio a plan carried out that is simplicity itself, and we here refer to it, not necessarily as possessing any novelty, but merely to show how simple it is to carry out what we have said we look upon as a matter of prime importance. At this time of the year, as the water is delivered from the main, its temperature is often not far from 40°. What we saw was a youth pouring boiling water into a large jug of water taken from the main, till it reached a temperature—as ascertained by a thermometer—of 70°. This was kept in the dark room while development proceeded and the various stock solutions were reduced to the requisite strength by dilution from this "warm water." We were informed that, all the winter through, the temperature of the developer rarely varied more than three or four degrees at the outside, and we could readily believe, as we were informed, that it greatly increased the certainty of good results. The plan was simple, feasible, and, there can be but little doubt, utilitarian. The capabilities of usefulness in the simple use of hot water are by no means exhausted, and at a future time we propose to continue our consideration of an important and neglected aspect of manipulation.

MATT-SURFACE PRINTS ON ORDINARY PAPER.

NOTWITHSTANDING the great variety of choice that at present offers in the way of printing methods, there always seems to be room for anything that is new, or, if not new, at least out of the common routine. Witness, for instance, the revival, in the present Exhibition of the Photographic Society, of the old and almost forgotten photo-crayon process. It is difficult to decide what is, at the present day, the "prevailing fashion" in photographic printing; for, while one section of the community pays most attention to platinotype and matt bromide effects, there are others who incline rather to the enamelled or glazed finish and style, others who keep the happy mean represented by the newer kinds of gelatino-chloride or albumen papers. There can, however, be but one opinion as to the rapidly growing popularity of matt effects both for large and small work.

Comparatively few of the modern producers of matt prints, whether on platinotype, bromide, or chloride papers, are at all familiar with the charming results obtained on the plain papers of forty years ago or thereabouts, some of which were produced by development, others by the alternative process of "printing out." As a rule, the productions of the present day partake of the general character of platinotype, that is to say, they are of the cool grey or neutral black tone, with here and there a departure in the direction of sepia or brown, although the latter tints are seldom or never equal to those obtained in days gone by. But the rich purple-black tones and velvety softness of the old plain paper prints are almost unknown now, although, when seen, they never fail to attract the attention of even the most ardent admirers of the more modern style.

And yet such tones are by no means impossible of attainment with some of the matt printing-out papers at present in use, although perhaps a departure from the usual course of procedure is needful in order to get them; with the development papers they appear to be wholly unattainable, unless it be by means of some more or less roundabout method of toning, certainly not by development proper.

To produce them, with paper of home preparation is, however, one of the easiest things in the world to any one who will take the trouble to depart from the strictly beaten track and, at any rate, partly prepare his paper instead of purchasing it ready for use in the printing frame. One such method was alluded to in our issue of last week, although the results thus obtained are, perhaps, not equal to those derived from a specially prepared paper.

The first *desideratum* is, of course, a suitable paper, which should be not only even in texture, but free from any impurities likely to act injuriously in connexion with the salts employed in sensitising. When a specially prepared paper for photographic purposes is available, the difficulty, of course, disappears, and it only remains to select a sample the texture of which best suits the size and character of the pictures to be produced. If such paper can be obtained in the salted state—and we believe some of the dealers still keep it in that condition—so much the better, as not only will at least one operation be saved, but it may be accepted as granted that the surface has been properly sized.

Starting with an unsized paper, it will be necessary to ascertain by experiment, first of all, whether the preliminary sizing has been performed. We do not here allude to the sizing which necessarily takes place in the process of manufacture, but to a special process, that with most samples of paper is necessary, in order to keep the sensitive salts, as far as possible, on the surface, and so conduce to brilliancy of image. This is more particularly necessary for small work, exhibiting fine detail and gradation, which would be utterly ruined or lost in the sunken-in appearance resulting from an unsized or imperfectly sized paper. In this respect, the process referred to last week is scarcely adapted to small work, although it answers very well for large bold effects.

The materials usually employed for this purpose consist generally of arrowroot, gelatine, and sometimes we have used gum tragacanth with advantage, the first and last being preferable for purple tones, while gelatine answers best for brown tints. The latter is applied in the liquid state, by floating the paper for a sufficient period to allow the solution to penetrate the surface uniformly without sinking too deep, and the strength will be regulated by the texture and hardness or absorptive character of the paper. The point to be aimed at is to close the pores of the paper without imparting any perceptible gloss to the surface.

Arrowroot and gum tragacanth require different treatment on their application, and considerably more care. The former is made into a stiff smooth paste by boiling, and must be entirely freed from lumps and allowed to cool. The latter is allowed to swell in cold water until it assumes the form of a thick paste, which must also be rubbed perfectly smooth. To apply either of these to the paper, it is spread upon a smooth surface, preferably of glass, and the size is then rubbed on well with a soft turkey sponge, using only sufficient force to cause it to spread evenly, and the treatment must be continued until a perfectly even appearance results, and the paper lies uniformly limp and flat upon the support. It is then hung up and allowed to become thoroughly dry.

Some operators combine the sizing and salting operations in one by dissolving the salts in the size, but this method is scarcely to be recommended except in very skilful hands. The danger arising from the uneven spreading of the salted size would obviously be much greater than when it is unsalted, while, in the case of gelatine, the risk of the salting penetrating into the paper instead of remaining on the surface would also be increased. When, however, a hard and even layer of size has been applied, it is comparatively easy to add an equally uniform coating of salt by floating the paper for a short time on a solution of suitable strength.

The salting solution consists mainly of one or other of the soluble chlorides, bromides, or iodides, according to whether the paper is intended for development or for printing out; but other ingredients of an organic character are often added, with a view of influencing the tone or brilliancy of the resulting prints. Thus citric, tartaric, acetic, lactic, and malic acids, or their salts, are frequently used in combination with the chlorides for printing-out paper, but for those intended for development the utility of such additions is not so obvious, sufficient variety of effect being produced by modifying the combinations and proportions of the haloid salts.

If gelatine forms the basis of the size, the salting solution for printing-out papers may consist of chloride alone, the gelatine producing a sufficiently organic reaction to give vigour to the image, but with arrowroot it will be preferable to combine the chloride with one or other of the organic salts. For a plain salting solution nothing succeeds better than a ten or twelve-grain solution of chloride of ammonium. Chloride of barium is used by some on account of the less hygroscopic character of the barium salts, which conduce to the keeping qualities of the paper both after salting and sensitising, though it is more difficult to obtain purple tones when the barium salt is employed.

Of the different organic salts of silver, the citrate seems to combine best with the chloride; hence, where an organic salting bath is required, we prefer to use a mixture of chloride of ammonium and citrate of potash, in the proportions of eight grains of the former and ten of the latter to the ounce of water.

The prepared (sized) paper is floated for a couple of minutes on the salting solution, or a measured quantity may be poured on to it and spread evenly by means of a small piece of sponge or a flat camel's-hair brush; but the floating method is to be preferred, as giving an even coating without allowing the solution to penetrate too deeply into the paper. When floated sufficiently, the sheet is drawn over the edge of the dish on a clean glass rod to remove the superfluous solution, and hung up to dry in a warm room. The more rapidly the drying is effected, the more will the salting be confined to the surface.

A method of combined sizing and salting may be mentioned which gives excellent results as regards both tone and brilliancy, the image showing little tendency to sink into the paper if the various floating operations be too prolonged. The sizing mixture consists of a solution of bleached lac in borax, one hundred grains of the former being boiled with twenty grains of the latter in an ounce of water, until completely dissolved. The solution is set on one side for some days, until it deposits an opaque sediment and becomes clear and bright. It is then decanted or filtered, and ten grains of chloride of ammonium added, when it is ready for use. This solution may be applied freely to the paper by means of a brush, and allowed to soak in until the paper becomes quite limp, when the surplus is drained off. When dry, the surface becomes insoluble, and the sensitising solution shows little tendency to sink deeply. The tone produced by the borax is a pleasing purple black. We have not used this method of sizing for development paper, but have no doubt it would answer.

White and Silvered Reflectors.—Opinions appear somewhat divided amongst those who produce enlargements by daylight, as to whether looking-glass or white reflectors are better, that is, if one may judge from what one sees in every-day practice. Some use the one and some the other, and they each, doubtless, think it the better. We refer to this topic here, in reply to a correspondent, instead of in the usual column, because the query put is not an uncommon one. Now, each kind of reflector may be the better under certain conditions of the light. For example, with a clear, blue, cloudless sky, if a silvered glass be employed, very little light of value will be reflected, and the image will appear lacking in illumination; but, if a sheet of white paper be laid over it, the aspect is entirely changed. The image is at once more brilliantly lighted, and the exposure correspondingly curtailed. Under these conditions the white reflector is the better. On the other hand, if the sky be covered with bright, fleecy clouds, then will the better light be obtained with the looking-glass, because it reflects them direct on to the negative. Therefore it will be seen that both sorts of reflectors are the better under different circumstances, and for this reason silvered glass is preferable as a fixture, because it can at any time be covered up with a sheet of white paper or cardboard. Thus the advantage of either kind can be secured at will.

Clouds in Lantern Slides.—*Apropos* of the advent of the lantern season, and a question asked at a recent meeting of one of the Metropolitan Societies as to the relative exposure for printing in clouds with a negative of given density, when one of the members suggested that the better way was to print the clouds on a separate glass, we would here remark that that is the system we have generally advocated; in fact, it is the one usually adopted by the best workers when clouds are utilised from a second negative. The advantages of this method of procedure are manifest, for it requires very great judgment to correctly time the exposures of the two negatives so that the images develop in unison with each other. Many slides are lost through the clouds not being dark enough, or being too heavy for the landscape; more generally the latter. When both images are on the same plate, there is no way of getting the clouds and landscape in perfect accord if the two negatives, as is often the case, are of a different character. When, however, they are printed on separate plates, one being the cover glass, there is no difficulty in the way, as the development of each plate can be modified according to circumstances. Furthermore, any slight outline from unskilful masking is less conspicuous when the picture is on two plates than when it is on one. As we have said before, much trouble may be saved by printing the clouds on the cover glass instead of on the same plate as the landscape.

Reversing Mirrors.—It will be remembered that a few weeks back attention was directed to the subject of reversing mirrors, and to the fact that they should always be left perfectly free in their settings. Since then we have been shown a mirror that had been condemned as worthless because, so it was asserted, it was impossible to produce a sharp negative with it. A casual examination sufficed to show why this might be the case, and it was this: The glass was about six inches by four, and was set in a brass mount, the flanges of which were secured by metal screws, which clamped it tightly. These screws we loosened, so that the glass could be shaken about freely in the mount. A negative was now taken, and it proved to be perfectly sharp. The fine definition of the lens was not impaired in the slightest degree. This mirror was fixed, as the majority are, in front of the lens, but we could not help, as we have done before, doubting if this is the best position for it to occupy. So far as results are concerned, it matters not whether it is placed before or behind the lens. For several reasons, the latter would appear to be the preferable position. Inside the camera it is less exposed to atmospheric influences, there it is better protected from mechanical injury than it is when fixed in front of the lens. Furthermore, the mirror fittings are liable to obstruct the light, or cast a shadow on the object to be copied when, as is often the case, it is very close to the camera. We are quite aware that mirrors are fitted in that way, but it is not general, in this country at least.

Piracy.—Scarcely a week passes but that we have complaints from photographers, more especially those in provincial towns, of the piracy of their work by some of the illustrated press. It is pretty evident that some, not all, consider a photograph common property, and treat it accordingly, whether it be copyright or not, and that, too, without any acknowledgment to the artist. Often the reproduction is slightly altered, as by the introduction of a figure or so, but this does not evade the copyright. There is no question that, when a copyright photograph is pirated by any of these papers, very heavy penalties could be obtained. Why then, it may be asked, are they not enforced? There are, we suspect, more than one reason. Many photographers, in a small way of business, do not care to risk the heavy law expenses sure to be incurred in attacking a wealthy paper, who would defend the action at any cost. One of the objects of the National Association of Professional Photographers, by the bye, was to have been the protection of copyrights, but we have never heard of a single instance of their moving in the matter, and some flagrant cases of piracy must have come under their notice. Some photographers do not think it worth while making their work copyright until they find it has been reproduced; then, of course, there is no remedy, yet they complain all the same. We imagine that the majority of photographers whose works have been pirated would have had no objection to their reproduction if their permission had been asked, and an acknowledgment given in the paper of the authorship thereof. The reproduction of the photographs in an illustrated periodical we imagine does not injure the sale of the original. Still the copyright is the property of the photographer, and it ought to be respected. Some day, perhaps, an illustrated paper may be mulcted in heavy penalties for piracy of a "common photograph."

Outdoor Meetings.—The summer season may now be considered at an end, and many of the Societies will be issuing their annual reports. Some have already done so. It will be interesting to note this year what will be said with reference to the periodical outings arranged by the different Metropolitan ones. The two or three whose report has been published contain the almost stereotyped sentence to the effect that the attendance at the outdoor meetings has been very meagre notwithstanding that previously existing arrangements had been modified, &c. Not infrequently a rider has hitherto been added, that unpropitious weather has probably been the reason. No such idea can possibly be entertained this year; for never before have we been favoured with such a summer for outdoor photography. Why, then, the spare attendances? One reason we know which has tended to it is that meetings have been arranged in districts where good subjects were known to exist, but when the members arrived there was no one to point out in which direction they lay. Hence strangers to the neighbourhood often returned home without seeing anything worth photographing, while they had been within a short distance of most charming subjects for the camera. Another reason, and perhaps a stronger one, is that many people who are particular in the choice of subjects do not care to go with a large party. They prefer to go alone or in company with one or two others at times, and to places, more convenient to themselves than those arranged by the Society of which they are members. Seeing that, so far as the London district is concerned, outdoor meetings are practically a failure, would it not be well for some of the Societies to consider whether they should not be abolished? Ostensible meetings that do not come off do not add to the status of any Society, photographic or otherwise.

PHOTOGRAPHY IN NATURAL COLOURS—*UN FAIT ACCOMPLI.*

On Wednesday evening, October 11, the first business of the Photographic Congress then assembled at the Society of Arts was to hear an account from Mr. Leon Warnerke of the results in colour photography obtained by M. Lumière. There was a very large attendance, and Captain W. de W. Abney, C.B., F.R.S., was in the chair.

Mr. Warnerke read a paper descriptive of the modifications on Lippmann's plan of preparing the sensitive plate arrived at by M. Lumière. This has already been given in the pages of The British Journal of Photography (see page 325, May 26, 1893); and to that article, as well as to others in our volume for 1891, we may refer the reader who may desire to be placed in possession of the working details of the method employed by M. Lumière.

By the kindness of Mr. Warnerke, we have had an opportunity of privately inspecting the photographs. At the meeting referred to he would not let them go out of his hands, as they are regarded as too valuable to be risked. A large number of learned societies are waiting their turn to have them before them. The pictures are about two and a half inches by one and a half inches, and are mounted under common glass prisms and backed up with opaque material such as paper. When viewed in the ordinary way, they appear something like an ordinary lantern slide would against an opaque material. Held at their proper angle, however, they are seen in the full beauty of their natural colours. On Wednesday night, Mr. Warnerke said that, for viewing them, the best plan was to have sky light reflected, or, when lamps were in use, to have the light reflected from the shade or glass. For projection, a very powerful light was required. Looking at these pictures was like looking upon nature on a bright summer day, and they must all feel that they were in the presence of one of the greatest inventions of the nineteenth century.

We have said that we had an opportunity of examining the specimens privately. They have a certain metallic-like lustre, but are notably true and realistic in most of the colours. One of them, the first in the order of success, was a photograph of a chromolithograph of a French soldier. This had an exposure of an hour. It would be absurd to talk of fidelity to the original in the absence of the latter or any means of telling what it was like; but, knowing what chromos generally are, we risk the assumption that it was extremely good. The gems of the collection are, however, four views from nature. In these the blue of the sky, the play of sunlight on the green trees, the marigolds on grass beds, the red tiles of a house roof, zinc roofing, gravel paths—and, in fine, what we term the *tout ensemble* of the colour effect are truly remarkable. The exposures given to these five range from 40 minutes down to 4 minutes, the last being an indoor picture representing a *savant* seated at his table, upon which are his microscope, bottles of chemicals, &c. The flesh tints of the gentleman's face and hands are rather too pinky, but the copper sulphate in a bottle, the yellow mount of the microscope, some fluorescein and other chemicals are perfectly reproduced.

These pictures were projected on the lantern screen at the Society of Arts, and called forth great applause. For ourselves, we can say that on the screen nothing was lost in the way of colour effect. The images were necessarily very small on account of a somewhat rough-and-ready projection system employed. This apparently consisted of the passage of a beam of light from an arc lamp through a lens on to the picture, the prism mount of which reflected the light on to another lens which transmitted the image to the screen. After some of the pictures had been shown a second time, a discussion took place.

Mr. J. Spiller said that for the first time they had had a satisfactory demonstration of photography in natural colours, and they ought to congratulate MM. Lippmann and Lumière, who had brought it to this state of perfection. He would also like to thank Mr. Warnerke, who had anxiously looked after the interests of the Society in the matter, and had succeeded in getting the loan of the pictures for exhibition. Nothing that had been done before approached what they had seen that night.

The President (Captain Abney) said that what they had seen that night was very remarkable; but it did not give him the idea that we had yet achieved photography in natural colours, as natural colours were pigments, so that we were as far off as ever we were. Here they had photographs which gave approximately the colour of nature seen by reflected light; for, looking at it at one angle, the true interference phenomenon was seen. If we were going to take photographs by this means, we should have to take the precaution of having the light falling on them from one particular direction. Still this did not make it the less wonderful. He had, himself, experimented with the process, and had produced results superior to anything of Lippmann's he had seen. In taking spectrum photographs, it was quite possible to get blue at the red end, and red for blue. There was one weak part in the pictures shown, and that was, the reds were not as good as they ought to have been; that was because the plate was sensitised to correspond with the colour wished to be reproduced. To get interference by photography, they must develop for it, as, with a red light and a plate not sensitive to it, one could not get the interference which was necessary. The next step to be made would be to get a pure red which was necessary to give the finishing touch to the process, and, for that, what was wanted was something to enable us to photograph the red end of the spectrum in a satisfactory manner. There was a pure bromide process extant, which might be utilised for the purpose because it was more sensitive to the red than to other parts of the spectrum. He congratulated Messrs. Lippmann and Lumière for taking such photographs as they had seen, in a reasonable time, for four minutes was not a long time.

AMERICAN NOTES AND NEWS.

Frederick Hart Wilson.—It could not possibly fail of being a severe blow to Dr. Edward L. Wilson when he lost his son, a young man of talent and promise, who had in some measure been educated to succeed him in conducting *Wilson's Photographic Magazine* (*née* the *Philadelphia Photographer*). Born in 1864, he showed an early taste for naturalist studies, on which was soon grafted a training in science, literature, and art. After leaving college, where he graduated with honours, he initiated a literary career by becoming a reporter on the daily press, subsequently studying art in Paris and New York. He

contributed to several periodicals, illustrating many of his articles by his own sketches, which were mainly of a humorous or satirical nature. One of his best articles was the paper he wrote for the St. Louis Convention in competition for the $100 prize offered, and from which we hope to give copious extracts on an early occasion. His health gave way after having undertaken the editorship of *Ohio in Art*, and on August 8 he died at Hygiene, Colorado, whither he had gone for recuperation. Our sincere sympathies are tendered to his sorrowing father and friends.

The Hand Camera of the Future.—It is the opinion of Mr. C. Ashley Snow (in *Wilson's Magazine*) that the hand camera of the future has yet to be evolved. It will work at about *f*-8. It will be provided with a finder giving a view as large as the plate used; and it will, by a reflecting mirror, present the view rightly, instead of upside down, as now. The lens will be so attached as to be easily removed for the substitution of others often more suitable for the kind of work in hand. The shutter will be wholly under control, and the focussing device respond to any demands made upon it. There will be an iris diaphragm, and a ball-and-socket joint to the tripod head. There should be a swing back and a side swing. These conditions are Mr. Snow's. Let us see to what extent English manufacturers have anticipated then. Almost all hand cameras of any pretensions have lenses working at *f*-8, and some exceed this considerably in rapidity. We have, on more than one occasion, described hand cameras, made and sold in England, in which the finder is identical in size with the sensitive plate. Nay, some eight or nine years since, this was a feature in cameras made by at least one maker in New York, and this, too, by means of a reflecting mirror, presented the view rightly instead of upside down. A camera having this peculiarity was patented in England, so long ago as August 20, 1861, hence this feature has long since been recognised. The substitution of one lens for another is already effected in many of our best hand cameras. The shutters *are* under control, and we already have iris diaphragms to our lenses. Concerning the ball-and-socket joint to the tripod head, what has a tripod to do with a "hand camera," the species now spoken of? True, a tripod is a delightful, if not a necessary, adjunct to a hand camera, and we would never think of going on a photographic outing without one; but the instrument becomes not a "hand," but a *stand* camera, when it has to invoke the friendly aid of a tripod. Besides, ball-and-socket heads are made and sold every day in London. So Mr. Snow's desiderated hand camera of the future *has* already been evolved, and is the camera of the present—that is, for those who prefer it to the simpler kinds equally easy of access, a fact, of which he will become aware if he will brave the fancied terrors of the Atlantic, and favour the Mother Country with a visit. All the same, Mr. Snow's prospectus is a good one, and, to render it absolutely perfect, his camera of the future only requires to be made binocular. Then it would, indeed, be the hand camera *par excellence*.

The American Photographic Press and the World's Fair Congress.—The *Photographic Beacon* administers a mild castigation to its New York brother, the *Times*, for a statement or prophecy it was unwise enough to make a few weeks since to the effect that "the *Photographic Times* is the *only* photographic magazine that will give a complete report of all the most important papers read" at the World's Fair Congress of Photographers, and asks: "How does he know? He was not there, and the editors of several of the other magazines were." We ourselves were, and still are, unaware of any private understanding with the Directors of this Congress in virtue of which such a statement could have been made. It is the case, however, that on the day on which we read this in the *Times* we were in receipt of a first consignment of the papers referred to, which had been kindly printed specially for the press with the view of giving them the greatest publicity possible; and, the *Photographic Times'* prediction notwithstanding, it is only fair to ourselves and to the Congress to say that we can point to our pages of the past few weeks in corroboration of the fact that we, at any rate, have given a complete report of the most important papers read. It is not safe to prophesy unless one knows.

Another New Flashlight. — We learn from the *Beacon* that, in course of a meeting of the Chicago Camera Club, an adjournment was made to the studio to witness a new system of flashlighting a sitter. The Williams system consists of a frame supporting thirty-six small gas jets in four rows of nine each. Immediately behind each burner is a small cup, into which are placed a few grains of magnesium powder, and the cups are attached to rods connected together, so that, by the turning of a crank, they are simultaneously emptied over the flames from the jets, giving a brilliant mass of light spread over a comparatively large surface. A negative of a lady was taken by this agency, and that it was successful was proved by a slide made from it being projected on the screen a little later on in the evening.

How Massey Photographed at the World's Fair.—It puzzles us somewhat to know precisely by what means Mr. W. E. H. Massey managed to snatch, under the very eyes of the *vigilantes* of the Chicago Exhibition, such a fine set of pictures as he has obtained, judging from such samples as have been given in the *Canadian Photographic Journal*. The subjects are sharp, well selected, and fully exposed. The artist gives a graphic account of the petty harassments to which he was subjected by the agents of the *concessionaire;* but, as we read, he eventually circumvented them by the expedient of hiring a gondola, or an electric launch, and photographing therefrom while going, in some instances, at full speed past the respective subjects which he has so ably snap-shotted. "The magnificent buildings," he says, "have been grouped with the greatest care, and with the surrounding landscape—which is like a fairyland, beautified with artificial lakes and canals, the latter spanned here and there with handsome white bridges—combine to make up a veritable paradise."

The Colours of Nature in Photographs. — Mr. Abraham Bogardus is evidently a conservative of the staunch old-time type, at any rate in regard to those "photographs in natural colours" which are the outcome of the experiments of Lippmann and Lumière. That the colours of nature have, in the works of the latter, been produced, is a real fact, and has been demonstrated to those assembled at the Chicago Congress over a month ago, and during the past week to the Congress of the Societies affiliated to that of Great Britain in the Society of Arts' rooms. Mr. Bogardus, in the *St. Louis and Canadian Photographer*, calls himself an "incorrigible" on the colour question. He says: "I am ready to be convinced by literal facts, but do not propose to be convinced by newspaper stories, or by the reports of scientific men who seem to be easily deceived, and who ought to know better." What evidence, then, must be adduced before Mr. Bogardus will believe? Suppose that he, himself, had an opportunity of seeing and examining the Lumière pictures, and, not being colour-blind, were to testify as to the reality of the blueness of the sky, the yellowness and redness of the flowers, the greenness of the grass, and so forth, and be met only by the cool rejoinder from his neighbour, "I don't believe you, nor do I propose to be convinced by newspaper stories, nor by the reports of scientific men." "But," continues Mr. Bogardus, "it is not producing colours to expose a chemical substance to the sunshine, treat it to another chemical solution, hold it at a certain angle, and call the iridescent effect seen photographing the colours. Countless substances can be made to do that without a camera." Were we desirous of raising a discussion, we might point out that the exposing of a plate coated with a chemical substance to the sunshine (in a camera), and then treating it (in a dark room) to another chemical solution, aptly describes the method now universally employed in obtaining form in light and shade; and it is not logically impossible that, by a strictly analogous method, iridescent colours, answering to the colours radiated from these forms, might also be produced. Of course, as regards the countless substances by which this can be done "without a camera," we prefer to think that Mr. Bogardus has selected language which does not quite accurately represent what he intended to convey. Is he, as an old and experienced Daguerreotypist, willing to admit that colours—and not only colours, but those of nature—were produced on Daguerreotype plates by Becquerel, Niepce de St. Victor,

and others, by means of the processes described in considerable detail by those *savants*, or were they, and numerous scientists and artists of the European side of the ocean, deceiving themselves and others by imagining they saw colours where none really existed?

A PAINTER'S VIEW OF THE PHOTOGRAPHIC EXHIBITION.

The exhibitions in London, especially those of the fine arts, or arts more or less allied to them, have now become so numerous and incessant that, unless for people of ample leisure, it is impossible to keep pace with half of them; hence, for several years I have not had the pleasure of visiting a photographic Exhibition, but I have recently observed several notices of the above, in which favourable mention was made of some highly artistic figure studies by Count W. von Glueden, which induced me to go, a few days ago, to see them. I was more than charmed by these and many other beautiful works which now grace the walls. I expected to have my knowledge increased and my eyes refreshed by a great deal that would be new to me after a lapse of three or four years, but I cannot say that the appearance of any great progress was very apparent; there was one negative progress, however, the *carte-de-visite* and the frames full of commercial specimens and shoppy advertisement pictures were much less in evidence than formerly. Another negative progress noticed was that greater facility of progress over the Exhibition was afforded by the removal of the central screens, thus the gallery assumed a more spacious and comfortable appearance; this also enabled me to stand in the centre and take a general survey of the *tout ensemble*. The first thing that arrested my attention was the spotty, cut-up, disjointed and inharmonious appearance of the collection, owing to the discordant, and, in some cases, very *bizarre* effect of the frames and mounts. This is a difficulty which cannot be easily surmounted in a photographic Exhibition; the Society cannot, as at the Royal Academy, make a rule that all pictures must be in gilt frames, but they might at least announce that excessive width or unsuitable character of frames and mounts might prevent pictures from being accepted, or from being hung in positions they might otherwise merit. This question of framing photographs is one that should receive more attention than appears to have hitherto been bestowed on it. The tone and colour of the print depends very much upon the tone, and colour, and depth of its surroundings. Captain Abney is one of the highest authorities on the science of light and colour, and he could, if he chose, sketch out some valuable suggestions on the subject of the harmony, juxtaposition, and contrast of colours, as applied to the framing and mounting of photographs.

I then observed an unwonted variety of colour in the prints the cold grey of the bromide and platinum pictures being relieved by a pleasing variety of warm platinum tones, of carbon, and a few of the good old silver prints, with their fine rich tones, which, though on glossy surface, are still very pleasing for small work, and still popular if one may judge by their predominant appearance in the shop windows; in this connexion I say nothing about permanency.

I shall now take a walk round, beginning with No. 1, a carbon enlargement, called *The Young Musician*; it is probably excellent photography, but the composition of the figure and hands is arranged without either character or grace. No. 2, *Fruit*, studies by J. T. Hopwood. Surely no painter can look at these beautiful delineations without feeling grateful that the glorious art of photography can preserve for him the drawing, the light and shade, the modelling, the texture and the character of the fruit and flowers, which in hot weather would have shrivelled up and lost their drawing long before he could complete a perfect painting of the subject. Then he could preserve the photograph intact for reference, or for future use in other work. Or, better still, if he has not time to make a finished painting, he could have a second print, a little lighter, and rapidly dash in the colour effect from nature, either in oil or water colour, the first print being preserved intact for reference to detail. Well-defined photographs such as these would also be very useful in drawing schools. No. 11, *Frederic Goodall, Esq., R.A.*, looks very bright and youthful here. I suppose his fine picture of the *Village Festival* in the Vernon Collection was painted nearly fifty years ago. It seems to me a defect in this portrait that the face and the neck, from the rim of the hat to the top of the collar, are both on one flat plane, thus giving the appearance of an enormous swelling in the neck; from the slight line which indicates the chin, the neck downwards should have been thrown more or less into shade. The peculiar curl of the end of his left moustache gives him the appearance of having a ring in his nose; that most prominent point of the picture should have been toned down.

No. 14, *Clouds Descending the Valley*, Zermatt, by William England, would be very helpful to a painter. No. 15, *Mont Blanc by Moonlight, from Coutter's Hotel, January 7, 1893, 10 p.m.* (bromide enlargement), by Captain Abney. This is a wonderful picture—a snow scene of great delicacy, and perfect definition everywhere; I could have believed that it was taken at midday in June, but there seems a weakness and want of depth in the shadows. I imagine that, if it had been printed darker, it would have gained the desired strength and richness without any loss of essential detail, and that it would have possessed more brilliancy and more of the character of moonlight. Then, in my humble opinion, the art value of the picture is depreciated by the unsuitable character of the frame and mount. The print is cold, grey, and weak; it is rendered still more so by contrast with the bright, rich cream colour of the mount by which it is surrounded, and by the rich, warm, dark brown colour of the common varnished wooden frame, with a gilt slip, I think, which encloses the whole. I fancy I should have tried the effect of a neutral-tinted mount of much lower tone—perhaps a cool greenish drab or mud colour—and a dull ebonised moulding. Probably the *savant* could not spare time from his absorbing scientific studies to see to the framing himself, and entrusted some one else to get it done for him. No. 23, *Against the Tide*, W. Dawes. The composition comes out well for an instantaneous study, but the atmospheric character of sky and the transparent liquidity of water have been insanely destroyed by the absurdly coarse character of the printing paper. What should have represented pure sky and water are here presented the sky as coarsely granulated stone, the water as some new composition of wool and mud, on the surface of which some shaggy boats are making frantic efforts to accomplish locomotion—a dirty, rotten result. No. 25, a legitimate photographic study by Robert Terras; head of a nice old peasant woman, about four or five inches, printed in silver on plain paper, warm in tone, and much more like nature than the miserably cold and grey bromides in the neighbourhood. No. 26, *Bonchurch Cliffs*, by Herbert Young, M.A. A pearly, delicate study, but the water is vapid and opaque; yet it is a charming picture as compared with the wretchedly grey, washed-out bromide enlargement next to it. No. 33, *The Wherry*, a carbon enlargement from negative by P. H. Emerson, possesses a charm on account of the luminous liquidity and effect of transparency in the water, an effect greatly helped by the boat in the centre. The atmosphere is hazy, but that does not account for the utter disproportion in atmospheric strength between that ugly clump of branchless foliage protruding from the top left-hand corner, and the large clump of trees immediately beyond it, which look as faint as if they were half a mile away. Here, again, the warm mount and the gold make the cold enlargement suggestive of a drawing made with washes of writing-ink; but the black moulding is much better than the white. Just above this is No. 32, a large sunset picture (platinum), by Lewis Cohen. This is a photograph of a high order, although it lacks transparency, and is too dark and heavy in parts.

PALETTE.

(To be continued.)

WET COLLODION.

[North Middlesex Photographic Society.]

REPORT OF LECTURE AND DEMONSTRATION GIVEN BY MR. W. E. DEBENHAM.

The wet-collodion process is the one best adapted for preparing plates to make negatives for line work or photo-lithography, and where clear black and white and sharpness of line are necessary. Wet collodion is also necessary for making enamel plaques, when the film is toned with platinum or iridium and placed upon a plaque and fired. Wet collodion is also used for making enlarged negatives, lantern slides, and copying. There are some essential differences in the collodion and gelatine methods. In the gelatine method the image is developed from the bromide of silver, which forms the sensitive surface; that bromide yields its silver to form the image. In the wet-collodion process the image is formed of silver, not from the iodide of silver in the film, but from the nitrate of silver, which is in the accompanying sensitising bath. Now, although the film in the case of collodion is, as I stated just now, for the most part iodide, there is an advantage in having a certain amount of bromide in it. Formerly bromide was not used for negative processes, but it was found that a little bromide gave a smoother surface, the plate was cleaner in development and less liable to fog; and, moreover, it was more fit for development by the iron method than the plain iodide, which was, generally speaking, developed with pyro.

Now to the actual work of preparing a collodion plate. In the first place, you must have glass which is clean; glass which is only *apparently* clean to the eye will not do, it must be *really* clean, or else where there is a trace of dirt on the surface of the glass—though it may be not sufficient to be seen—the silver will be deposited from the bath under the action of the developer, and will make a stain underneath the collodion between the collodion and the glass. That stain is not only injurious as a stain, but the collodion will, generally speaking, fly up off the glass when the plate is dry. The first thing, therefore, is to have your glass clean. We at one time used patent plate, but that has now gone out of use for this purpose. Sometimes you will find the glass covered with an apparently smoky stain; if you find this, do not use it, or else the collodion will fly off when it is dry, even if it does not cause a stain during development. The glass may be cleaned in various ways, according to the purpose to which it has previously been put. If it is in a very bad state, or has been used for negatives which were intensified with mercury, then you should dip it in moderately dilute nitric acid, say one in five of water

But, generally speaking, it is sufficient to take a piece of list, and roll it into a flat pad, then put a little whiting and water on the surface of the plate and rub it pretty hard with the pad, afterwards wash it under a tap, dry it with a cloth, after which it must be thoroughly polished. Do not stand the plate up to dry on taking it from under the tap, for, if you do, the water will settle and form marks on the glass which you will not be able to get rid of; and you must on no account use glass which has anything the matter with it. I have found the great secret of polishing glass successfully and tolerably rapidly is to use a cloth which is not quite dry. With a perfectly dry cloth it is almost impossible to get glass clean; the cloth must not be so damp as to leave a smear; but, if that is avoided, rubbing the glass with such a cloth will very soon bring it to a satisfactory polish. I have known photographers to suppose that, if the breath flies off rapidly, the glass is clean; but that is a delusion, it merely shows that the glass is warm from rubbing, the breath should dry off smoothly, there should be no streaks. But there is one particular mark which you may see, and that is an appearance something like flames that die away altogether; I do not know how to account for it, but, when you see that, you know it is a glass in very good condition.

Now, the glass being clean, has to be coated with collodion. I prepare my own collodion, and the following is the formula I adopt:—

A.

Pyroxiline	100 grains to 120 grains.
Ether ·720 to ·725	10 ounces.
Alcohol abs.	5 ounces.

That forms plain collodion. It is allowed to stand for a few hours at least, so that it can be decanted from sediment. The iodising solution is conveniently added afterwards, and not made with the collodion itself. It is made thus:—

B.

Ammonium iodide	60 grains.
Cadmium iodide	40 „
Cadmium bromide	10 „
Iodine	1 grain.
Alcohol ·820	5 ounces.

These solutions are then mixed, and together make up a pint.

When the plate is coated with collodion containing iodide and bromide, and placed in a solution of nitrate of silver, a double decomposition takes place. The iodide and bromide form iodide and bromide of silver in the film itself, and leave, of course, a certain amount of nitrate of cadmium and nitrate of ammonium in their place. You must, however, have a considerable excess of nitrate of silver, or else you will have nothing to develop from, as it is that from which your image is formed.

The sensitising bath is a thing which used to give old photographers a good deal of trouble, as it was so liable to get out of order. Ordinary nitrate of silver will do to make the bath, and a bath successfully made with it cannot be distinguished from that made with triple recrystallised; and, in order to make tolerably sure of success, you can adopt the method which I will describe. The nitrate of silver is first made up with about one-third of the amount of water which is to form the bulk; the strength of the bath should be—

Nitrate of silver	30 grains,
Water	1 ounce,

which is something like fifteen ounces of water to every ounce of nitrate of silver. Suppose we have sixty ounces of water to four ounces of nitrate; in the first place, put in about one-third the amount of water, add a little liquor of potash—a few drops—until it forms a slight brown cloudiness which does not redissolve; we know then that the bath is not acid, but that it is possibly alkaline, just alkaline. When in that alkaline condition, it throws down impurities which, whilst in the acid condition, would remain in it. Then add a solution of iodide of potassium, a few drops at a time, until no more of the deposit redissolves. Now fill up with the remaining two-thirds of water at once; a quantity of iodide of silver will be deposited, and in settling down it appears to carry down impurities with it.

Make your bath, so far, some time beforehand, and leave it until you really want it; then filter it, and add to every pint one drop of nitric acid; the bath should then be in good condition and fit for use. When a bath is not in good condition, the result is that, where the shadows should be perfectly clear, no deposit at all, there is a certain amount of deposit, sometimes so bad as to cause a fog, that spoils the picture entirely.

An upright glass dipping bath is customary, with a dipper to hold the plate. It is very convenient to have a millboard cover made for the bath, and the dipper, which may be of gutta percha, attached, so that when the dipper is inserted the lid comes down, and when the lid is removed the dipper and plate are withdrawn.

The plate being properly cleaned, as before explained, is now coated with the collodion. In coating the plate, number the corners in your mind 1, 2, 3, 4; hold the plate by the thumb and fingers of the left hand as near the corner of No. 3 as possible; pour on plenty of collodion, so as to be sure it will go all over, run it first into corner No. 1, which is opposite the thumb, then 2 and 3 which is the thumb corner, and off into the bottle again at No. 4. Now, if the plate is left still, it will form marks; so keep the plate in one plane, but raise alternately, the corner next the thumb and the opposite corner, so as to alter the direction of the running-off lines crossing them, and thus get rid of lines altogether, or nearly so. Large plates are best coated with a pneumatic holder, or by supporting them on a pad of paper with the hand flat underneath. After coating, the plate must be left a short time to set; it must not be placed in the silver bath instantly. The time depends upon the time of year, the quality of the collodion, &c.; if any part is perfectly dry, it will give a thin, useless image, and will ruck up in developing; if it has not set sufficiently, the edge where it has been poured off will show streaks coming down from it. In placing the coated plate into the sensitising bath, it must go in without a halt, or there will be a line; it must not be hastily put in so as to cause a splash, or there will be marks where the splashes settle, but it must be put in evenly and quietly.

The plate should remain in the sensitising bath for an average of three minutes. If, on taking the plate out of the bath, it shows greasy-looking marks, it has not been in the bath long enough, and must be put back. On removing it from the bath, it should be drained for a minute or so to get rid of the surface moisture, and it is then ready for the exposure, which, whether the plate is intended for a negative or positive, must be made in the camera, as the wet plate, coming in contact with a negative film, would ruin it at once. The wet-collodion plates are some thirty or forty times slower than an ordinary gelatine plate.

The developer consists of—

Sulphate of iron	10 to 20 grains.
Acetic acid	15 minims.
Water	1 ounce.

I use no alcohol with a fresh bath, and, on the whole, I find I get clearer pictures without; but, if the bath has had many plates dipped in it, you will be compelled to use alcohol in your developer, otherwise it will not flow smoothly, but will halt and make marks. After washing off the developer, cyanide of potassium is used as the fixing agent, of which a little may be poured on the plate, but I much prefer a dipping bath where many plates have to be fixed. It is much quicker to use than hypo, and is easier to wash out.

If the plate needs intensification, it can be done in several ways, but the usual intensifier is—

Pyro	2 grains.
Acetic acid	15 minims.
Water	1 ounce.

Flow this over the negative and back into the measure, then drop into the measure three or four drops of the sensitising solution. That which has drained from the plates, if it has been saved, will do very well. Pour it back on to the negative, and it will at once give a brown colour, and, by degrees, deepen to perhaps twice the intensity the plate originally had.

Suppose you find that your picture is slightly marked from a dirty glass, and you expect that the film will fly off when dry, but, on the whole, it is so good that you would like to save it, in that case, while it is still wet, flow over it some rather thin gum water, and then it will probably stick to the glass as it dries.

A collodion negative must be varnished, as the film is so tender that it cannot safely be printed from without this precaution. Any of the negative varnishes on the market will do for this.

There is not so much latitude of exposure with the wet plate as with the dry gelatine plates, as the developer cannot be modified to the same extent. The wet-collodion process is cheap to work, the chemicals for a half-plate only costing somewhere near a halfpenny. In case of a negative being spoiled, the film may be cleaned off easily, and the plate is then available for use again. If the plate has been varnished, hot water will loosen the film.

NIKKO PAPER.

[Croydon Microscopical and Natural History Club.]

This development paper, as distinguished from the printing-out paper, has recently been introduced by the Eastman Company, and we pro-

pose to-night to lay before the members of the Club our experience in the development and toning of Nikko paper, so far as they have gone up to the present time.

Although the ferrous-oxalate development is the only one referred to in the instructions issued with this paper, yet it is stated that any of the other developers may be used; and, if time permits, we shall endeavour to show you the results, obtained with the following developer, *i.e.*, hydroquinone, amidol, metol, and glycin, any of which may be used, the chief difference in the results obtained being the *colour* of the developed image.

Following up an opinion we have before expressed, and which has been endorsed by the editor of THE BRITISH JOURNAL OF PHOTOGRAPHY, we again reiterate the statement that development formulæ ought always to give the quantities of each ingredient to each ounce of developer used. The want of such information was abundantly proved by the value set on the tables compiled with so much care and trouble by Messrs. Clark & Ferrero, and yet we find formulæ still being published to make anything from a pint to a gallon of developer, and, on endeavouring to reduce these to ounce quantities, some curious and interesting fractions occur, which go far to throw discredit on the published formulæ.

The ferrous-oxalate and hydroquinone developers are probably sufficiently well known; but, for those who wish to try the newer developer, we have reduced the quantities, as given in the formulæ sent out by the manufacturers to ounce proportions, as follows:—

"AMIDOL."

Pure sodium sulphite	21 grains.
Distilled water	1 ounce.
Amidol crystals	2 grains.

Dissolve the sulphite in the water, and add the amidol. As the latter is very soluble, it may, like pyro, be used dry at the moment the developer is wanted.

"METOL" SODA.

A.

Distilled water	1 ounce.
Metol	6½ grains.
Dissolve and add pure sodium sulphite	65 „

B.

Distilled water	1 ounce.
Soda crystals	54 grains.

Dissolve.

"METOL" POTASH.

A.

Distilled water	1 ounce.
Metol	4½ grains.
Dissolve and add pure sodium sulphite	45 „

B.

Distilled water	1 ounce.
Carbonate of potash	45 grains.

"METOL" STOCK SOLUTION.

Distilled water	1 ounce.
Metol	6½ grains.
Dissolve and add pure sodium sulphite	65 „
Soda crystals	54 „

"GLYCIN."

A.

Glycin	17 grains.
Carbonate potash	66 „
Pure sodium sulphite	51 „
Distilled water	1 ounce.

Dissolve.

B.

Carbonate potash	43 grains.
Distilled water	1 ounce.

For use, mix one part of A with two parts of B.

These solutions are to be mixed in varied proportions, and sometimes diluted with water, according to the instructions issued with each developer.

We will now proceed to expose and develop a piece of Nikko paper with each of these developers taking them in the order given, when we shall find that the ferrous-oxalate gives from a soft grey to a velvety black; hydroquinone more or less of a black; while the newer developers appear to give beautifully soft pictures of a colour intermediate between these two. Some prints we have previously prepared will illustrate this, and another print will show the effect produced by squeegeeing on to a pulp slab previously prepared with spermaceti dissolved in benzoline, and which we much prefer to talc.

The exposures, which were all made at a distance of three feet from a gas flame, varied from thirty to sixty seconds according to the density of the negative, and the usual device of shading some parts of the negatives, where thin, during exposure was adopted.

Nikko paper appears to give a great latitude in exposure, and to develop up slowly but vigorously, and shows no sign of fogging or staining with any of the developers we have tried.

Having developed the Nikko print, we can, if the colour is not agreeable or we wish to alter it, resort to toning. And for this purpose we have used two solutions, the results of which we shall demonstrate to you. 1. There is the now well-known acid uranium toner first suggested by Mr. Weir Brown, which gives very warm tones, but which do not appear to wash out, as they do in the case of bromide paper; this may be due either to a difference in the emulsion, or to the fact the uranium toning with Nikko paper is much slower than it is with bromide paper. Examples of this we show you.

2nd. The sulphur-toning formula issued by the Eastman Company, which, as you will see by the example before you, gives nice warm sepia tones. In using this process, however, two precautions are necessary, *i.e.* (1) Not to use the bath before it has been made *at least* twenty-four hours; (2) to develop darker than the toned print is required to be. If these conditions are not observed, the result will be as in the print before you—it will be almost bleached out of existence. Another point in connexion with this toner is that it should be kept warm—that is, from 100° to 120° Fahr.—during the toning process, as a print that was allowed to remain in it cold *all night* showed no sign of toning the next morning.

We have now laid before you some of the methods of treating Nikko paper, and we may say, in conclusion, that we believe there is a future for this paper, as it appears to be very amenable to various kinds of treatment.

J. H. BALDOCK, F.C.S.

A NEW GELATINO-CHLORIDE PAPER: DEVELOPMENT OF PARTLY PRINTED PROOFS.

THE Paget Prize Plate Company, after considerable experiment, are just placing a new gelatino-chloride paper on the market, and last week we accepted an invitation to attend at the Company's premises at Watford for the purpose of witnessing a process they have worked out, whereby advantage is taken of the circumstance that weakly printed images on gelatino-chloride paper may be developed up to full intensity by ordinary alkaline development, and toned and fixed in the usual manner. The Company anticipate that where a number of prints are wanted from one negative a saving of time may be effected, and thus a professional photographer would find it advantageous to utilise the daylight for rapid underprinting and subsequent development in preference to printing right out, which would take very considerably longer.

On the occasion of our visit a number of portrait, landscape, and architectural negatives were used for making the exposures. These latter varied from two minutes in the shade (approximately one-tenth of the time necessary for printing out) to fifteen and twenty seconds in the sunlight. Included among the prints made was a vignette, this being selected in order to show that the paper does not give double tones. The prints when taken from the frames just showed the finer details. They were then placed in a solution of potassium bromide 1 : 20, in which they acquired a yellow tone, and were then washed in plain water. After the washing they were treated with a developing solution as follows:—

Solution 1.

Hydroquinone	½ ounce.
Sulphurous acid	¼ „
Sodium sulphite	¼ „
Potassium bromide	60 grains.
Water to	30 ounces.

Solution 2.

Caustic soda	½ ounce.
Sodium sulphite	1 „
Water to	30 ounces.

Solution 3.

Bromide of ammonium	1 ounce.
Carbonate of ammonium	1 „
Distilled water to	30 ounces.

The carbonate of ammonium should be in clear lumps. If from exposure to the air it has become coated with the white powdery bicarbonate, the latter should be scraped off.

For use: Two parts No. 1; one part No. 2; two parts No. 3.

Development was complete in about five minutes, the pictures then presenting the appearance of washed, untoned albumen prints, rather less in depth, the right moment to stop development in the gelatine prints being just when the finest details are disappearing.

After about ten minutes' washing, the prints were placed in the toning bath, the following "separate" bath being the one employed:—

Sulphocyanide of ammonium	30 grains.
Gold chloride	2½* ,,
Water	16 ounces.

The toning action started rapidly and was completed in from six to ten minutes, according to the particular peculiarities of the print. The prints, as was afterwards shown, did not lose in the fixing solution, and they were adjudged to be toned sufficiently by transmitted light, that is, when so viewed, the yellow colour in them should have disappeared. In all, some thirty-six prints were exposed, "bromised," washed, developed, washed again, toned, and fixed, and several of them dried off with spirit, in about two hours and a half.

Some of the wrinkles that came out in the course of the demonstration might be of service to others taking up partial development of gelatine papers, which Mr. W. J. Wilson anticipates will be largely done. While two minutes in the shade may be accepted as the minimum printing time, a little, or even much more, is not at all hurtful, as it comes to this, that, provided the minimum exposure has been given, any stage of under-printing, however slight, is amenable to development. Slow and tolerably well-restrained development appears to be the best adapted for the case. Washing between the various operations assumes the greatest importance, particularly between development and toning, the more thoroughly the print being washed the better the toning action proceeds. Another feature of the process is that if a print, when in the toning bath, should have been found to have been under-developed, the toning solution can be removed, and the print well washed, redeveloped up, and toning again proceeded with; also that over-developed prints are easily and harmoniously reduced in a very weak solution of cyanide of potassium.

Comparing several developed prints with those printed out in the ordinary manner, no difference in quality could be detected, while the whites of the former were as pure as could be desired in every way. The demonstration was highly successful, in fact; and the Paget Company should receive the thanks of many a professional photographer for having put him in the way of a useful device.

THE PHOTOGRAPHIC CONGRESS.

The Congress of the Societies affiliated to the Photographic Society of Great Britain was opened at the Society of Arts on Wednesday afternoon, the President (Captain W. de W. Abney) being in the chair. There was a very good attendance.

A paper on *The Astigmatism remaining in Some Astigmats*, by Herr Emil von Hoegh, was read. This dealt with the application of Dr. Rudolph's method of testing for aberrations as applied to the double anastigmat of Goerz and the Zeiss anastigmat.

The proceedings were continued with the delivery of an address by Mr. Andrew Pringle on *The Present Position of Photo-micrography*, in which he pointed out that scientific instrument-makers were giving their attention to cheap apparatus, so that photo-micrography could be taken up at a moderate cost. Dividing the systems of apparatus usually employed into two, he described and illustrated by means of lantern diagrams that one in which the microscope was on one piece, and the receiving surface on the other, pointing out that with it there was a danger of the non-synchronous vibration of the parts. In the other system there was a rigid connexion of all the parts of the apparatus. Having illustrated Zeiss' and Swift's forms, he next showed a diagram of one produced by Baker for himself, which, among other advantages, allowed of the head being placed between the front of the microscope and the camera. For photographing liquids or objects contained in liquids he spoke highly of Van Heurck's arrangement. In this a box having a door at its side was placed over the microscope, which enabled one to look down on the object. A great many objects had to be photographed in a living or moving state. In Nachet's arrangement there was an auxiliary tube, along which a prism projected the image, so that an observer could watch it, and when the focus was settled the prism passed aside and the exposure was made. His own modification of this consisted of an inverted camera over the microscope, with eyeholes at the side for watching the object, and an arrangement of shutters for the exposure. Having noted recent advances in the introduction of colour-sensitive plates and apochromatic objectives, Mr. Pringle showed slides by Messrs. T. F. Smith, Comber, Dr. Bousfield, and himself, and a series by Mr. Carnell illustrating the advantages obtained by the use of colour-correct plates, and concluded by insisting on the advantages of photo-micrographs over drawings of pathological specimens, and the value of photo-micrography to scientific men.

Dr. Bousfield referred to the sweating properties of the glass of the apochromatics, and said that, while they gave exquisite sharpness in the centre of the field, they fell off at the margins. They wanted something much better than that before they could be said to have reached finality. Absolutely the best objective he had used was a "Powell & Leland."

Mr. Pringle agreed that Powell & Leland produced objectives which had surpassed those of Zeiss in flatness of field. With regard to correction, Dr. Piffard had said that the future of photo-micrography depended upon the light being near the D region of the spectrum, the objective corrected for the D line, and the plates sensitised to the D line.

The President said that Mr. Pringle's remarks about tremors were unfortunate, as the earth was always in a state of tremor. He did a certain amount of photo-micrographic work years ago, and was much troubled by the want of achromatism of the lenses. He found that the best way to cure it was by monochromatic light from a pure spectrum, by decomposing a ray of light by a prism, and interposing a slit in the path of the monochromatic ray, which was then taken up by a lens.

A paper by M. Weissenberger, of St. Petersburg, on *A Process of Photo-mechanical Printing in Natural Colours*, was then read by Mr. Warnerke. This appeared to be the well-known process of preparing three colour-sensitive negatives, and, by means of prints from three gelatine blocks, superposing the three colours, yellow, blue, and red.

Mr. F. E. Ives said he had already published what he believed to be very nearly the best conditions for arriving at results similar to those shown. If he undertook to say what were the scientific errors in the paper, it would take up a lot of time. He did not think it had been demonstrated that it was not possible to obtain negatives which did not require touching out. We could obtain three negatives of colour sensations, and those sensations existed in definite proportions, and each negative is the one we require for reproducing the object. The author seemed to think that both ends of the spectrum were given. He once thought that himself. In 1881 he devised a plan of working by cross lines, and while he could reproduce with ordinary correctness coloured photographs, he could reproduce nothing like landscape colour that was not simply bad. He had made by gelatine printing reproductions of landscapes which came near to nature, but still more satisfactory results when the colours were combined by light. He concluded by warning any one against investing money in such a process, as it was commercially unworkable.

After other remarks, Mr. Warnerke took occasion to point out that M. Weissenberger only had a scientific object, as distinct from a commercial one, to serve, in bringing the process forward.

A paper on *Photography in Compartments* was read by the author, Mr. Hector Maclean, F.G.S., and a short discussion followed.

On Wednesday evening, after Mr. Leon Warnerke had discoursed on Lumière's photographs in natural colours, to which reference is made elsewhere, the President read a paper on *Chemical Action and Exposure*, which dealt exhaustively with the experiments made to confirm previous statements of the author that the sum of excessively small exposures was not equivalent to the same exposure given at one time, and that feeble intensity of light also failed to give the calculated amount of chemical action. In a brief discussion which followed, the Chairman (Mr. J. Spiller) said he had been in the habit of considering that, if a sitter were placed twice a given distance away from the camera, the amount of light falling upon the camera would be four times what it would be in the first case, and the exposure would be regulated accordingly; it was also a novelty to be told that two exposures of half a second each were not equal to a single exposure of one second. This ought to have been discovered before.

Mr. H. A. Lawrance suggested that, as the subject covered a wide field, discussion on it should be postponed.

Mr. W. E. Debenham said the paper was contrary to his views; he had tried the experiment by printing, and had found it impossible to tell the difference in the exposures.

Mr. H. M. Elder thought the paper would have an important bearing on many departments of scientific work.

The evening proceedings concluded with a paper by Captain Hills, describing the photographic work of the recent solar eclipse.

On Thursday afternoon a paper by Dr. Rudolph was read on *A System of Measuring and Numbering the Stops of Photographic Lenses*, which discussed the existing systems of numeration, and concluded that it would be rational to take *f*-36 or *f*-50 as the unit, and, in order to minimise the occurence of fractions, to let the number vary as the relative rapidities, *i.e.*, inversely as the corresponding exposures. Taking *f*-36 = 1, the following convenient system is obtained:—

Relative aperture—	*f*-4·5, *f*-6·3, *f*-9, *f*-12·5, *f*-18, *f*-25, *f*-36, *f*-50, *f*-71.
No. of stops (relative rapidity)	64, 32, 16, 8, 4, 2, 1, 0·5 0·25.

A demonstration of collotype was then given by Mr. W. E. Debenham, and the meetings of the Congress terminated by the reading of a paper by Dr. Miethe on *The Practical Testing of Photographic Objectives*. This, together with most of the other papers, we shall produce in future numbers of the Journal.

On Thursday night, at the Exhibition Gallery, Pall Mall, a largely attended lantern entertainment was given, and on Friday evening a dinner was held at the Frascati Restaurant. The Congress appears to have been very successful throughout.

INTERNATIONAL AMATEUR PHOTOGRAPHIC EXHIBITION AT HAMBURG.

(From a Special Correspondent.)

This Exhibition was opened on October 1 by the President of the Committee, Mr. Ernst Juhl. There are about 450 exhibitors from all parts of the world, who sent nearly 6000 photographs for competition. The awards consist of fifty-nine first-class prizes and 170 diplomas, given by the Senate of Hamburg, several societies and clubs, and by friends of photography. Besides exhibitors from Germany, the representatives of the following countries took part in the Exhibition:—The United States of America, Chili, Ecuador, Japan, Australia, Belgium, Holland, Denmark, England, France, Italy, Sweden and Norway, Austria and Hungary, Russia, Spain and Portugal, Switzerland, China, and Argentine.

A Photographic Congress was arranged for October 7 and 8 by the Committee, to which all photographic clubs and societies were cordially invited.

At the first meeting of the Congress the decision of the Judges was published, the result being that the two first-class prizes were given to foreign exhibitors.

Mr. Rudolf Eickemeyer, jun., of New York, was awarded the large gold medal given by the Senate of Hamburg; Freiherr von Rothschield, of Vienna, the small gold medal given by the Society for Art and Industry.

The following English exhibitors were honoured with first-class prizes, viz.:—Mr. A. R. Dresser, London (an oil-painting, given by the ladies of Hamburg, as well as another prize consisting of a bronze plaque, size $7 \times 9\frac{1}{2}$); Mr. Paul Lange, Liverpool (an oil-painting, given by friends of photography).

Diplomas were also received by:—Rev. William Barlee, Cringleford Hall, Norwich; Miss Alice H. Brown, Norwich; Messrs. Martin J. Harding, Shrewsbury; Oct. Langtree, Craigavad, Belfast; John W. P. Norton, Sheffield; Clare Parks-Smith, Bristol; and A. E. Segnitz, Birmingham.

It is only six months ago that the International Amateur Photographic Exhibition was proposed by the Hamburg Amateur Photographers' Club, and it is due to the kind assistance of the Senate of Hamburg, the foreign consuls, the different societies and clubs, and last, but not least, to the Committee, that the Exhibition has been such a grand success.

News and Notes.

Woolwich Photographic Society.—October 26, Annual Meeting at St. John's Schools, Woolwich.

Photographic Club.—October 25, First Monthly Lantern Meeting of the season.

Northern Scientific and Photographic Association.—At the meeting of this Association on Thursday, last week, R. W. Bowers, Esq., F.R.Hist.S., delivered an address on Darwin and Evolution.

Newcastle-on-Tyne and Northern Counties, Photographic Association.—October 24, Annual Meeting and Exhibition of Slides at half-past seven p.m. at the Association Meeting Room, Art Gallery, Newcastle.

Mr. G. H. Cricks, 11 and 12, Great Tower-street, formerly of Messrs. W. B. Whittingham & Co., is now the London representative of Messrs. Stutz & Co., the agents for the "Drum" brand of photographic papers.

The Ilford Year-book for 1894.—A very handy year-book in the form of a comprehensive diary has been received from the Britannia Works Company, Limited. It is on the same general lines as that of last year, which proved so successful.

Leytonstone Camera Club.—October 21, Open Social Evening at headquarters at eight o'clock. 25, Demonstration on the *Collodion Process* by the President, Dr. W. Pickett Turner, assisted by Mr. A. J. Newton. Chair taken at eight o'clock.

Messrs. Arthur Schwarz & Co., of Dashwood House, E.C., have been appointed the European agents for Hetheringtou's Backgrounds, of which have seen several excellent collotype reproductions that show them to be of a highly artistic character.

The Bristol International Photographic Exhibition.—We understand that a large number of entries for this Exhibition have already been received. It opens on December 17, and will be divided into twenty-two classes, in which forty medals will be awarded.

Photographic Society of Ireland.—This Society has removed from 15, Dawson-street, Dublin, to larger and more convenient premises at No. 35, in the same street. All communications to be addressed to the Hon. Secretary, Mr. J. A. C. Ruthven, 40, Lower Sackville-street, Dublin.

Photographic Society of Great Britain.—Technical Meeting, Tuesday, October 24, at the Gallery, 5A, Pall Mall East. *Balloon Photography*, by Captain Mantell, R.E. *Lumière's Experiments in Printing with Manganese Salts.* Mr. R. Child Bayley will introduce the subject and show specimens. The meeting will *not* be held at 50, Great Russell-street, as previously announced, but at the Exhibition Gallery.

Central Photographic Club.—A successful inaugural smoking concert was held at the Club's headquarters, Coleman's Hotel, Covent Gardeu, last Friday evening. The premises are now ready for the use of members, and we are pleased to observe that the Honorary Secretaries are busy in providing the various Club conveniences for "social purposes." The residential value of the Club has been already put to the proof, several country members having stayed there during the past week.

Metric Weights and Measures Adopted by Druggists in the United States.—Following the seventh decimal meeting of the National Convention for revising the Pharmacopœia, the authorised revision has now been published, and will take effect as from January I, 1894. It is noteworthy that the Committee of Revision was instructed to direct that all solids should be weighed, and all liquids measured, by the *metric* system. Throughout the Pharmacopœia the metric weights and measures have therefore been adopted.

Photographers' Benevolent Association.—October 17, 1893, meeting at the rooms of the Photographic Society of Great Britain, 5A, Pall Mall East, S.W., Mr. A. Mackie in the chair. The Committee confirmed a loan of 15*l.* granted on September 28 by a Sub-Committee in a case that was partially considered by a full Committee on September 15. The following other cases were considered:—1. A discharged soldier, who had been a military photographer, and who, since his discharge from the army, owing to broken health, had been working as a carbon and process photographer until disabled by bichromate disease, applied for immediate assistance and a loan of sufficient money to purchase camera and lens. Owing to illness and time spent in hospital, he was penniless. The Committee granted a small sum in instalments for immediate subsistence, and instructed the Secretary to purchase a second-hand whole-plate camera and lens. Applicant had secured permits to photograph in several police barracks and workhouses. 2. Applicant, who was assisted four years ago with a grant of 5*l.*, applied for further small assistance until he should obtain situation. A grant of 2*l.* was made. 3. An operator, to whom a grant of 5*l.* was made on September 15 to enable him to reach a situation, applied for a further 5*l.* in order that his wife and family might reach him, and so reduce living expenses and enable him to repay the whole loan. Amount was granted. 4. An operator, who was assisted last year, and who, during the spring and summer, has been in several temporary situations, some of which were found by the Benevolent, made application for further assistance. Secretary reported that he had granted immediate relief to the extent of 1*l.* in instalments, and that, as the applicant had obtained a month's engagement, the application was withdrawn. Committee confirmed Secretary's advances. Donations were acknowledged from the following:—London and Provincial and Photographic Club Outing, 9*s.* 1*d.*; Messrs. Henry Dixon & Son, 2*l.* 2*s.*; Brighton Photographic Company per Mr. Wicks, 1*l.* 16*s.* 6*d.*; a friend of the Benevolent, 1*l.* Mr. Leon Warnerke was accepted as a subscriber.

Hackney Photographic Society's Exhibition.—This Exhibition was opened on Tuesday evening last, October 17, by Sir Charles Russell, Q.C., M.P., in the presence of a crowded assemblage. Sir Charles Russell, in declaring the Exhibition open, said he was glad to hear that the Society was flourishing, and that it was able to hold its own in open competition. Photography was now one of the fine arts, and its pursuit had many attractions. It was an agreeable means of association with neighbours, and of perpetuating pleasant memories of days gone by, and it also served very useful purposes. It was hardly too much to say that photographic science was the handmaiden of science itself, for in the pursuit of that difficult and abstruse science, astronomy, the lens of the photographer often revealed planets which even the most powerful glasses failed to discover. He wished long-continued success and increasing prosperity to the Society. A vote of thanks to Sir C. Russell was accorded, on the motion of Mr. J. Fenton-Jones, seconded by Dr. Owen Smith, and supported by Mr. J. Traill Taylor. We reserve a detailed notice of the Exhibition until next week, but in the meanwhile we give the Judges' awards:—Class A (Members Classes).—Championship Gold Medal, S. J. Beckett, 132; W. Houghtou's Silver Medal, W. A. J. Hensler, Silver Medal, C. H. Pollard, 88. Class B (Hand-camera Pictures).—Silver Medal, Robert Beckett, 217; Bronze Medal, F. E. Roofe, 164. Class C (New Pictures taken at Club Outings). — Silver Medal, No award; Bronze Medal, F. W. Gosling, 276.1 Class D (Members New Lantern Slides).—Silver Medal, S. J. Beckett; Bronze Medal, W. A. J. Hensler. Class E (Unmedalled Pictures). — Silver Medal, J. B. B. Wellington, 310; Bronze Medal, W. M. Warneuke, 360. Class F, (Portraiture and *Genre* unrestricted).—No awards. Class G (Champion Class).—Gold Medal, J. B. B. Wellington, 428; Silver Medal, No award. Class H (Lantern Slides. Open).—Silver Medal, W. England; Bronze Medal, A. Brooker; Extra Bronze Medal, W. Taverner. Apparatus.—Silver Medal, Henry Park.

Copying Pictures.—A contemporary has the following:—"We may be permitted to express a hope that there is some mistake in the story told by the *Manchester Guardian* concerning the destruction of *Love Among the Ruins*, painted by Mr. Burne Jones in 1873. The account which has already appeared credits a firm of art publishers, to whom the picture had been entrusted for the purpose of being photographed, with a singular lack of discretion. They mistook, so it is said, a water-colour drawing for an oil painting, and poured upon it some substance intended to make it shine. The effect was, of course, immediately disastrous. It is difficult to believe that any one accustomed to handling works of art could have made such a blunder over a drawing to the close examination of which there was evidently no impediment; and it is still more difficult to understand why any photographer should try to impart to the surface of the picture that shine which it is his habit to denounce as a drawback and interference. The tale seems to lack internal evidence." In a subsequent issue the same journal thus comments on the matter:—"A letter

which has appeared from Mr. Philip Burne Jones confirms the rumour about the destruction of his father's picture, *Love Among the Ruins*. It was, it seems, in Paris that the photographic firm committed the astonishing blunder that has caused so much comment, and it also seems that such reckless handling of important works of art is an every-day occurrence. The immediate effect of this last 'accident' will be to make the owners of valuable pictures exceedingly unwilling to allow them to be touched by the reproducer; and the ultimate effect, let us hope, will be to put a stop to these ignorant experiments with works of art. It cannot be too strongly urged that the owner of a picture by any artist of real importance has no moral right—whatever his legal position may be—to expose that picture to any risk of injury. He possesses temporarily an important link in the chain of evidence which establishes that artist's reputation; and upon the manner in which he and others like him deal with their art possessions depends the estimate which future generations form of that artist's work. Had there been in bygone centuries many reproducing firms with careless methods, and many owners as trustful as those of to-day, we should have had few of the classic canvases left to set the standard of the art of the world. What the restorer spared would have succumbed to the reproducer."

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 18,975.—"Image Finder for Hand Cameras and other purposes, Showing the Image on a Plane situated at any Angle round the Axis of the Lens by Rotating a Mirror." G. STOKES.—*Dated October* 10, 1893.

No. 19,129.—"A Post-card for Photographic Use." C. HARBERS.—*Dated October* 11, 1893.

No. 19,199.—"Improvements in Photography." Communicated by R. E. Liesegang. A. ZIMMERMANN.—*Dated October* 12, 1893.

No. 19,206.—"Improvements in Chrono-photographic Apparatus." E. J. MAREY.—*Dated October* 12, 1893.

No. 19,239.—"Improvements in the Mode of and Means for Draining and Drying Photographic Plates." J. PUMPHREY.—*Dated October* 13, 1893.

No. 19,282.—"Improvements in Instruments for Calculating Photographic Exposures." A. WATKINS.—*Dated October* 13, 1893.

No. 19,304.—"Improvements in Photographic Cameras." J. D. MCKELLEN and S. D. MCKELLEN.—*Dated October* 13, 1893.

No. 19,330.—"Improved Adjustable Support for Photographic Printing Frames." E. H. HARDY.—*Dated October* 14, 1893.

No. 19,333.—"Improvements in, or connected with, Photographic Pictures." A. A. BARRATT and A. J. E. HILL.—*Dated October* 14, 1893.

SPECIFICATIONS PUBLISHED.

1892.

No. 20,253.—"Photographic Dark-slide Recorder." THORNTON & PICKARD.

No. 20,679.—"Frames for Printing Magic-lantern Slides." SCOTT.

No. 21,622.—"Paste for Photograph Mounting." VOGEL & WEINBERG.

1893.

No. 4081.—"Photographic Shutters." THORNTON & PICKARD.

No. 10,196.—"Photo Printing Surfaces." Communicated by Stanford. BOULT.

PATENTS COMPLETED.

AN IMPROVED APPLIANCE FOR PRINTING VIGNETTE PHOTOGRAPHS.

No. 16,481. JOHN COULSON ROWBOTHAM, 115, Thornton-road, Bradford, Yorkshire.—*September* 15, 1893.

THIS invention relates to an improved appliance to be used in printing vignette photographs, and its object is to more perfectly soften or tone down the outline of vignettes.

For this purpose I employ a zinc or other sheet metal plate having an opening or aperture approximately the size and shape of the vignette. The margin of this opening or aperture is raised or curved upwards so as to "dish" that part of the plate, and the raised or curved portion is perforated with one or more rows of holes, which may be reduced in size and number as their distance from the edge of the said opening or aperture is increased.

By this arrangement the light admitted beneath the margin of the aperture is admirably diffused and softened for vignette purposes.

IMPROVED SOLUTIONS FOR TONING PHOTOGRAPHIC PRINTS.

No. 17,768. RUPERT GREVILLE WILLIAMS, Greenfield House, Heywood, Manchester, Lancashire.—*September* 16, 1893.

MY invention relates to improvements in solutions and process for toning photographic prints, and is applicable more particularly to that class of prints which are known as gelatino-chloride, irrespectively of their having been printed from the negative upon gelatino-chloride printing-out papers, gelatino-chloride printing-out slides, or gelatino-chloride printing-out opals. I mean by the foregoing term, "gelatino-chloride printing-out," a paper, a slide, or an opal or other suitable surface prepared with a gelatino-chloride emulsion.

One of the objects of the invention is to replace the expensive salts of gold, platinum, and the like metals, which have hitherto been generally used, by potassium, sodium or ammonium sulphide.

The prints toned by my improved process are very permanent, and this permanence is the necessary result of the chemical reactions which take place during the said process.

The solution which I have found to be generally most useful for the purpose of the present invention consists of a mixture by volume of forty parts of ither potassium, sodium or ammonium sulphide, and 600 parts of strong ammonia liquor, which mixture is then made up to 2000 parts by the addition of water.

The proportions given in the preceding paragraph may be varied to any extent without departing from the invention, subject to the two following limiting considerations:—

With reference to the proportion of the sulphide:—The smaller the proportion, the longer will be the time which the process of toning will take.

With reference to the proportion of the ammonia:—As its function is only to keep the bath alkaline independently of the alkalinity imparted to it by the sulphide, any proportion capable of so keeping the bath alkaline will meet the requirement of my invention, and, on the other hand, excess of ammonia will not impede the process of toning, although too much will soften or blister the printing out.

The method of using the improved toning solution prepared as above described will be understood from a description of the way in which it is applied to a gelatino-chloride print which has been obtained in the usual manner.

After the print has been washed in cold running water for about half an hour, it is immersed in a mixture of about one volume of a saturated solution of sodium hyposulphite and three volumes of water containing a small quantity of ammonia. The print rapidly turns a bright canary yellow, and in a few minutes is fixed. All traces of the hyposulphite must then be removed by thorough washing, when the print is transferred to the toning bath, which is made up by adding one part by volume of the toning solution above described and fifty parts of water, in which it is moved to and fro for a few minutes, by which time it will have assumed a tone varying from orange-brown to chocolate-brown, according to the length of the immersion. The process just described must not be carried too far, otherwise unpleasing tones may be produced. The colour of the print after it has been dried is quite different to that which it had while wet. This being the case, it is advisable to keep a print which has been satisfactorily toned according to the present invention, and use a wetted portion of it as a guide. When the print undergoing the process of toning presents the same appearance in point of colour as the guide, it is removed from the bath, washed thoroughly, and then drained and dried. An additional alum bath, to harden the film, may often be used with advantage.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The hereinbefore-described process of toning gelatino-chloride photographic prints. 2. In toning solutions, the combination therewith of alkaline sulphide solutions in place of solutions of gold, platinum, or the like metals, as set forth.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 23	Camera Club	Charing Cross-road, W.C.
,, 23	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 23	Lantern Society	20, Hanover-square.
,, 23	North Middlesex	Jubilee House, Hornsey-road, N.
,, 23	Putney	Boys' Gymnasium, Charlwood-road.
,, 23	Richmond	Greyhound Hotel.
,, 24	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 24	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 24	Hackney	206, Mare-street, Hackney.
,, 24	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 24	Paisley	9, Ganze-street, Paisley.
,, 24	Rochester	Mathematical School, Rochester.
,, 25	Bath	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 25	Burnley	Bank Chambers, Hargreaves-street.
,, 25	Leytonstone	The Assembly Rooms, High-road.
,, 25	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 25	Southport	The Studio, 15, Cambridge-arcade.
,, 26	Camera Club	Charing Cross-road, W.C.
,, 26	Glossop Dale	
,, 26	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 26	Hull	71, Prospect-street, Hull.
,, 26	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 26	Liverpool Amateur	Percy-buildings, Eberle-street.
,, 26	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 26	Oldham	The Lyceum, Union-st., Oldham.
,, 27	Cardiff	
,, 27	Croydon Microscopical	Public Hall, George-street, Croydon
,, 27	Holborn	
,, 27	Maidstone	"The Palace," Maidstone.
,, 27	Swansea (Annual)	Tenby Hotel, Swansea.
,, 27	West London	Chiswick School of Art, Chiswick.
,, 28	Hull	71 Prospect-street, Hull.

North London Photographic Society.—October 3, Mr. Griffiths in the chair.—At the last meeting the subject of getting even toning results on P.O.P. was referred to by several members, and Mr. BISHOP now gave a demonstration of his manipulation of the paper. He used the combined fixing and toning bath made according to the original formula given by the Eastman Company for use with their Solio paper. He found the No. 1 hypo solution improved by keeping. The gold solution should be shaken up before adding it to No. 1. The prints should be printed rather deeply from plucky negatives, and not washed before being put into the toning bath. The prints must be examined by transmitted light, and when the brown colour disappears the prints are removed to the washing water. Mr. Bishop toned about a dozen prints with good results and the simplicity and rapidity of the manipulation was fully

appreciated. He preferred drying the prints on ferrotype plates in preference to glass. The plates required no preparation, and he never had any failures in consequence of the prints not coming off. If a matt surface is required, opal was preferred to ground glass for drying the prints on.

Hackney Photographic Society.—October 11.—An entertainment was given by the HON. SECRETARY (Mr. W. Fenton-Jones) entitled *My Italian Campaign*, or a trip from England to Italy by way of Paris, Marseilles, Rome, Nice, Geneva, Pisa, Florence, Venice, Naples, &c., which was illustrated by about 150 slides put through the optical lantern under the management of the Society's Lanternist, Mr. Albert Rose. Notwithstanding the inclement weather there was a numerous gathering of members and friends. The lecture was very instructive and interesting, and the slides, which were of excellent quality, were nearly all taken in a hand camera, those of Venice, Rome, and Mount Vesuvius calling for special comment, these being excellent both as regards composition and finish. The variety of subjects which were shown proves what a decided advantage and great range of subjects a hand camera can produce, for many pictures, such as those taken from the train along the route, would have been impossible to obtain with other than a hand camera. A voluntary collection was taken up on behalf of the Photographers' Benevolent Association, which realised 1*l.* 13*s.* 9*d.* A vote of thanks to the lecturer, which was proposed by Mr. C. Kemp and seconded by Mr. Puttock, brought a very enjoyable evening to a close.

Ealing Photographic Society.—The attendance at the Annual Meeting, held on October 5 at the Public Buildings), showed that interest in the Society was well maintained. The report and balance-sheet for the past year were unanimously adopted. It transpired that there had been a gain of eleven members during the year, making a total of fifty-one. A large and well-appointed dark room had been provided at an expense of about 25*l.*, more than half of which had been specially subscribed. The room, with all necessary apparatus and chemicals, was available for the use of members at any time without charge. Lockers could be obtained, if desired, at a yearly rent of 5*s.* Amongst the papers and demonstrations given during the winter session were the following:—*Photo-micrograph*, Mr. Charles White; *Sandell Plates*, Mr. S. Herbert Fry; *Gelatino-chloride Printing*, Mr. Mummery; *On the Improvement of Negatives*, Mr. R. Whiting; *Amidol as a Developer*, Mr. Morgan; *Exposure*, Mr. Howard Farmer. After discharging all liabilities, there was a small balance in hand. The officers and Council for the current year were elected as follows:—*President:* Mr. H. W. Peal.—*Vice-Presidents:* Messrs. C. Jones, W. T. White, T. Simpson, H. C. Draper.—*Council:* Messrs. Wakefield, Belt, Gregory, C. Whiting, and Drs. Gibbons and Phillpotts.—*Hon. Librarian and Custodian of Dark Room:* Mr. B. E. Peal.—*Hon. Treasurer:* Mr. A. F. Taylor.—*Hon. Secretary:* Mr. Murphy. It was decided to take immediate steps to provide an enlarging apparatus in the dark room capable of enlarging from whole-plate negatives and under up to 24×18. It was hoped that the apparatus would ultimately be furnished with the electric light. It was also decided to circulate portfolios of prints for criticism. It was notified that at the meeting on October 19 Mr. S. H. Fry would demonstrate the *Paget Printing-out Process.*

Putney Photographic Society.—October 2.—The VICE-PRESIDENT (Dr. W. J. Sheppard), in a short introductory address, briefly reviewed the progress made in photography during the past year. Referring to the Society, he said that, both in numbers and work, steady improvement had been made, and the remarkably good and enthusiastic meeting that evening showed plainly that there was a bright and prosperous future before it. He hoped the members would now shake off some of their modesty and compete at the open competitions this winter, as he believed their work certainly gave them a right to. The Society would hold an exhibition in December, and he felt certain if the members would all compete and send their best work, the show would be very successful. He had great pleasure in announcing the result of the summer competition for prints, the silver medal being won by Mr. Walter L. Colls, the bronze medal by Mr. H. Faulkner, and the certificate by Mr. W. Martin, jun. Three new members having been elected, were welcomed by the Vice-President, who introduced them to the meeting. A Committee was elected for drawing up rules and arranging the details of the proposed exhibition. Mr. ZACHARIASEN introduced a hand camera, designed by himself. After briefly stating some of the disadvantages connected with nearly every form of magazine camera, and the preference shown by many good workers for dark slides as being generally more reliable and suitable for good all-round work, he proceeded to describe his model. The only objections to the ordinary dark slide were, he thought, their bulk and weight, and perhaps more particularly the danger of stray light getting in when used in a hand camera, and frequently carried about for a considerable time with shutter of the slide drawn. To meet these objections he had constructed double dark slides weighing two and a quarter ounces and three-eighths of an inch thick; he was enabled to make this reduction in weight and thickness by the novel design adopted, in which the usual draw-out shutters and partition between the plates were dispensed with. But what he attached still more importance to was that all parts of the dark slide would, except when changing, be placed and manipulated in a light-tight chamber, so that the chance of any plate being fogged was absolutely *nil.* The camera shown was externally very like the ordinary box form, measuring five and three-quarter inches wide by four and a half inches high; it was made to hold twelve dark slides, each containing two quarter-plates. Proceeding to show the working, he opened a small lid at the back, inserted the slide in a groove, and shut the lid; when the slide is thus enclosed in the camera all that is required to make the exposure is to give a small lever on the outside of the camera a quarter of a turn. As this need only be done immediately before exposure, the sensitive surfaces are very efficiently protected against any dust which may find its way into the camera when travelling or carrying it about. A great safeguard against carelessness has been introduced here, as it was clearly demonstrated that it was quite impossible to withdraw the slide until it was securely closed. On examining the camera, it was seen that there was no delicate mechanism or springs to get out of order, and that the system was simplicity itself, merely consisting in inserting the slide and turning the lever. Mr. ZACHARIASEN said he had thoroughly tested the camera during a five weeks' tour in Norway, when about 150 films were exposed, without the faintest hitch or sign of fog in any one.

Richmond Camera Club.—At the weekly meeting, held at the Greyhound Hotel, Mr. Zacharasen showed a hand camera designed by him which, besides being light and compact, had some novel points. The plates are exposed in double dark slides of a new form, which are about half the thickness of the usual kind, and one third the weight. The slide is enclosed within a light-tight chamber in the camera, and the shutter of same opened from outside by means of a lever. Mr. S. H. FRY gave his lecture on *Lantern Slides with Gelatine Plates*, his remarks being chiefly concerning the Paget printing-out plates. He considered that the essential characteristics of a good slide were great brilliancy combined with great purity of tone. The shadows should be quite transparent, and there should be some clear glass in the picture. The question of colour was a most vexed one. At first, slides made on gelatine were cold in tone, but the result of several years' experience with them had made it possible to obtain almost any colour. For reduction purposes a fairly rapid plate was desirable, but to obtain the finest deposit the printing-out plates were the best. True, they were slow, but not as much as some believed, while a good method of development greatly overcame that objection. They could be slightly printed out and then developed, which, he thought, was the method giving the best results. He preferred a combined toning and fixing bath. It was essential to keep the bath either neutral or alkaline, hence he recommended the addition of a lump of chalk to it. To obtain warm tones on the ordinary lantern plates the exposure should be increased considerably, and carbonate of ammonia added to the developer, as it acts as a restrainer and colour-giver.

Ashton-under-Lyne Photographic Society.—October 4 and 5.—Dr. Hamilton, Messrs. Thomas Glazebrook, Samuel Woolley, and Robert T. Marsland gave an exhibition of stereoscopic views. Dr. Hamilton's contribution depicted views taken in Norway, Switzerland, and places visited by the Society during the summer. Mr. Glazebrook's were from the Isle of Man, North Wales, &c., including one or two very fine cattle studies. Mr. Woolley's views were mostly taken on the Society's rambles, and, as they were taken by his (own made) hand camera, many of them were a source of much amusement. One of the views, taken on the Marple ramble when at tea on the lawn at Joel Wainwright's, Esq., was very good. It was one of the Society's Vice-Presidents taking his last cup of tea, on the grass with an empty plate beside him, with a number of friends smiling around him. Another view was one taken on the Liverpool outing. It was at the time of the Liverpool assizes, and was taken from the top of the St. George's Hall steps as the Judge was leaving his carriage and coming up the steps. Mr. Marsland's views were nearly all taken on the river Dove, between Mill Dale and Hartington, with a few on the river Manifold. A large number of members and friends visited the rooms of the Society, and were very much pleased with the exhibition.

OCTOBER 11.—Mr. J. T. LEES gave a demonstration on *Lantern-slide Making.* There was a fair number of members present, and Dr. Hamilton, the President, in introducing Mr. Lees, said it had often been a matter of much curiosity and surprise to him to know what became of all the negatives of photographs when so many members of the different Photographic Societies were having rambles weekly all through the summer. He could not think that the whole of them were failures. One way of using those results would be shown by Mr. Lees. Mr. Lees, before giving his demonstration, had thrown on the screen a number of slides showing different faults in them, and pointing out where they could be improved. He also showed slides with clouds put on the cover glass, and then had the slide separated and showed the slide without cloud, thus showing the improvement by having a suitable cloud added to the slide. He then proceeded to expose and develop a number of plates on negatives provided by different members. He exposed six at once at different distances from the light, and after they were developed and fixed they were put into the lantern and thrown on the screen. He advised all new beginners to keep to one good brand of plates and one developer, and if they persevered they would in time become successful.

Gosport Photographic Society.—October 11, First Annual Meeting.—The position of the Society is regarded as thoroughly satisfactory, and during the year the membership has considerably increased. Special demonstrations and excursions have been held on various occasions, and were much appreciated. The Treasurer's account showed a balance of 10*s.* 11*d.*, and there were also outstanding subscriptions amounting to 1*l.* 2*s.* 6*d.* The heavy expenditure this year was caused by the purchase of apparatus, &c., which it was necessary to have. After the usual votes of thanks, Mr. Morrish proposed, and Mr. Churcher seconded, the election of Mr. R. E. Froude as President for the ensuing year. This was carried unanimously. The other officers elected were:—*Vice-Presidents:* Rev. L. J. Matthews, Mr. George Churcher, and Mr. T. E. Williams, R.N.—*Council:* Messrs. S. W. Furze-Morrish, H. Fisher, A. Fisher, E. Tucker, V. W. Misselbrook, and W. Moss.—*Hon. Treasurer:* Mr. W. B. Smith.—*Hon. Secretary:* Mr. Reginald E. Green, 8, Chapel-row, Portsea.

Leeds Camera Club.—This Club, formed a few weeks ago, has already attained most satisfactory dimensions, and promises to become one of the most popular and energetic Societies in the provinces. At the last meeting, held in the Club's rooms at the New Waverley Hotel, Call-lane, on Thursday, the 12th inst., seventeen new members were elected, and donations to the Club's Album, Question-box, Notice-board, Minute-books, &c., were promised by various members. The meeting gave its approval to a capital syllabus (which includes lectures, demonstrations, lantern exhibitions, and musical evenings), drawn up by the Committee for the coming session, after which a very instructive paper on *Exposure* was read by Dr. Thresh, the President, which was followed by an interesting discussion thereon. Next meeting, Thursday, October 26, at eight p.m.; subject, *Flashlight Photography*, by Monsieur A. Homburg.

Leicester and Leicestershire Photographic Society.—The Winter Session of this Society was very successfully opened on Thursday evening, the 12th inst., when a highly instructive lecture was delivered by Mr. H. COWDELL, one of the members of the Society, entitled *Snap-shots in the East*, illustrated with seventy lantern slides depicting scenes, manners, and customs of the Eastern people, all taken from negatives obtained by Mr. Cowdell with a snap-shot camera on his journey to Constantinople, Athens, Smyrna, and the Levant. The slides as they appeared on the screen were described with that piquancy and detail which can only be attained by personal acquaintance with the various subjects. The slides were mostly of a high-class character, as might be expected from an operator who has made this branch of the art his study, and altogether the lecture was highly successful, and may be taken as a happy augury for the progress of the Society during the ensuing season. The Mayor's Parlour, Old Town Hall, was quite filled with an interested audience, and at the close of the lecture a hearty vote of thanks was proposed by Mr. Matthews (Wigston), seconded, and carried with acclamation. Before the lecture the usual formal business was transacted. Nine members were proposed for ballot at next meeting, and one elected, and the members may be congratulated on the prosperity which is attending the efforts of the officers of the Society.

Rotherham Photographic Society.—October 3, Annual Meeting. Dr. Baldwin (President) occupied the chair.—The HON. SECRETARY presented the fourth annual report, which stated that the Society had increased in membership and local importance. It had become affiliated to the Photographic Society of Great Britain, had received official recognition from the Rotherham Corporation, having, by invitation, furnished a room in the newly opened public museum in Clifton Park, and had inaugurated a photographic survey of the district. As to the general work of the Society, there had been indications of improvement. Members were, however, urged to furnish negatives and prints for criticism, and to make fuller use of the question-box. The average attendance at the fifteen ordinary meetings held had been nearly nineteen. The papers and demonstrations had proved of great interest, while the four excursions—Ingleton, Wyming Brook (Sheffield), Roche Abbey (Rotherham), and Wingfield Manor (Derby)—were popular. The annual Exhibition in the early part of the year was very successful from a photographic point of view, and received a fair amount of public patronage. The opening ceremony was performed by Lady Albreda Fitzwilliam, herself a follower of the art-science. Acknowledgment was made of various journalistic contributions. The membership had increased to fifty-one. The report and balance-sheet (also presented) were approved. The balloting for the Council resulted as follows:—*President:* Dr. F. B. Judge Baldwin.—*Vice-Presidents:* Messrs. E. Isle Hubbard, W. H. Haywood, and G. T. M. Rackstraw.—*Hon. Secretary:* Mr. H. C. Hemmingway.—*Hon. Financial Secretary:* Mr. W. H. Shephard; Messrs. J. Leadbeater, W. Mason, J. W. Whittington, I. Wright, and W. Firth. Four new members were afterwards elected. The short time at the disposal of the meeting after the conclusion of the business was devoted to lantern-slide examinations and criticism.

Widnes Photographic Society.—October 11, Mr. V. C. Driffield presiding.—A paper was read by the Vice-President, Mr. G. J. Warner, F.C.S., on *Photography, Past and Present, and Hints to Beginners.* He briefly described the progress of the last twenty years, and compared the results of the collodion process with the present, advising beginners to use only slow plates, and to endeavour to obtain an accurate knowledge of the exposures required under varying conditions of light. He pointed out the objectionable yellowness of many old gelatine negatives, rendering them unfit for printing, and showed what were really the qualities of a good negative. The great advantage of plates correctly labelled and their relative sensitiveness was dwelt upon, and the necessity for the introduction of exact methods of work. The paper was illustrated by a number of prints and negatives extending over a long period. Five new members were elected.

Glasgow and West of Scotland Amateur Photographic Association.—October 16, Mr. Wm. J. B. Halley, President, in the chair.—Twenty-nine new members were elected. After the formal business was disposed of, the President addressed the meeting, referring briefly to the satisfactory position of the Association and the prospects of the session now opening. Mr. Stewart Smith, Vice-President, read a paper on *Enlarging*, and exhibited his apparatus suitable for daylight or limelight. At the conclusion of his paper, he made some exposures by limelight, and showed how to print-in a sky from a separate negative. Arrangements for the Annual Exhibition of members' work were discussed, the opening day being fixed for December 22. In connexion with this Exhibition, medals will be offered for sets of lantern slides with suitable lecturettes, which must be delivered before the Association during the session. The meeting terminated with the usual show of members' lantern slides.

Photographic Society of Ireland.—October 13, Professor J. A. Scott (President) in the chair.—The Society removed from the old rooms at 15, Dawson-street, Dublin, to more commodious premises at No. 35, in the same street. This being the first meeting of the session, and after the ordinary routine of the business was gone through, the PRESIDENT, in eloquent terms, welcomed the members and visitors, who together formed a good gathering, to the new premises, and in the course of his remarks referred to the past work of the Society, its present position, and the work to be done by its members in the future. After having touched upon many topics of interest, Dr. Scott notified to those present that the meeting of the Photographic Convention of the United Kingdom was to be held in Dublin next year, and further stated that members should give every assistance and make themselves useful in whatever way inclined towards making the Dublin meeting on a par with any of the former ones, and making it of special interest in order that Irish photographers might extend a very hearty welcome to a large number of their British brethren. Some very good slides were afterwards shown on the screen by the following gentlemen:—Mr. Corry, Mr. J. A. C. Ruthven, Mr. J. White, also some coloured slides by the President. Messrs. Hargrave and Cooper officiated at the lantern.

FORTHCOMING EXHIBITIONS.

1893.	
October 20–31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 20–Nov. 11...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
,, 20–Nov. 15...	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
,, 30, 31	*East London Photographic Society, New Tabernacle, Old-street, E.C. Hon. Secretary, W. R. Gould, 61, Gibraltar-walk, Bethnal Green, E.
November 7–11	*South London Photographic Society. Hon. Secretary, C. H. Oakden, 51, Melbourne-grove, Dulwich, S.E.
,, 20–25.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18–Jan. 22, 1894	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

PHOTOGRAPHIC PERSPECTIVE.

To the EDITOR.

SIR,—Mr. Debenham's diagram is quite correct, and, indeed, represents a truism. But I must say that, being familiar with dogs, and breeding dogs, all my life, I cannot possibly conceive a six foot square kennel raised thirty feet from the ground. When Mr. Debenham, after writing about houses at a distance, likened them to "a row of dog kennels so near at hand and at such an elevation as to bear the same relation to the eye that the houses do in the first case," it never occurred to me that the parallel as accepted by Mr. Dennis Taylor presupposed that, to fulfil Mr. Debenham's conditions, the kennels were to be raised in the air and shifted to the right or left, or else the houses sunk into the ground instead of the observer's standpoint being altered. If that be granted, the rest is simple mathematics.

I read Mr. Debenham's remarks to refer to a row of houses and a row of kennels on a level plane. Certainly no more than this is involved in my original reference to the subject, and I repeat that under such conditions no change of position of the observer or camera would enable coincident perspective lines to be taken.—I am, yours, &c.

FREE LANCE.

WARMING THE DARK ROOM.

To the EDITOR.

SIR,—Under the above heading you inserted, in your issue of Sep. 29, a letter from me, recommending George's "Calorigen," and in this week's JOURNAL your correspondent "L. M." cautions your readers that I am "wrong in one or two points," but abstains from enlightening us upon what points. From the context, however, it would appear he falls foul of my assertion, "They will not answer connected with an ordinary chimney;" for he informs us that, eighteen years ago, he had a grate taken out and a George's Calorigen placed in the ordinary fireplace, and that it has worked ever since with perfect success—presumably in the same position.

It would have been better if "L. M." had stated more clearly where I was wrong; but, as the whole point of the paragraph lay in the statement they require "*two* openings making in an outer wall," the only legitimate inference is that he has placed his Calorigen in an ordinary fireplace *without two* communications with the external atmosphere; for obviously I laid no restriction on the actual position of the stove, "if this requirement" (two openings) "can be complied with." The chimney can be, and is sometimes, used as one of the necessary openings; but, for reasons given later (see sub-paragraph *b*), this mode, if it can be avoided, is undesirable; I much prefer to use the chimney as an extractor.

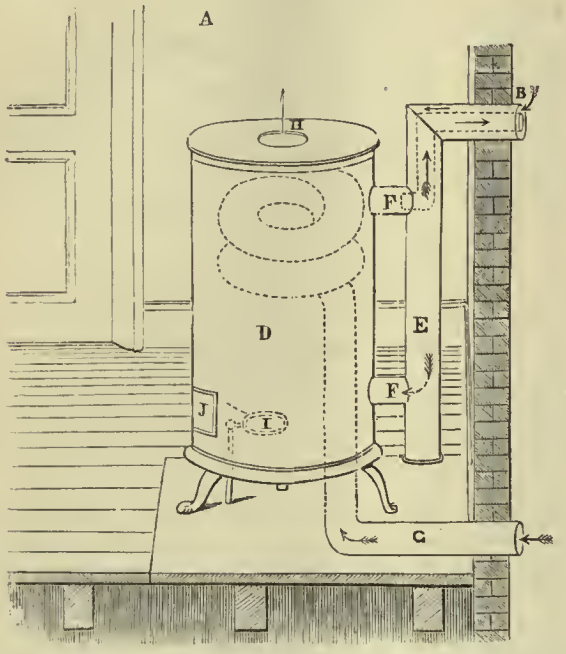
I do not for a moment question that, placed as "L. M." leads us to suppose he has placed his, the gas will burn and the room be warmed—indeed, heated more than if the stove be placed as I stated it should be. But I do assert most emphatically it is putting a really scientific invention to a degraded use, and one never contemplated by the inventor.

It reminds me of a case that came under my own notice a few years ago in Leeds. The committee of an Institute had gone to considerable expense in putting in Tobin's tubes to ventilate their lecture hall; the result, at first, was all that could be desired, but presently the benefit seemed *nil*. When I came to examine the place, I found every tube

stuffed up with brown paper. Upon asking the attendant for an explanation, he informed me had filled them up "*because they let in such a lo of air!*"

"L. M.'s" case is on all fours with this. For all practical purposes, George's Calorigen is a warm-jacketed Tobin's tube, and certainly does, when properly fixed, "let in a lot of air," which was the inventor's intention; but, perhaps, "L. M." prefers warmth to fresh air.

For the benefit of any one thinking of purchasing a stove, let me explain:—



The stove consists of a cylinder, D, containing a ring of ordinary union gas jets, I; these are lighted through the door, J, which is then closed *air-tight* by means of an asbestos packing, the two openings in the side of the cylinder supply the necessary air to the gas, G inlet, H outlet, both these should be carried by pipes through the wall, direct to the external air (these are the connexions sometimes made with the chimney, but as explained later it is an undesirable mode). It will be seen that thus the gas burns in a chamber absolutely cut off from all communication with the apartment, A, and contamination of the atmosphere is impossible. Inside the cylinder is a tube coil, for the admission of fresh air, the coil being over the flame, the lower end passes through the bottom of stove *and the wall of the apartment*, direct to the external air, the upper end opens into the apartment.

The action is this:—When the gas is lighted, an upward current is established in the coil, fresh air is drawn in from outside, is heated and passed upwards into the room. Thus, not only is the apartment warmed, but one of the main difficulties of ventilation overcome, viz., fresh pure air is introduced without the creation of chilly draughts and all other currents are *from within the room, outwards;* no mean advantage.

There has always been a difficulty in gas stoves drawing their supply of air from the room, and discharging to the outer air; shifting winds, sudden gusts, &c., so alter the balance of pressure between the inside and outside atmospheres that instances are not unknown of the gas flame being actually blown out, and most of us have at times seen a blowing forward of the flame from down draught. In the George's Calorigen, properly placed, this difficulty is ingeniously overcome by the outlet pipe, F B, being placed inside the inlet pipe, J F, the area of both pipes being approximately the same, with the result that whatever affects the pressure on one affects the other equally, and leaves the gas flame perfectly undisturbed.

Now, what happens with L. M.'s stove?

If it has no communication with the external air excepting by the chimney, it must (almost) be set in one of three ways:—

(*a*) F communicating with the chimney, B and G, with the room.
(*b*) F F communicating with the chimney, H, with the room.
(*c*) B, G, H all communicating with the chimney.

If *a*, the supply of air for the gas is drawn from the room, there is risk of contamination by down draught, and the atmospheric pressure is reduced, causing the balance to be restored by cold and often vitiated air rushing in from chinks in the floor or skirting board, or under the door.

If *b*, there must be a double current in the chimney, up and down, and very probably the gas is supplied with air strongly impregnated with carbonic acid, the result being imperfect combustion and reduced duty per cubit foot burnt. Also the ingenious arrangement of putting the tubes, F and F, one within the other must be omitted.

In both *a* and *b* arrangement, the coil is useful as a warming agent, but absolutely useless as a ventilator, the vitiated air of the room merely passing and repassing through the coil.

If *c*, The position would be too absurd to contemplate, the foul air from F merely passing into the chimney to be drawn back into the room through G.

In all systems of heating and ventilating, there ought to be provision made for both ingress of pure air and egress of foul; unfortunately, so far as I am aware, no gas stove is made that in itself provides both. George's draws air in, Fletcher's and others draw it out; but one being provided (ingress or egress), the other is usually left to chance or to a separate apparatus. It would be an interesting experiment to fix a calorigen in all particulars as I have described, excepting that the tube I, supplying air to the flame, should terminate in the apartment, the end being closed by a delicately-balanced swing valve opening *inwards*, to guard against back draught. Such a stove should keep the supply and pressure of air pretty constant, as much vitiated air being drawn over the flame as the coil admitted pure from the outside.

You, Mr. Editor, in your leading article this week on this subject, "sit" somewhat unmercifully upon my recommendation of the so-called syphon stoves; this letter is already far too long for me to trespass further on your space, but with your kind permission I may have a word to say in reply on a future occasion.—I am, yours, &c.,

Park Royd, Halifax, October 9, 1893. EDWARD J. SMITH.

P.S.—Messrs. Farwig & Co.'s address is No. 1, Upper Thames-street, not number 4.

DEVELOPMENT OF PARTLY PRINTED GELATINO-CHLORIDE PRINTS.

To the EDITOR.

SIR,—My attention has just been called to an article in the *Photographic Times* of New York (September 29, 1893, page 544), by Mr. Walter E. Woodbury, in which the writer describes the method of developing gelatino-bromide paper recently shown and published by us, giving exactly the same formula for development.

As this article is unfortunately, although no doubt unintentionally, worded in such a way that the reader may suppose that Mr. Woodbury claims the method as his own discovery, and as such supposition places us in a position requiring explanation, I will ask you to kindly allow me to state the following facts:—

The process was discovered by us more than a year ago, and Mr. Woodbury being in our employment it was shown to him, under promise of secrecy, some time last winter. I do not know the exact date, but certainly before he left our service in February.

On February 21 we deposited a sealed paper containing a description of the method with Mr. H. Sturmey, Editor of *Photography*, who, at our request, recently published it in *Photography*, October 5 and 12, together with a statement of how and when it came into his possession.

Why Mr. Woodbury has now published the process without our knowledge or permission I do not know, and can only suppose that in the change and excitement of his new position, and after the lapse of so many months, he had forgotten the circumstances under which he became possessed of the information. This seems the more likely, as he appears to have also forgotten an important detail, giving, as he does, "iodide" of potassium instead of "bromide" for the preliminary bath. Iodide is practically useless for the purpose.—I am, yours, &c.,

WM. J. WILSON,
Paget Works, Watford, October 14, 1893. *For Paget Prize Plate Co.*

MR. STILLMAN AND MR. BLAIR.

To the EDITOR.

SIR,—I regret that Mr. Stillman feels compelled to say in your issue of September 29 that "Mr. Blair neither comprehends clearly nor represents fairly" what he wrote in his letter published in your issue of July 21. I always supposed that the judges of open letters were the readers. If the first twenty or thirty lines of his letter referred to will be re-read, I think it will be concluded, by those having a knowledge of what it is "to make photography a practical affair," that I understood what he *wrote*. Whether I understood what he meant or not is another matter. It is quite apparent to me, from the reading of Mr. Stillman's letter in the September 29 issue of your JOURNAL, that he threw down the gauntlet too vehemently, and I have no desire to follow further. If Mr. Stillman was a producer of the articles which are relied upon "to make photography a practical affair," it would be easier to discuss with him. He would then realise the difference between a formula which will make a plate or film for an amateur's own use and one that makes photography by the masses practical. The same may be said regarding apparatus.

Fearing that Mr. Stillman did not mean just what he wrote, I was careful to say, in the commencement of my letter, what I understood him to mean as follows:—

"By making 'outdoor photography a practical affair,' I presume Mr.

Stillman means adapting it to be used by the masses; for photography as practised by some of the best workers is not the result of the apparatus, plate, or paper maker. Nor do I understand Mr. Stillman to mean the men who first conceived the idea of a sensitive plate without the silver bath. The knowledge of making a dry plate lay unused too many years to give to its discoverers (if such gradual gathering of knowledge could be called a discovery) the credit of the dry plate of to-day."

I will abide by the judgment of your readers, and regret deeply that the question of to whom the greater share of honours belongs should arise.—I am, yours, &c., T. H. BLAIR.

London, October 13, 1893.

WOOLWICH PHOTOGRAPHIC SOCIETY.

To the EDITOR.

SIR,—We should like to inform your readers residing in the vicinity of Woolwich that the winter season of the Society will commence the 26 inst., with the annual business meeting, and continued the second and fourth Thursdays in the months to April inclusive. We have been enabled to draw up a good programme, and a cordial invitation to attend the lectures, &c., is given to all who are interested in photographic work.

The Hon. Secretary will be pleased to receive the names of all who wish to join us and to answer any inquiries respecting the Society.—I am, yours, &c., JOHN BOATHWICK PARTING,

3, *Friars Villas, Old Charlton, S.E.* *Hon. Secretary.*

October 16, 1893.

THE BENEVOLENT.

To the EDITOR.

SIR,—We have very many applications for the loan of a camera, or money to purchase a second-hand camera, from men who are perfectly willing to work, but who have been forced down by illness and other circumstances. If any of your readers had old apparatus that is still light-tight, though otherwise superannuated, we could make good use of it; and as our grants this year have far exceeded our income up to the present, and as we have in prospect many urgent applications, owing to the extremely bad photographic season, we feel loth to spend money on even the cheapest of second-hand cameras, if we can obtain old disused ones from sympathisers.—Yours faithfully, for the Committee,

H. SNOWDEN WARD, *Hon. Sec.*

P.S.—Stout soled boots, clothing, and hats we can well dispose of if any readers can spare them.

Memorial Hall, Ludgate-circus, E.C.

THE ACTION OF A LENS SIMPLY EXPLAINED.

To the EDITOR.

SIR,—I am much surprised and pained at your remarks in the issue of August 25, in which you practically accuse me of using Mr. Wm. Taylor's article and appending my signature thereto. In reply, I would inform you that my article on "The Action of a Lens Simply Explained" was written partly from notes and principally from my article on lenses in my *Encyclopædia of Photography*, which portion was written some five or six years ago. I have not a copy of Mr. Taylor's article, and therefore do not know how far my article resembles his, but would say that, as it is merely a written statement of the fixed laws governing the action of a lens, it is not unlikely to be similar to another article exactly on the same subject. With regard to the diagram, I discovered it among some scraps and cuttings. I sent it to the artist as a guide, with directions for a number of alterations to suit my article as first written. Except in one instance, however, these instructions were not carried out, so that the cut had to appear nearly the same. As it is an illustration of a ray of light passing through a lens, I should imagine that there was not much scope for variety.

With regard to my own article, I claim nothing original about it. The subject has been written upon thousands of times, and, so long as there are beginners in the art, will, no doubt, be written yet another few thousand times.—I am, yours, &c., WALTER E. WOODBURY.

New York.

[Having drawn the attention of Mr. William Taylor to the matter referred to in the preceding letter, we have received the following reply.—ED.]

DEAR SIR,—I have to thank you for calling my attention to a paper contained in the Convention number of the *Photographic Times* of New York, and pretending to be written by Mr. Walter E. Woodbury.

As a specimen of cool and impudent plagiarism, this work of Mr. Woodbury's is a model.

The paper, which is entitled *The Action of a Lens Simply Explained*, is a garbled transcript of a paper entitled *The Principles of a Lens Action* which I wrote several years ago, and which has been published in the *Amateur Photographer* and in all recent editions of my firm's catalogue of photographic lenses. (Taylor, Taylor, & Hobson.)

It is true that Mr. Woodbury has taken pains to say "the boy is not so tall as the man" where I have said "the man is taller than the boy," and that my diagram is shown with black lines on a white ground instead of with white lines on a black ground. This is very clever of Mr. Woodbury, and displays the character of his sparkling originality.

But from first to last, with slight periods of digression, and where there is embodied other matter whose origin is equally indisputable, the paper reads side by side with my own in the following way:—

Original.	*Plagiarism.*
As sound is transmitted by wavelike motion of the air, so is light transmitted by the wavelike motion of certain ether filling universal space.	As sound is transmitted by a wavelike motion of the air, so is light transmitted by the wavelike motions of this luminiferous ether.
A surface capable of being seen must be to some extent rough. The roughness acts in this way: Waves of light meeting the surface and reflected from it are broken up by the rough particles. Each projecting particle becomes a centre from which reflected waves of light spread out in all directions.	Waves of light meeting the surface of an object, provided it be to some extent rough, are broken up. Each particle becomes a centre from which waves of light are reflected and spread out in all directions.
The angle of view of a lens is determined by the relation of its focal length to the measurement of the image which it can usefully define.	The angle of view of a lens is determined by the relation of its focal length to the measurement of the image which it can best define.

I fancy the name of Mr. Walter E. Woodbury was not unknown to me before, but it is a surprise to find him capable of such a thing as this. It will be well for American Photographic journalism to purify itself from such impostnre and impostors.

We are accustomed to look upon America as the peculiar home of men like Mr. Woodbury, but I cannot think that the responsible owners and editors of American photographic journals contemplate with satisfaction such conduct.—I am, yours, &c., WILLIAM TAYLOR.

Taylor, Taylor, & Hobson, Slate-street Works, Leicester.

October 16, 1893.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—On my return from the Continent, and on looking through the catalogue of the parent Society's Exhibition, I find Messrs. Thevoz's book, *Zermatt*, classified as an apparatus. Here we have a new departure altogether, and about the first successful attempt to combine photography and its best application, "phototype," with letterpress. Nothing of the kind has ever been seen in the Photographic Society's rooms, and, I presume, because it cannot be hung on the walls, it is put down as an apparatus. The book is a production of art, and was not intended to be exhibited as "an apparatus."—I am, yours, &c. J. R. GOTZ.

19 *Buckingham-street, Strand, London,*

October 11, 1893.

THE MADRAS EXHIBITION.

To the EDITOR.

SIR,—Will you kindly allow me to state, for the information of intending exhibitors at our coming show,—

1st. That all pictures should be addressed to the care of the Hon. Secretary, Amateur Photographic Society of Madras, Royapuram, Madras.

2nd. That no forms of entry are required, but a list of titles for catalogue should reach me by November 20, 1893; the list should also state the particular prizes for which the pictures are competing.

Thanking you in anticipation for your courtesy, I am, yours, &c.,

FRED. DUNSTERVILLE, *Hon. Secretary.*

Amateur Photographic Society of Madras, Royapuram,

Madras, September 27, 1893.

THE FORFARSHIRE EXHIBITION.

To the EDITOR.

SIR,—The Committee of the now permanent Photographic International Exhibitions for Forfarshire for the advancement of photographic art for Forfarshire are to hold a Lantern-slide Competition in December and January next, and we shall be glad to receive slides from exhibitors. Open to all classes of photography, and to the best sets of six. The Forfarshire medal will be awarded. Particulars can be had of myself at Arbroath. I may also inform you that you may enter us in your new Year-book the officers of the above. Mr. James Watson Craik, is Local Secretary.—I am, yours, &c., W. J. ANCKORN.

THE SALON.

To the EDITOR.

SIR,—Will you kindly allow me space to correct a few inaccuracies in your notice of the Photographic Salon? You say that "the exhibits are the work of about 110 persons, *nearly half of whom* (the italics are mine), singular to tell, are also exhibitors at Pall Mall." The real facts are that out of 108 exhibitors at the Salon, 27 are also exhibitors at Pall Mall. Again, "We have already made the acquaintance of many of the pictures at other exhibitions." Out of the 294 pictures, only 11 have been previously exhibited anywhere, and even this applies, in the case of 9 of them, to the private exhibitions of the Camera Club. May I also be allowed to say that the Photographic Salon is no more intended to supplement the Exhibition of the P. S. G. B. than, for instance, is the Congress of that Society at the Society of Arts intended to supplement the annual Conference of the Camera Club held at the same place. You state that "the *raison-d'être* of the Salon rests on the most slender support, and the continuance of a second Exhibition, either in a rival or supplementary capacity, is out of the question." The predictions of last year, which have already been falsified, entitle us, I think, sir, to disregard such sombre prognostications, and, when we consider the support which the public have already given to our enterprise (a support far beyond our most sanguine anticipations) and the very general chorus of satisfaction expressed both by it and the public press, it is surely unwise to prophesy concerning the continuance of a successful Exhibition which has avowedly been instituted as the *first* of a series.—I am, yours, &c.,

ALFRED MASKELL.

Dudley Gallery, Piccadilly, W., October 17, 1893.

Answers to Correspondents.

J. DORMER.—Thanks.

A. J. GRIFFITHS.—Next week. Why not address your letter as directed?

G. W. O.—We fear that we cannot recommend any safe reducer for over-printed platinotypes.

COLLO.—You will find directions for working the collotype process at page 518 in the ALMANAC for 1893.

W. T. M. D.—You may find the information in Mr. W. T. Wilkinson's book; see also articles in back numbers of this JOURNAL.

JOHN SELF.—Possibly Messrs. W. A. Mansell & Co., Oxford-street, can supply you with oleographs and pictures of German production.

RAVEN.—A drachm was, doubtless, meant. Mix a portion of A with B and then redissolve the precipitate with the remainder of A.

J. G. RITSON.—Let the prints stop short of being quite dry and then pass through a burnisher, the roller of which is heated, several times.

B. COLLOTYPE.—1. Treat the prints successively with albumen and methylated spirit. 2. Solution of hydrofluoric acid will answer for stripping the films.

C. P. P.—1. Precipitate the gold by means of solution of proto-sulphate of iron. 2. We have found metol admirably suited for both time and instantaneous exposures.

PLATE TROUBLE.—See the pages of the ALMANAC, where several clearing solutions are recommended. It would appear that you do not use any preservative for your pyro.

D. S.—The white deposit on the Daguerreotype after cleaning is, in our opinion, caused by not having completed the final washing by *distilled* water. This is absolutely necessary.

F. W. R.—There are a number of magnesium flash lamps on the market suitable for the purpose. We cannot recommend any particular one. Consult the catalogues of the dealers.

JELLY says: "Will you inform me of any process by which gelatine can be hardened and made insoluble in water?"—Yes; mix chrome alum with it or bichromate of potash, followed by exposure to light.

INQUIRER (York).—Aluminium powder may be obtained from Mr. Horne, 2, White Horse-alley, Cow Cross-street, E.C. The metal can be had from the Phœnix Metal Co., Stamford-street, S.E., but we do not know if in the form of very fine wire.

T. T. SIMS says he has a new leather camera case that smells very unpleasantly, and asks if there is any way by which the smell can be destroyed. We know of no better way than exposing it freely to the air. Try keeping it out of doors, where the sun has free access to it, if possible.

RICHARD.—1. We cannot tell the cause of the discolouration—possibly the albumen was in bad condition. 2. We should think that if a Royal Prince had specially allowed you to photograph him you would be within your right in using the words "Under Royal Patronage."

HACKNEY AMATEUR.—Print a few sets of clouds on cover glasses. Let them be of different forms and degrees of density. Superpose them one after the other on the lantern slide, and select that which best harmonises with the subject of the picture. See also a note on this subject among our leaderettes.

T. CARPENTER.—We should say that, from the behaviour of the solution when it is spread on the paper, the gelatine contains grease. That is by no means an uncommon fault with gelatines of foreign manufacture. Try a similar preparation, but employing an English gelatine, say, Nelson "No. 1, Photographic."

A. P.—Possibly an unsuitable mountant was employed in the case where the prints deteriorated. If it was the same mountant throughout, we fear we cannot account for it.

D. W. A.—Glucose can be had from any operative chemist. When obtained from this source, a reliable article for experimental purposes can be relied upon. Glucose, in the form of a syrup, is an important article of commerce, and is largely used in confectionery, but it is not to be recommended for photographic purposes.

C. ROWE complains that last week he bought some gelatino-chloride paper at a photographic warehouse, and, upon opening it, he found it was discoloured and spotted; and from the date, or what was assumed to be a date, upon the package, it had been made over a year. No doubt, if this were pointed out the paper would be exchanged.

ALFRED R.—If a satisfactory likeness, as per circular, is guaranteed, we don't see how you can refuse a resitting if the sitter and friends do not approve of the portrait. The fact that the photograph is a good one in no way ensures a "satisfactory likeness." Most photographers consider it a matter of policy to please their sitters, although at times it is difficult to do so.

J. WITHERBY.—In the first attempts at photographic engraving it will be better to get the plates proved by a regular copper-plate printer. Although copper-plate printing seems very simple work, considerable skill is required on the part of the workman to get the best results from a given plate. A novice might mislead himself, as to the character of his plates, by his want of technical knowledge in the printing.

C. FOWLER.—The fault is not in the paper, but in the toning of it. You have taken the prints out of the bath as soon as they have acquired the tone desired when looked at by reflected light only. The tone of gelatino-chloride prints should be judged of by looking through them. The tones then seen will be much the same as they are in the finished picture when viewed by reflected light. Under-toning is the only fault.

C. H. C.—It is no use attempting to work the collotype process in the way proposed. A properly constructed drying box is an essential, as the plates must be dried in a horizontal position and not standing upright. Temperature, during the drying, is an important factor in the process, and means must be provided for regulating it. Extemporised arrangements should be avoided by the novice in his first attempts at collotype.

R. S. O.—The print in question is a collotype of inferior quality, and we should say was produced at a very cheap rate in a power press. We judge this by the coarseness of the grain. A coarse open grain can be printed from at a much quicker rate than one that is finer. With regard to the second query, machine collotypes can be produced quite as good as those by the hand press, but they require greater skill in working, and the press must be worked at a comparatively slow speed.

W. MASTER writes as follows: "I am experimenting with what I think is a new method of making typographic blocks. I have hitherto been using lead for the casting, but now I want to try with the same metal as that used by the stereotyper. On inquiring at several metal shops in different parts of London, I was told that I should have to make it for myself, and this I have no convenience for doing even if I knew how. Can you tell me anywhere where the metal can be purchased ready for casting?"—Our correspondent has been applying at the wrong places. He should have gone to a stereotyper's. We have little doubt but that any stereotyper will supply a small quantity of the metal he uses for experimental purposes.

I, 2, 3 says: "After developing some carbon pictures on the patent flexible support, and drying them, I applied the double transfer paper, just as I did with some pictures I produced on glass some years ago; but, when the transfer paper was dry, I could not get the picture to separate from the support, not even after soaking in water for two or three hours. Can you give me any reason for my want of success?"—The cause of the picture sticking is that the support was not waxed; or, if it was, not sufficiently so. In using the flexible support for the first time, it is a good plan to thoroughly wax it, according to the directions given with it, and, after it has stood for an hour or so, to treat it a second time. After the first time of using, a slight waxing only is necessary.

SUSSEX says: "I have a large glass dipping bath that was used in the collodion days, but it was left during the winter with some water in it, which froze and cracked the vessel from top to bottom. Do you know of any means of so repairing it that it could be used as a fixing bath for dry plates, as it would then be most useful to me? I may say that the crack is not open enough to run any cement in it."—The bath can be repaired in the following way: First stick a narrow slip of gum paper over the crack on the outside; then get a wooden case made three quarters of an inch larger inside than the bath is outside. On the bottom of the case—inside, of course—put a couple of strips of wood three-eighths of an inch thick for the glass to rest on, and similar strips at the sides and ends. Then pour into the intervening space melted pitch, or, better still, paraffin.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1747. Vol. XL.—OCTOBER 27, 1893.

AN IMPEDIMENT IN POPULARISING THE STEREOSCOPE.

The impediment hinted at arises out of the stupidity of photographers themselves. There are numerous photographers who, not certainly from any desire to do so, but from sheer carelessness or ignorance, act in the mounting of their pictures as if they were determined to do all that lay in their power to disgust the public with their productions, by trimming and placing them on their mounts in such a way as to render it quite impossible to see them properly in a stereoscope of the verage class.

We, and every intelligent writer and teacher on this subject, have invariably taught that, if the distance at which the two halves are mounted apart exceed three inches, such a difficulty in getting the prints to coalesce will be experienced as may lead to their unhesitating condemnation. We can sympathise with the desire of those who, having obtained a negative replete with beauty from side to side, are averse to having, as they imagine, its beauty marred by a rigorous cutting down of its sides; but it is altogether a mistaken liberality which prompts them to fill their mounts with pictorial subject, for this is the kind of generosity which impoverishes not the giver, but the receiver, as such a picture serves no good purpose, but only strains the eyes of the unhappy owner, who vainly strives to see the combination stereoscopically.

As we have often said, there is no limit to the vertical dimensions to which a stereoscopic pair of prints may be trimmed, should the subject demand it, such subject being a tall building, a ravine, or other object of like nature. But, as regards lateral dimensions, the case is altogether different, and it is in this respect where so many blunders are made.

We take it for granted that every photographer at least desires that his friends shall be able to see and examine his binocular efforts without trouble or pain—nay, more, that they shall do so with such readiness as to be insensible of putting forth any effort in doing so; and the object of this brief article is to urge in bringing about such a state of matters, more especially as this is so easy of attainment.

The condition requisite for the average human eyes seeing the stereoscopic effect of a picture at first sight, and without any straining of the muscles of the eyes, is merely to see that the distance of an object *in the foreground* of one picture from the same object in the duplicate does not exceed three inches. It would still be better were this distance an eighth to a quarter of an inch less. We say "in the foreground," because if a foot rule is passed over the near and the distant objects embraced in a binocular photograph, it will be found that similar objects in the foreground are separated to a greater extent than those in the distance; and that, whereas the former may be three inches apart, the objects in the extreme distance may not exceed two and a half inches. As a general rule, the nearer, within moderate limits, the elementary portions of the stereoscopic pair are placed together, the more easy is it for the eyes of the spectator to effect their coalescence.

But, if three inches be exceeded, the difficulty of effecting this is increased in a rapidly increasing ratio, until, when it reaches three and a half inches, coalescence becomes impossible to all but trained eyes, and passes even beyond their powers when such distance is exceeded.

And yet this distance is frequently exceeded by some makers, who fail to discover why there is evinced a disinclination on the part of the public to purchase their slides. Let it be noted that, although with a stereoscope having only a very small degree of magnifying power, wide subjects can occasionally be got to combine, this cannot be done with the better class of instrument, in which the lenses or prisms are achromatic and of considerable power, unless provision has been made to effect their separation to their utmost limits, and not even then if the separation of the pictures is much over three and a half inches.

When we consider the great influence exercised upon a stereoscopic picture by their trimming and mounting, it ought to behove manufacturers of these prints, in their own interest, as well as in that of the public, to pay some attention to this. To those who possess slides of valuable or interesting subjects, whether portraits or landscapes, which resist their efforts in bringing them into coalescence, we would say, steep them in tepid water so as to loosen them from their mounts, and retrim them to the extent of taking a quarter of an inch, or thereabouts, from the sides, finally remounting them.

Several years since we obtained a dozen slides of great interest from a foreign maker, who sinned very greatly in respect of the grievance we speak of; and it was not until we had trimmed and remounted them in the manner here hinted that we—or our friends—had any real enjoyment of the collection.

DIFFUSED DEFINITION: METHODS OF OBTAINING IT.

Some persons are apparently inclined to consider pictures of the "fuzzy" order quite a modern idea. Such, however, is not the fact, for over forty years ago, in the very earliest days of the art, the excessive sharpness given by the lens was objected to

by some, and different ways of destroying it were suggested. That advocated by the late Sir William Newton has been utilised by modern "fuzzyists," namely, the interposition of tissue paper, or other translucent media, between the negative and paper while printing. Later on, Mrs. Julia Cameron produced her extremely unsharp pictures by employing lenses possessing a large amount of spherical aberration, such as a single lenses with an abnormally large aperture. The object of the present article is not to touch upon the question of the desirability, or otherwise, of diffused definition, but rather to point out some of the ways by which it can be, and at different times has been, obtained.

It may here be explained that diffused definition produced by one system may be widely different from that obtained by another. For example, the diffusion in a picture caused by putting the lens out of focus, after focussing, is very different in character from that produced by using a lens possessing a certain degree of spherical aberration aud worked at its sharpest focus, as with a single lens with large aperture, or the lens of Mr. Dallmeyer, in which spherical aberration can be introduced at will. Unsharp pictures result in either case, but the effect is quite different. The late Mr. Claudet introduced a very ingenious way of destroying the excessive sharpness in any one plane, or as it was termed, diffusing the focus. His method was to alter the focus of the lens during the exposure. This he did, not by racking the tube in or out, but by causing the glasses themselves to approach towards, or recede from, each other, thus altering the equivalent focus while the negative was being exposed. The pictures produced in this way were very pleasing, and, although they were not really sharp, they did not appear to be blurred, or at all pertaining to the pictures of the present fuzzy school.

Many years ago a novel method was suggested for destroying excessive sharpness. It was this: A cord was tied to the camera and fastened tightly to the floor. Then, after a portion of the exposure had been made, a violin bow was lightly drawn across the string so as to produce a slight tremour in the camera. The blurring produced in this was distinct from that obtained by other means. Another plan was, during the exposure, or during part of it, to place a lighted spirit lamp some distance below the lens. This caused rarefaction of the air, and thus produced motion of the atmosphere similar to the heat haze so frequently seen near the ground on a hot summer day. This has a marked influence on the sharpness of a negative.

We have seen some very good effects produced by using a lens of the old doublet form in the following manner: The fixed stop had been removed and larger Waterhouse stops substituted. The exposure was commenced with a stop sufficiently small to give sharp definition. Then, when the negative was, say, half exposed, the stop was removed, and the exposure completed with the full aperture, which, of course, gave an unsharp image on account of the spherical aberration. Thus was obtained a somewhat sharp image as well as a confused one. Here, again, we had diffused definition of a different kind from that obtained by the other methods indicated. This system is also sometimes utilised in enlarging from small negatives in which the retouching is painfully conspicuous, or the face badly freckled. The exposure is commenced with a stop in the lens, and completed with the full aperture of the instrument. The character of the image thus obtained is quite different from that where the lens is put out of focus. Sometimes the lens is moved slightly in or out of the sharpest focus during the exposure, but the fuzziness produced by this method differs from that by the others. All the above methods of diffusing definition were chiefly utilised for ameliorating the excessive sharpness in large portraits, but it is obvious to every one that they can be equally as well applied to every other class of picture.

Reference was made at the commencement of this article to destroying the sharpness of a picture by printing through a translucent or transparent medium. That is often resorted to, but not always, perhaps, to the best advantage. Our older readers will remember a then new style of portrait that was shown in this country some quarter of a century or so ago—the invention of Denier, of Russia. The pictures appeared to be both sharp and unsharp at the same time, and were not at all unpleasing even to those who look upon excessive sharpness as an essential to a good photograph. The method by which they were produced was offered for sale as a secret process, and was never published authoritatively, though there was much speculation at the time as to what it was. It was said to consist of taking two thin negatives—identical—and printing from them with one superimposed upon the other. Be that as it may, we and others produced similar, indeed, identical and equally as good, results in the following manner. The negative, a perfectly sharp one—indeed, an every-day negative—was taken and placed in the printing frame with a piece of sensitive paper upon it and exposed to light. When the print was about half, or a little more, done, a sheet of thin glass, or, in the case of small pictures, two or three thicknesses of sheet gelatine, was interposed between the paper and the negative and the printing completed. By varying the depth of the contact printing and the thickness of the, afterwards, interposed medium, the effects could be considerably modified. It is a little surprising, considering the outcry that is sometimes made with reference to the excessive sharpness in large portraits, that this method of ameliorating it is almost, if not entirely, neglected; for, although the pictures thus obtained are not actually sharp, they can scarcely be classed as unsharp, unless the contact printing is too brief, yet they are quite distinct from the class of pictures termed "fuzzitypes." The effect can be further varied by making what may be termed the primary printing through the insulating medium, and completing it with the paper in contact.

MATT-SURFACE PRINTS ON ORDINARY PAPER.

As a matter of course, the choice of the method of sizing will depend, in a great measure, on the character of the paper to be used, for which any of the plans mentioned may be employed with a smooth-surfaced sample; it would obviously be undesirable to adopt either of the plans that involve rubbing in the size with a sponge when the surface is at all rough. Under such circumstances a very uneven coating would be obtained at the best, and it is more than probable that the surface texture of the paper would be ruined and rendered totally unfit for the purpose intended.

With moderately rough paper, a rather thin solution of gelatine, applied evenly with a brush or by floating and subsequent draining, will give the best results. The solution must not be thick enough to confer any glaze when dry or to collect in the hollows or inequalities of the surface, and one of the kinds of gelatine that swell but little under the influence of moisture will be found to answer the requirements best. For

very rough paper, such as drawing-papers, the aqueous shellac solution has given us by far the best results, as it answers a variety of purposes. It fills up the body and hardens the texture of the somewhat porous paper, without any production of gloss, better than gelatine, and is far easier of application than such substances as arrowroot. It, moreover, more completely isolates any chemical impurities, such as so frequently exist in that class of paper; but, where any special tendency in that direction is found to exist, it is advisable to apply a double coating, the first being allowed to thoroughly permeate the paper, the second, with which the salting may be combined, being applied after the first has become perfectly dry.

The second coating, under these circumstances, will be wholly on the surface, for, after the mixture of lac and borax has been once dried, it becomes insoluble in aqueous solution at the ordinary temperature. For this reason, although the salting solution itself may be allowed to soak completely into the body of the paper, the sensitising solution subsequently applied penetrates only to a very slight depth, and the image is thus kept well upon the surface. Bearing this in mind, we are enabled to secure beautiful evenness of sensitising on even the roughest paper by adopting the following course:—

The combined sizing and salting solution described last week, consisting of the aqueous lac solution to which chloride of ammonium has been added, is used, and may be applied with a brush and allowed to soak well in, or the paper may be floated on or immersed in the solution until thoroughly permeated. The superfluous solution is then removed by dabbing with a sponge or pressing gently between blotting-paper, leaving only that which has been absorbed into the paper, which is then allowed to dry completely, in which state it will keep well for an indefinite period. To sensitise it, the silver solution is applied to one surface, either by floating or by means of a suitable brush, and, after having been allowed a stated time to act, the surplus is removed as before and the paper again dried. In this manner an evenness of printing surface is easily obtained that it is almost impossible to secure by other means, as, when the size is only drained off, it is apt to collect in the irregularities of the surface, which necessarily absorb a larger proportion of the salting and sensitising solutions afterwards applied.

With regard to the sensitising very little need be said, if the sizing and salting of the paper have been first properly performed. The bath consists of a plain solution of nitrate of silver, which may vary in strength from forty to sixty grains to the ounce of water, according to the strength of the salting and other circumstances, bearing in mind that, the stronger the salting and sensitising, the richer will be the resulting prints, and the easier will it be to secure pure black tones. For grey or light tones the sensitising solution may be weaker, but it is always advisable to let the salting and sensitising bear a direct relation to one another. A sixty-grain silver bath answers well with a salting solution of ten grains to the ounce, which is as strong as is usually necessary; but for very thin negatives, or where great contrasts are required, both may be increased, or the reverse when the negatives are hard.

The ammonio-nitrate bath was a great favourite with many workers in the old days, and is made by adding to the plain silver solution, drop by drop, strong liquid ammonia, stirring well at the same time, until the precipitate at first formed is redissolved. This bath fell into disuse on the advent of albumen paper, for which it is quite unsuited, on account of its solvent action on the albumen. Its chief recommendations are that it gives greater rapidity and more vigour with proportionately weaker solutions. But the paper keeps only a very short time after sensitising, which will prove an objection in the eyes of many modern practitioners who have become accustomed to ready-sensitised and keeping papers.

The ammonio-nitrate bath formed in this manner contains a very considerable proportion of ammonia, but its advantages may be secured in a modified form—that is to say, with a reduced proportion of ammonia—by dissolving only a portion of the silver nitrate, and converting that into ammonio-nitrate, as above described, and afterwards adding the remainder of the silver. Or, it may not be generally known, if a small quantity of nitrate of ammonia, or other alkaline nitrate, be dissolved with the nitrate of silver, any quantity, however small, of liquid ammonia may be afterwards added without causing any precipitate, although, with a plain *new* solution, the first drop of ammonia would cause a dense cloudiness. After using the solution for sensitising, as old silver printers are aware, ammonia may be added without causing a precipitate, owing to the presence in the bath of the alkaline nitrate formed by double decomposition.

Plain paper keeps better after sensitising than albumen without any special precautions, but it is preferable to use it as soon after sensitising as possible. If it must be kept, the addition of a minute quantity of nitric acid to the silver solution will greatly increase the period in which it will retain its whiteness; and, though this addition raises some little difficulty in the way of securing certain tones—purple, for instance—its influence will not be seriously felt when black or grey tones are desired.

So far we have supposed our matt-surface paper to be prepared in the well-known old-fashioned style, by separate salting and sensitising; but it is equally open to apply the more modern system of combining the two operations in emulsion form. We do not intend here to give any formulæ or directions for the preparation of the emulsion, as these will be found amongst the formulæ in the ALMANAC. We wish simply to remark that the matt surface is obtainable with emulsion in ordinary papers with as much ease as by simple salting, the glossy surface familiar to the users of commercial gelatine paper being obtained by special means. When an emulsion is used, there is in a general way less necessity for the preliminary sizing, since the emulsion itself, owing to its thicker nature, has less tendency to sink into the paper than plain aqueous solution. Some papers, however, do require sizing, but where such proves to be the case we should be inclined to change the paper rather than resort to an additional operation when thoroughly suitable papers are to be obtained. When sizing is considered necessary, we remark that the aqueous lac solution is not suited for use with emulsion, owing to the fact that the alkali it contains combines with the soluble constituents of the emulsion, and not only causes irregularity in printing action, but entirely alters the character of the tone. It must be borne in mind that in sensitising in the ordinary way the salted surface has presented to it a practically unlimited quantity of silver capable of combining, not only with the soluble chlorides, but also the alkali, and still leaving an excess. In the case of an emulsion, however, containing as it does but a small excess of soluble silver salt, to which it owes its special characteristics of tone, the presence of alkali (borax) in the surface of the paper suffices to upset the balance and utterly change the nature of the sensitive surface.

While there is no great difficulty in the preparation of emulsions for printing purposes, we doubt whether many of our

readers at the present day will care to venture on the task. Still, if they do, they will not find it an insurmountable one. The chief difficulty will be in the application of the emulsion to paper; and this is, perhaps, greater in the case of the printing-out emulsion containing soluble matter than on that of a negative emulsion or one intended for development. Floating the paper upon the emulsion will be found in every respect the easiest plan for getting an even coating, but it involves the necessity for keeping the emulsion liquid without raising the temperature too high, which soon causes discolouration of the organic salts in the preparation.

Pouring the emulsion on to the paper laid, either damp or dry, upon slabs of glass, is altogether unsatisfactory without special appliances for keeping it stretched tight, besides which it is difficult to secure an even coating sufficiently thin to avoid gloss. A rough-and-ready mode of coating, introduced by Mr. T. G. Whaite some years ago, answers very well for emulsions free from soluble matter, but is not so satisfactory with the printing-out preparations. It consists in applying the emulsion in the solid or jelly state by means of a stiff brush, spreading it evenly over the paper with a sort of dabbing or stippling action, and then passing the paper over a hot plate to liquefy the gelatine and cause it to form a homogeneous coating. But even this requires a lot of care and proper appliances.

Perhaps the best plan will be found that recommended by Mr. W. K. Burton a short time back, in which the sensitive materials are applied to the paper by floating it upon a very thin emulsion—thin, so far as gelatine is concerned, but rich in silver salts. With chloride of silver, such an emulsion is easily made of sufficient thinness to cause no trouble in keeping it liquid, and will present the minimum of difficulty to the inexperienced.

Examination of Ether.—According to Herr G. Traub, good ether, in contact with caustic potash for twelve hours, should not undergo any change. At intervals during this time a few drops should be let fall upon blotting-paper, and the odour scrutinised. Also, if ether be slowly and carefully added to sulphuric acid, and the whole kept well cooled, not the slightest discolouration should take place.

Soap Bubbles.—As this subject has lately been before our readers, we may give the formula for a solution, recently given to the Paris Academy of Sciences; it is said to afford thin and very permanent bubbles. Yellow resin and carbonate of potash of each equal weights, and water ten times that weight, to be boiled together till solution is complete. Before use the solution is to be diluted with four times its volume of water.

Quick Preparation of Hydrogen.—Messrs. J. G. C. Macdonald and John Ball have recently written to the *Chemical News* stating that they have found the addition of a small quantity of solution of nitrate of cobalt to the zinc in making hydrogen leads to a greatly increased rapidity of evolution of that gas. For those lantern experimentalists who wish to use hydrogen in place of ordinary coal gas, it is evident that this "wrinkle" will be of considerable service.

Monochromatic Yellow Light.—Herr H. E. J. G. du Bois uses a Linneman burner, in the flame of which he introduces a soda rod, preferably of a diameter of 0·4 cm. and a length of 12 cm. to 15 cm. The rods are made of a mixture of sodium bicarbonate, sodium bromide, and tragacanth gum. Herr E. Pringsheim uses an Argand burner for white or monochromatic light at will. For the latter he injects a spray of salt solution by means of a T-tube into the gas current. When the latter is put out of use, of course the ordinary white flame is given.

Patents' Abridgments.—The difficulty first besetting a would-be patentee is the novelty or otherwise of his invention, and to meet this the Patent Office is publishing a new series of illustrated abridgment classes. They have been arranged according to subjects, and include all specifications of patents applied for between 1877–83. They are excellently grouped by the Comptroller-General, and will be found most useful. Optical instruments are a class of most interest to photographers, and include improvements in telescopes, microscopes, stereoscopes, magic lanterns, lenses, reflectors, &c. Various tripod stands find a place in the volume.

Light-dispersion Difficulties.—In the course of his treatise upon the photography of the most refrangible rays of the spectrum, Prof. Schumann says that the "photographic result in the most refrangible ultra-violet would have fallen out far better if the light which originates on the refractive phases, and in the interior of the prisms and lenses, had not regularly illuminated the visual field so strongly that on prolonged exposure the whole plate is coloured more strongly than the spectrum itself. We might, indeed, as I observed in 1888 with the spectrum apparatus of Simony, considerably reduce the diffused light by shortening the slit length to a minimum (0·2 mm.); but even here, on prolonged exposure, it overpowered the delicate impression of the most refrangible rays to total invisibility."

A New Incandescent Arc Lamp.—As the "glow lamp" has little actinic power in ordinary photographic work, and the arc lamp requires more skilled attention, considerable interest will be taken in the new electric illuminator described in the title of this paragraph, the invention of Mr. L. B. Mark, M.E. The arc is enclosed in a small envelope of highly refractory glass, closed at top and bottom by plugs, through which the carbons pass. A safety valve is placed in one of the plugs, to avoid undue pressure in the globe through the heating and expansion of the inside air. Upon closing the circuit, the oxygen is consumed and the gases brought to a very high temperature, at which they maintain the carbon vapour coming from the arc. This vapour is deposited upon the internal surface of the glass in a very thin coat. The glass globe must be small, and then the heat usually dissipated in the air is conserved, and raises the temperature of the enclosed gases and carbon vapour. Under these conditions, the arc itself is almost invisible, but the entire chamber becomes luminous, giving the appearance of a solid cylinder of light. There is not quite so much light efficiency from a given amount of electricity as with the ordinary arc lamp, but far more than with a glow lamp.

SOME CURIOUS EXPERIENCES WITH METOL.

I SHOULD like to place on record some rather curious experiences I have recently had with images developed with metol, and compare notes with other workers, with a view of ascertaining whether such occurrences are really due to some difference in the deposit or image formed by the new developer, or to other unsuspected causes.

Some time ago, I think, I remember reading a complaint of some difficulty or peculiarity in the behaviour of the image developed with amidol, I think, in the fixing bath, and I set it down at the time chiefly to imagination, or something like it. Possibly others may attribute my "experiences" to the same cause, though I have most carefully examined the whole of the circumstances, and can arrive at no other conclusion than that there is some difference—what, I cannot say—between the composition of the metol image and that produced by other developers.

The first case I shall mention, although it is the most recent chronologically, more particularly stamps the difference between the different developers, although, had the phenomena occurred indis-

criminately, I should have thought little or nothing of it—photographically, at any rate. A number of negatives were left in the printing frames for a period of some days—about eight or nine—in contact with ordinary printed paper which had been used as the backing pads. It was precisely the same paper—in the same publication—in all cases, and the same paper had been in the frames for several months. The negatives alone differed in character, some being developed with metol at different times during the past three or four months; one or two with hydroquinone, also recently; and the rest pyro-developed, four or five years old.

On taking the negatives out of the frames, it was found that several of them had been bleached perfectly white, or rather a dirty, yellowish-white in patches, just such a colour as is produced upon a gelatine negative by any of the hypochlorites; and, if the occurrence had been universal, and not strictly partial, as it was, I should have set it down to the action of a considerable quantity of "antichlor" in paper having been set in motion by accidental damp.

But, when I say that every one of the metol negatives was so affected and not one of the others, it would appear to be too singular a coincidence, that just those particular frames should have been touched by damp and no others. However, to test the matter, I took the pad that had been behind the very worst affected negative and placed it in contact with a recently developed hydroquinone film, selecting that because it might be that the age of the pyro negative had given them a protective hardness. Now, after more than a fortnight's contact there is no trace of any impression. There I leave that question for the consideration of others.

The next case is a most curious one, and offers absolutely no data on which to proceed to explain it. Two portrait negatives of the same individual were taken, as I can remember, amongst the first of those I developed with metol several months ago, and they were amongst those which from their quality first interested me in the new substance. I have other negatives taken on the same day, and about the same day some developed with metol and some with pyro, but these two are the only ones affected in the manner I shall describe. They have been, with others, packed away for some time in the ordinary plate packing boxes, simply placed face to face in couples, with nothing between them.

On taking out the two negatives in question a few weeks ago, the image in both cases had changed to a peculiar pinkish-brown colour, where it had originally been black, and closely resembled in appearance, I remember so well, faded negatives that had been intensified with iodide of mercury and hypo in years gone by, though it is needless to say no mercury in any form had been near these. Both, too, showed a considerable loss of detail, one being much worse than the other in this respect, the half-tones and finer details having been apparently completely eaten away, and represented by perfectly clear glass.

Now, there is no reason to suppose that those two negatives received any different treatment in the matter of length of washing or other circumstances than the rest of the negatives taken on the same day. If anything, they would have a slightly better washing than many of the others, as they were taken in the morning, and would, according to my habit, remain in the washing rack until the end of the day's work. Otherwise, I might have set the result down to insufficient washing and the consequent fading action of hypo, although neither the colour nor the appearance of the film would in any way lead to that conclusion. But these two out of many are the only ones affected.

The curious part is that under treatment, one of them with bichloride of mercury followed by ammonia, the other with plain sulphide of ammonium, the whole of the lost detail returned, and, though the negatives are by no means "beauties" to look at, they print nearly as well as at first.

The last instance I shall give is partly explainable, so far, at least, as the fading is concerned, though it remains to be explained in this case why only metol images are affected. Several negatives were found to be, some partially, some wholly, turned yellow as if converted into iodide of silver. Some time ago I tried the method given in the JOURNAL for detecting the presence of hyposulphites in the negative after fixing by treatment with iodide of potassium; but, not having that salt at hand, I used iodide of ammonium, the remnants of a bottle that I have had for fifteen or sixteen years, and which had become a mass of yellow crystals saturated with a deep brown-coloured liquor.

What the chemical action of this complex decomposition product had been upon the images to which it was applied I cannot say; but there was the result, but only on those negatives developed with metol. Can any readers of the JOURNAL throw any light on these puzzles?

W. B. BOLTON.

CONTINENTAL NOTES AND NEWS.

Thiosinamine.—Thiosinamine, which our readers will remember was employed by Colonel Waterhouse in his reversal experiments, has been suggested as a fixing agent by Herr Liesegang, who thus enumerates its advantages and properties. An aqueous solution of thiosinamine (CS,NH_2NH,C_2H_3) fixes gelatino-chloride plates as rapidly as hypo; for bromide films it takes longer to act. Chloride papers are completely fixed in four minutes in a one per cent. solution of thiosinamine. With gold chloride solution thiosinamine may be used to form an energetic combined toning and fixing bath. Aristotype prints so treated resemble platinotypes. Concentrated acids (HCl for example) do not decompose it or minimise its solvent powers; alkalies should not, however, be employed with it. It does not injure the image in any way. Unfortunately thiosinamine is very costly—120 francs per kilogramme.

Development of Partly Printed Proofs on Albumen Paper.—Herr. Valenta directs the usual exposure to light to be reduced to a fourth or a fifth, and recommends the following developer:—

A.

Hydroquinone	10 grammes.
Alcohol	100 c.c.

B.

Sodium sulphite	100
Citric acid	5
Water	500 c.c.

For use take 5 c.c. of A, 5 c.c. of B, and 100 c.c. of water. The violet tone of the print rapidly passes to a yellow brown, and development is finished in about ten or eleven minutes. The prints are next washed and toned in a sulphocyanide bath. The following combined bath, recommended by Messrs. Lumière for their citrate of silver paper, also answers:—

Water	500 grammes.
Sodium hyposulphite	200 „
Ammonium sulphocyanide	25 „
Alum	30 „
Solution of acetate of lead (1:10)	40 „

Heat to sixty degrees and filter. To each 100 c.c. of the solution add 50 c.c. of water and 10 c.c. of a one per cent. solution of gold chloride. This bath will tone in about ten minutes. The following pyro developer may also be employed for the purpose:—

Water	1000 grammes.
Sodium sulphite	100 „
Pyrogallol	10 „
Citric acid	11 „

This developer, even after use, keeps well. The prints are washed in the usual manner when taken from the printing frame.

A Solder for Aluminium.—This solder is the invention of a Norwegian, and it is composed of cadmium fifty parts, twenty parts of zinc, and thirty parts of tin. The zinc is first melted, the cadmium is added, and finally the tin in fragments; the mass is melted and well stirred, and then run into ingots. The solder may be employed for other metals as well as aluminium, the proportions of the ingredients being varied to suit circumstances. A strong and tenacious solder requires a large proportion of cadmium; to obtain the greatest possible adhesiveness, the proportion of zinc must be large; great polish is obtained by increasing the tin.

Longevity of Aristotype Paper.—M. Hoffmann has recently printed and toned some Aristotype paper which he bought in Moscow in 1886, and which had since gone through many climatic vicissitudes. Excellent results, without degradation, were obtained.

AUXILIARY EXPOSURE.

Quite early in the days of collodion, a slight exposure, either before or after the camera exposure, was advocated, but no very satisfactory results appear to have been obtained. Now and again the subject is revived, apparently only to be put aside without coming to any definite conclusion. So long as the eye alone is trusted to estimate the results, this must necessarily be so, for it is quite unable to correctly estimate the resulting alterations, also the introduction of extra fog is very misleading.

If only confined to an intentional exposure, few would be in any way interested, but, as an auxiliary exposure may be given in various ways unintentionally, its precise effect seems to need a little investigation. It may occur thus:—

1. During the manufacture of the plates.
2. Light received when changing plates.
3. Reflection from the surfaces of the lens or camera.
4. Light received during development.

1. The exceedingly careful manufacture of the present day has reduced this to a very small amount, so small indeed that Messrs. Hurter & Driffield, in their method of estimating the speed of plates, found that the reduction of silver due to this cause might be simply classed with the opacity of the glass and gelatine, and the reduction due to the chemical action of the developer; that is, that the total opacity due to these three causes combined, might be taken as uniform over the whole plate, the effect of which is simply an increase in the time required for printing, the gradation of the photograph remaining unaltered.

2 and 3. When, however, a considerable amount of light has reached the plate, the action becomes important. Instead of a uniform reduction of silver all over the plate, we have now a uniform time addition to all the exposures, the amount of which is, of course, unknown. Its true effect is easily obtained by giving certain known exposures and a known auxiliary exposure to a part of the plate, afterwards comparing the opacities obtained.

On page 458, July 21, Diagram No. 2, Messrs. Hurter & Driffield give all the necessary data by which the altered curve due to auxiliary exposure may be plotted, thus, with, say, one-candle meter second auxiliary exposure, the new curve would be found by taking from the diagram the density due to 1·312 C. M. S. exposure and marking it off upon the ·312 C. M. S. line. In similar manner throughout, 1·625 upon ·625, 2·25 upon 1·25, &c.

Notwithstanding that the densities are found to be greatly increased where the exposures are small, nothing is gained, but rather the contrary, because the total range of density has been reduced, and the shadow detail must therefore be less, seeing that the high lights remain almost the same as before. Anything whatever that may cause auxiliary exposure before development should therefore be carefully avoided. (See also p. 634.)

4. Light received during development. This will be found to vary greatly in its effect, because at first it begins by acting in a similar manner to auxiliary exposure before development; but, as development proceeds, it is really printing through a partially formed negative upon the sensitive portion still remaining. The ratios, both of density and opacity, are now completely altered, and, if the auxiliary light is excessive, not only is there much fog, but with some plates reversal of the shadows.

In order to test the action fully, plates which had received the usual test exposures for the determination of speed were partly developed, and, after giving an auxiliary exposure, the development was completed. The period of correct reversal with the best plates so far found is very small, still it is sufficient to allow of a direct positive being taken in the camera, instead of a negative, provided always that both the camera and auxiliary exposures are calculated very accurately.

It is necessary to arrange that the highest lights may come about in the position where the shadows begin to be correctly represented in a negative. Owing largely to the high lights being degraded by the weak negative developed before the auxiliary exposure is given, the results at best are poor compared with a transparency made in the usual way from a negative.

Only comparatively slow plates appear to give any available latitude; but, as the exposure required to obtain a positive is only about one-thirtieth to one-fiftieth of the time needed for a properly exposed negative, an actinograph speed of about 600 has been reached, or about four times the rapidity of the quickest plate yet put on the market.

Any attempt to alter the gradation of a negative by auxiliary exposure during development appears therefore far more likely to spoil it altogether than to result in any improvement.

J. Sterry.

THE ENGLISH LAKE COUNTRY.

[London and Provincial Photographic Association.]

If any one should contemplate making a visit to the English lake district he can hardly do better than go to Ambleside in the first instance, making excursions from that picturesque centre as opportunity may offer. I was, last June, led to take this course, and I obtained the hint by the simple expedient of consulting a map, for the map told me that within a short walk south of Ambleside was the Head of Windermere, about an equal distance north was Rydal Water, Rydal Hall and Waterfall, and that a short distance from there another lake, *Grassmere*, could be reached. There were thus three of the English lakes within the compass of a short ramble from one another, besides waterfalls, glens, and other beauties, which seemed to make Ambleside a most advantageous centre. To Ambleside, therefore, I went, and found no reason to repent my choice.

It is a quaint village beautifully situated in a valley, the hills rising all round it except in a southerly direction, where they open out towards Windermere. Windermere, although, I believe, the largest of the lakes, is tame in aspect when compared with the others, moreover, it is so narrow that it has more the appearance of a river than of a closed-in piece of water. The hills surrounding it are not high, and they mostly slope gently down to the edge of the water, park-like in appearance and studded with private residences. Beyond a few sky and water effects I did not attempt any photography on Windermere.

One of the oldest, prettiest bits in Ambleside is the mill, which I now show you. It has been immortalised by Turner and by many other lesser artists, and has evidently not changed much in appearance during the past 100 years. At the time of my visit there was very little water, for, though the lake district is generally considered to be a very damp neighbourhood, it shared in the general drought of 1893, and the waterfalls were robbed of much of their usual grandeur. Ambleside is essentially a tourist rendezvous, and there are coaches coming in and out of the town continually, which run in connexion with small steamers on Windermere. One morning, in a back lane, I came upon a picturesque smithy. There is nothing very noteworthy about my picture, save that it is taken with a hand camera. But the glory of Ambleside is Stock Gill (a gill, I should tell you, is a narrow ravine, with a rapid stream running through it). A bobbin mill stands at the entrance to Stock Gill; but when I photographed it—again with a hand camera—there was certainly not water enough to make it bob, or do anything else. Turning our backs upon the bobbin mill, we can walk for half a mile or so up one of the sweetest ravines in the lake country. There is hardly enough water to make a connected stream. It is more like a collection of deep pools, variegated by boulders. In the peat-stained water of these pools you can see the trout playing about by hundreds, and wondering when some rain is coming to refresh them. This is a lovely stream, which affords a picture at every few yards. Here, on a dull day, and in the absence of wind, with a short-focus lens, stopped down, you have a photographer's paradise. You can either follow the river-bed, or you can climb the high bank, which carries you sometimes fifty feet or more above it. The scenery is grand under both conditions. But you do not reach the highest point of the glen before you hear the sound of tumbling water, for you are approaching Stock Gill Force. The water here makes three falls, altogether seventy feet in height, and you will notice that the principal fall is divided into two by projecting rocks. After a few days' rain, I am told, the scene here is of the grandest description, the water playing over the rocks in a sheet of foam and amid clouds of spray. When I visited it, the water was half-asleep.

I have already told you that Ambleside is a convenient centre from which excursions can be made, and one of the first which I undertook was to Rydal. The village has nothing interesting about it, save the house called Rydal Mount, where the poet Wordsworth lived for so many years. I did not go there, for the whole district is flooded with photographs of the place, and I was content to leave it alone. Close by is Rydal Hall, the seat of Lady Le Fleming, and I was far more interested in this place because the grounds contain two noteworthy waterfalls. On my way thither I passed some rough ground, with a promising group of

cattle perched high up on a granite hill. I stalked them, and had a shot at them. But cattle are the most unsatisfactory models, and always group themselves as badly as possible. Nor will they take a hint to do better; if you pitch a stone at them, they simply move away.

On the main road, just outside the village of Rydal, is a mass of rock with steps cut in it so that one can reach the summit. Wordsworth is said to have chosen this point as a favourite resting-place. It is now so overshadowed with trees that nothing can be seen from the summit. Doubtless it was different in the poet's time. It is noteworthy that you are ta liberty to climb these steps without paying for the privilege. You have to pay for most things in the lake district; it generally costs you a shilling to see a waterfall. This is certainly the case with the falls at Rydal. You call at a cottage for a guide, and the guide solemnly unlocks a side gate into the park and takes you there.

The upper Rydal Fall is half a mile from the one which we just saw. You can only see it from one point, and from the nature of the surroundings I do not think there is any other choice as to the position for your camera. If you want a more comprehensive view, you must therefore do as I did, and screw on to your camera a shorter-focus lens.

Rydal Lake is one of the smallest in the district, but at the same time one of the most beautiful. It is not a mile in length, and scarcely a third of a mile across, so that you can make the circuit of it in little more than an hour. But every step will open up to view fresh beauties; and one gets so satiated with the loveliness of nature, that you feel the same kind of exhaustion as you do after an hour or two in a picture gallery. There are one or two islands on the lake, small as it is, and here the wild fowl congregate in peace, for no one can disturb them.

The guide-books to the lake district are most aggravating to read, for at every third or fourth page they quote Wordsworth. The copyright on that good man's works has run out and such quotations are cheap.

Near to this spot, on the high road, is Nab Cottage, where Hartley Coleridge lived.

In the lake country, if you want to take photographs, you must do a lot of trespassing. And this is not always easy work, for hedges, hurdles, or gates, are replaced by very stony stone walls over which you have to climb at the risk of breaking your neck.

Here, on the left of my picture, you will see the kind of wall I mean. But some of them have loose stones artfully arranged on the top, so that, although you can climb up there, you find yourself on a very insecure place, and feel as if you and the wall too were on the point of tumbling down.

Continuing on the road by the side of Rydal Water you come to Grassmere, which is also a very beautifully situated lake. Far away at the head of the lake lies the village of Grassmere and Grassmere Church. This is one of the very ugliest churches in the kingdom, but the guide-books rave about it principally because Wordsworth and Hartley Coleridge lie buried there. It is so much photographed that I did not care to add to the number of pictures. But I changed my mind when far away by the side of a mountain rivulet I caught a glimpse of it through the trees. Here distance certainly lent enchantment to the view. Besides, there was no one to worry me with quotations from the deceased poet.

A conspicuous feature of the scenery of Grassmere is a strangely shaped conical hill called Helm Crag, of which this is a distant view. It is very beautiful on a cloudy day to watch the rapid changes which come over a mountain like this, when the shadows chase one another up the sloping sides, and foreground and distance are alternately bathed in sunshine.

A good pedestrian has a great advantage over persons who have to depend upon another animal's legs. He finds his way into nooks and corners where the common tourist never thinks of wandering. I discovered this years ago in the Highlands, and I rediscovered it in the English lake country. As an example of what I mean, let me show you a few views taken of a small piece of water known as Loughrig Tarn.

"A tarn," says the guide-book glossary, "is a small sheet of water usually high up among the mountains." Now, you know why the tourists don't go there, it involves a heavy climb, and there is nothing but water to drink when they get there. But it is a beautiful spot, and well worth the barking of your shins in the climb over numerous walls, before you find yourself there. You run a chance of losing your way unless you carry a map and compass, as every wanderer should do, for houses are few and far between, and you meet no one among these solitudes.

Please observe the bit of disturbed foliage in this picture. I thought at first that this was a flaw, but showed it to a friend, and he raved about it. He was an impressionist. He said that, if the picture were his, he should destroy it, all but that bit in the corner; this he would frame, for, whenever he looked at it, he could hear the leaves rustling.

It is the fashion, as you all know, to set more store by a little figure study than by a landscape pure and simple. I do not agree with this notion. It is far easier to pose a figure by a cottage door, for example, than it is to conquer the difficulties of a view like the one before you. Any one who has tried to take a landscape like this, with distant hills bathed in sunlit atmosphere, will know what these difficulties are.

Leaving Loughrig Tarn, I made my way to Grassmere, and so home to Ambleside. On my way I passed through some exquisite scenery. Having spent a week at Ambleside and its surroundings, I resolved to go by coach to Ullswater. They charge you 5*s.* for the trip, and make you walk half the distance. Directly you leave Ambleside, the coach begins to go up hill until you reach the Kirkstone Pass, 1500 feet above, after which you come to Brothers' Water. The guide-book says that this name is derived from the sad circumstances of two brothers having lost their lives here, and it adds, "an accident which occurred twice." Now, you can imagine a man losing his life once, but he must be abnormally careless to lose it twice. These guide-books are really not reliable.

[*Mr. Hepworth then described how he arrived at Ullswater, and photographed the objects of interest round about that beautiful lake, once more returning to Ambleside through the picturesque village of Troutbeck, where he found many opportunities for camera work. His paper was illustrated by about sixty lantern slides.*] T. C. Hepworth.

DEVELOPED GELATINO-CHLORIDE PRINTING-OUT-PAPER.

[Photographic Record, Manchester.]

The following notes on my experiments in exposing and developing gelatino-chloride paper refer, for the sake of simplicity, to amidol alone. The other developers may be dealt with at some future time by myself, or some other of our members may be induced to turn their attention to it, and give us the results they may obtain. The subject is full of interest and the difficulties surrounding it are but trifling. I prepared a stock solution as follows:—

Hot water	5 ounces.
Amidol (Hauff)	20 grains.
Sulphite of soda (Johnson's)	4 drachms.
Potassium bromide	20 grains.
Hydrochloric acid	20 drops.

When cool it is ready for use, and is to be diluted with water as required.

By varying the proportions of the solution by the addition of water, in conjunction with the exposure, a variety of tones may be obtained. Thus a short exposure, with a strong solution of amidol, produces dark tones; while a long exposure, followed by a weak solution, gives warmer tones. It will be observed that the solution is distinctly acid and strongly restrained.

Three different tones may be obtained as follows:—Procure a fresh packet of Ilford P.O.P. (I have found that to act best so far), and, having selected a good quick printing negative, take them into the dark room—for the paper must only be opened in a ruby or orange light. Place the negative in a frame, and insert a sheet of the paper just as carefully as a bromide sheet or lantern plate is dealt with.

The exposure is now to be made by daylight. Expose the first sheet, say, for four minutes, and, if on returning to the dark room a faint image is visible, remove the print and put another sheet in its place. Let the second exposure be for two minutes, and then follow on with the third, giving it one minute. Mark the time of each exposure on the back of the sheets with a soft black lead while they are in the frame. This will save confusion.

To develop take

Stock solution	1 ounce.
Water	1 „

First soak the sheet that has received one minute's exposure in a weak acid-water bath (two drops of hydrochloric acid to the pint of water), and then immerse in the above developing solution. If the paper begins to darken where there has been no exposure, it is an evidence of under-exposure. If the exposure has been right, it will commence to develop very slowly. When complete, pass it direct into the fixing bath—hypo (saturated solution) one ounce, water three ounces. Over-development will produce a veil on the surface of the paper. When this is seen, the print must be placed at once in the fixing bath, and must remain there until it is removed. This may require half an hour or so. Keep the print face down in the fixing bath.

Now treat the second and third prints in the same way, using the same developing solution, &c.

If all has gone on right, we should have three prints, exhibiting three different tones. The one that has received one minute exposure should be of a black tone, the two minutes' exposure should be a warm sepia brown, and the four minutes' exposure should be a light sepia approaching to red.

I have also been able to obtain very good results with the following combined developing agents:—

Amidol	3 parts	and pyro	1 part.
Amidol	3 „	„ metol	1 „
Amidol	3 „	„ glycin	1 „

Any of these may be employed without using an accelerator, but, if development requires to be hastened, a few drops of a 10 per cent. solution of carbonate of potass, or carbonate of soda, will accomplish it.

The stock solution of acid-amidol I have already given makes a very good developer when reduced to half strength for the Nikko paper just introduced by the Eastman Co. A good printing negative will require from ten to twenty seconds' exposure at one foot from the gas.

HENRY SMITH.

A PAINTER'S VIEW OF THE PHOTOGRAPHIC EXHIBITION.

II.

WHEN I commenced this desultory article I hoped briefly to notice the most interesting pictures in the show; but, as I find so many which are both highly interesting and beautiful, I shall be compelled, from want of time and space, to confine my remarks to the few which demand special attention.

No. 27, *Sous les Couriers Roses* (collotype), by Emile Frechon. This is the first of a set of five, Nos. 30, 36, 65, 195. The subjects seem to represent native life and scenery in Algeria. They are truly artistic in treatment. The prints are about 12 × 10, mostly vignetted on large sheets of drawing-paper, texture not coarse, and the part on which the print is impressed seems to have been smoothed a little. I almost forget what the collotype process is; I know very little of processes, or of the scientific mechanism by means of which photographers produce their pictures, but, if these pictures have been printed by machinery in a printing press, they are very beautiful results. No. 195 is the finest. It is on smooth paper, with a glazed surface. The clearness, and transparency, and the perfect definition are delightful. A medal has been awarded to No. 30, *Un Harem en Déplacement*. It should have been awarded for the five. It represents an Arab caravan in full swing, the ladies of the harem, in course of removal, being sacredly guarded from the gaze of profane eyes, in large, tentlike arrangements on the backs of the camels. As might be expected, the definition of the moving objects is not *quite* sharp, but it is sharp enough, and the motion is well represented. Neither is the landscape beyond the figures sharp; if the distance had been left sharp, it would have come forward against the softened figures, and have thrown the picture out of harmony. M. Frechon probably blurred the distance to prevent this. In such an exceptional case blurring becomes a virtue, not a vice; it is neither photographic depravity nor unworthy trickery.

No. 40, *Omegna, Lake Orta*, by J. A. Sinclair. Medal. A print destroyed by the extreme coarseness of the paper used; the rough, obtrusive texture is quite out of proportion to the small size of the print and the nature of the subject; it arrests the attention, destroys all feeling of soft, delicate, and atmospheric effect in the sky and distance—or such distance as is left—and brings them right up to the foreground like portions of a rude stone wall. What is called Lake Orta is actually depicted as a rough field, the surface of which is slightly obscured by a light fall of snow. A confused figure of a woman in the immediate foreground, although it helps the composition, is placed too near, and comes out too large in proportion to the trees, &c., which it dwarfs. I observe that these prints on very coarse paper invariably destroy atmosphere and the light and tender passages, and they destroy the clear, soft, liquid, and transparent character of water, which is not often obtained in photographic pictures. The delicate and refined qualities have all suffered from this epidemic of photographic small-pox, or measles, or both combined. The injury to the darker or nearer parts is not so apparent, but the *finer* qualities of good photography are *wilfully* destroyed; its great softness, and delicacy, and harmony of gradation, its marvellous wealth of detail, and its wonderful accuracy of definition, peculiar to itself alone, and which cannot be approached by any other of the graphic arts, are all cancelled. In support of my assertions I shall call the evidence of an able expert, Mr. J. A. Sinclair himself, who shall prove, by the admirable work of his own hand, that my protest is not uncalled for.

Now turn to the opposite wall and look at No. 184, *Lago D'Orta*, three hand-camera pictures (platinum) by J. A. Sinclair. The central picture is an exquisitely delicate and beautiful representation, on a smooth surface, of *Omegna, Lake Orta*, apparently printed from the same negative from which the small enlargement, No. 40, was produced. In the small picture we have not only the soft atmospheric effect, but a clear representation of the distant mountain on the left, and much beautiful detail which has been textured out of existence in the large copy. I quite admit that coarse paper may occasionally be used, without much disadvantage, for large studies of a suitable character—for instance, Mr. J. A. Sinclair's fine study, No. 204, *An Ancient Mariner*—and I believe he is well entitled to a medal for the general excellence of his work in the gallery; but, for No. 40! No, it does not represent artistic progress, it is photographic retrogression.

No. 55, *After Sundown*. A poor little photographic scrap on coarse paper—an attempt to imitate a sepia drawing by hand. Any landscape painter could make a better sketch in fifteen minutes. The flat-streaky sky in this nondescript thing looks as though it had been photographed from a first attempt by a little boy. Medal awarded. No. 84 contains seven admirable female heads (carbon) by Gebrüder Lützel, of Munich, each in a different colour, and cleverly transferred on to one large sheet of paper. No. 79, *Portrait*, a life-size head of a girl, injudiciously got up in an enormous frame and mount. No. 80 is an autotype enlargement from a negative by F. Bayley. This picture is full of majestic solemnity and poetical suggestion, but the beauty and harmony of the whole scene are marred by the tumble-down appearance of a lake in the distant mountains; it may be in correct perspective, but it does not look so; the reflection is so white, and the outline so hard, that it seems as if a piece of paper had been cut out and pasted on to the spot; this is just one of those inherent defects which cause a mechanical photographic reflection of a subject to differ from a work of art. It is printed rather darkly, in a blue-black inky tone, which detracts from its value, which is still more depreciated by contrast with the shine of the gold flat, and the richness of the warm brown or maroon colour of the frame.

No. 103, *The Proud Turk*, by J. S. Bergheim. Medal. This looks printed on one of those sketching boards for students, embossed with a surface to imitate canvas (these imitation tricks are bad—they had better pay a trifle more and get the genuine canvas mounted on boards), but Mr. Bergheim says it is a transparency over yellow blotting-paper. The effect would have been better if the paper had not been so yellow. The background is too light—no outline of right shoulder visible; figure, face, and background all same tone. Nevertheless, the study is manifestly produced by a man with fine artistic feeling. A better effect might possibly have been obtained by a tinted glass in front of the picture. Many of these cold bromide prints might be redeemed by a glass of a light amber tone, or a moonlight effect, for instance, might be effected by a glass lightly coloured greenish-blue.

No. 146, *Fountains Abbey*. Remarkable for the definition of the architecture and the transparent purity of the shadows. No. 154, four studies in red carbon, by W. J. Byrne, in a handsome, heavy, very dark green and gold frame, which weakens and overwhelms the studies in the four openings; the red is made to look very hot, and, as the colour cannot reach any depth in the shadows, the prints look poor and faded, although they are not really so. There is a complete absence of colour harmony. A frame of this tone would have suited the Ceylon landscape, No. 80, and *vice versâ*. If a photographer would take a print, say 8 × 6, of neutral tone, and get three mounts several inches wide round the opening, one blue, one red, one yellow, and place the blue, then the red, then the yellow over the print in succession, he would observe that the blue would, by contrast, give it an orange tone, the red would give it a greenish tone, and the yellow would give it a tone inclined to purple. Of course, no one would use a positive blue, red, or yellow mount, but a light or dark mount of a blueish, reddish, yellowish, or neutral tone should be selected to suit the requirements of a print. If three prints of the same subject, exactly of the same tone and strength, are used for the same experiment, and the blue, red, and yellow mounts are applied simultaneously, side by side, the effect of the contrasts will be more apparent. The eyes should rest briefly on the colour of each mount before looking at the print.

No. 156, *Portrait Study* (direct carbon), about 16 × 14, by H. Bullingham. I mention this pleasing portrait of a young lady because it affords an instance of the *judicious* use of the texture. Here it is that of ordinary drawing-paper—not rough—and nothing could be more appropriate to the character of the subject and the size of the picture. Moreover, paper of this texture is well adapted for receiving water colour.

Nos. 189 and 197 contain some valuable studies of *Animals at the Zoo*, by Henry Sandland. These are examples from a large collection of animal studies which that gentleman has formed by great assiduity and perseverance. In the case of some of the more shy and restless animals, he has only obtained his negatives after years of patient waiting and watching for his opportunity. Many of the finest animals are now dead. In some cases specimens to replace them can scarcely be hoped for. His collection will probably form the nucleus of an important zoological picture gallery, which would be of great service both to zoology and art. Buffon said, "*Le génie n'est autre chose qu'une grande aptitude à la patience.*" If this be true, then does Mr. Henry Sandland deserve to be regarded as a man of genius.

I now arrive at the magnificent *Figure Studies* by Count W. von Gloeden, which I came specially to see. They are the finest examples of pure and artistic photography that I have ever seen anywhere. Some of them would bear comparison with classic works of fine art by such painters as L. Alma-Tadema. There are twenty of them, commencing with No. 213. Although it is a matter of no significance, I may as well mention, *en passant*, that a medal has been awarded for No. 241. It would be

doing them an injustice were I to attempt to describe the excellence of their quality within a brief space. I must therefore content myself with advising every artist who has the opportunity to go and see them for him or herself,

No. 248, by John Howson. Medal. A passable little picture, *A Calm before a Storm*—clouds, water, and boats, apparently got up in imitation of an oil painting. It is a silver print, very yellow. The yellow helps to give a glowing effect of evening light. It would have looked bad had it not been saved by being harmoniously framed close up, without any mount, in a gilt frame, such as would be used for an oil painting. But—good gracious!—what have we here in No. 254? A small, miserable abortion of photography, a female figure in a sitting posture, with a black face, and a dreadful something—meant for a hand, wrist, and arm—in front of it, the ugliest representation of a portion of the human form I ever saw. *Mirabile dictu*—medal awarded! After this shocker, how refreshing it is to look up at those exquisite *Roses* by George McDonald, M.D.

No. 306, *Portrait* (direct, untouched, carbon), by Alfred Werner, of Werner & Son, Dublin. This is the grandest example of photographic art in the Exhibition. It is a full-length, life-size portrait of a charming lady, it is hung in a corner, and the large plate of glass renders it very difficult to see it properly; in some minor points it might have been better—for instance, if the left arm had been slightly turned round to show less of the back of the arm and more of the front edge, the outline and proportions would have been seen to more advantage; and, if the skirt of the dress on the same side had been drawn out a little, the lines might have been better. But, taking the composition as a whole, if this picture had been painted in oil colour, it would have been up to the average of full-length portraits to be seen on the walls of the Royal Academy or in Continental Exhibitions. Of course, this splendid photograph is passed unnoticed by the wonderful Judges who were capable of bestowing medals on scraps No. 55 and No. 254.

No. 322, *Dr. Carlyle*, from the painting by Sir G. Reid, P.R.S.A. (gravure). Sir George is the leading portraitist in Scotland, but this is not a happy example of his work. It is a side view of the Doctor, who appears to have almost turned his back on the spectator, whom he is taunting over his shoulder, with a disagreeable, sinister expression. Now refer back to No. 268, *Dr. Carlyle*, of Langholm (taken direct), a life-size head, by J. B. Scott. Observe what a much more pleasant and genial character the Doctor looks in the photograph.

No. 323, *The Lamb*, from the painting by Fred. Shields (gravure), apparently reproduced from an engraving.—The children afford a very poor example of Fine Art, when compared to portraits, in the exhibition of children about the same size, produced by photographic art. Nos. 319 and 333 are admirable reproductions of art, by R Keene; they are mounted and framed to perfection.

No. 329, *The Newhaven Packet*, from the painting by H. T. Moore, R.A. (gravure). A most successful Autotype reproduction.

No. 334, *A Yacht Race*. A carbon enlargement, printed in colour by Elliot & Son. This is an interesting experiment, but I doubt if this kind of printing can ever rival the results already attained by photo-chromo-lithography. I must finally notice a beautiful example of artistic furniture, No. 279, *Photographs from Nature decoratively applied*, by Fred. Hollyer. This indicates a grand field for the direction of photographic enterprise.

PALETTE.

FOREWORDS: ON PHOTOGRAPHY AS ONE OF THE GRAPHIC ARTS.

[Catalogue of the Photographic Salon.]

Among the monochrome arts photography seems to hold a place nearer to the copper-plate processes than to any others. Like them, it is a negative process, a plate being produced from which positive impressions are afterwards made. As in etching, the original plate is made by chemical means; as in mezzotint and aquatint, the drawing is in tones, not lines; but, unlike any other process, this drawing is accomplished by the action of light, without the interposition of the hand.

Although not entirely limited by what is presented before it, the camera is not much used to show its power of invention, being employed, generally speaking, to reproduce more or less accurately what actually exists before it at one time. The way in which it shall do this, however, is a matter that is to a very great degree under the control of the user; to a degree far greater than is usually suspected by either artists generally or by casual photographers.

The selection and use of the lens according as either special emphasis or a generalising effect is required, the selection and relation of exposure and development, the choice of printing method, including the varieties of surface texture, and, perhaps more than all, an infinitude of devices, selection, and modifications of effects by the skill and knowledge of the handicraftsman in printing; these allow a range of variations in treatment, that is amply sufficient for the expression of the worker's individuality or idiosyncrasy, artistic and poetical, or otherwise.

Among the chief virtues possessed by photography as a medium for artistic expression may be mentioned:—

Its great delicacy of tonal gradation.

Its ready securing of aerial perspective, as shown in many cases of twilight and mist effects, and in the rendering of atmosphere and distance.

Its means of fixing the forms and positions of rapidly changing subjects, as shown in the transient effects of moving water and clouds, and in so-called instantaneous pictures generally.

Its giving absolutely faithful drawing and perspective of any subject, however difficult, from an actual as distinguished from an imaginary standpoint.

Its adaptability to very varied classes of subjects, and above all, and through all these qualities, the wonderful naturalness of its results, a naturalness which must appeal to every observer and which is compelling closer study and knowledge on the part of all draughtsmen and painters.

These and many other points might be named, to show the great range of possibilities for the artistic employment of photography.

That photographers at times do not use their process to the best artistic advantage may be true; but, if so, the fault is with the worker, not the method.

The dull diagrammatic prose of the earlier types of work is giving way to a more subtly suggestive style of treatment; and the initial blankness of wonder at its possibilities has been, or is being, gradually replaced by a clearer perception of what it can do well, and can do, for certain classes of subjects and effects, with a perfectness unapproachable by other methods.

Perhaps the greatest curse of Photography in the sense now under consideration is the fatal ease with which indifferent work may be produced by its means. But for the best work as much artistic feeling, as much technical proficiency, and as much patience and care are required as in any other of the graphic arts; among which, for the intrinsic beauty of its products, it certainly deserves to hold an honoured place.

HACKNEY PHOTOGRAPHIC SOCIETY'S EXHIBITION.

Good though it undoubtedly was, we are inclined to think that this year's Exhibition of the Hackney Photographic Society, which was held last week at Morley Hall, N.E., hardly equalled its immediate predecessor in point of average quality, particularly in those classes which were then its greatest strength, viz., those open to non-members. Again, there seemed to us to be room for improvement in the hanging of the pictures, while their classification was, perhaps, not altogether successful. Still the Exhibition was, on the whole, a very meritorious one.

Class A (members' pictures not previously exhibited for competition) might with advantage have been much smaller, and we throw out a suggestion that in such Exhibitions a restricted number of pictures from members should only be admitted. Mr. W. J. Hensler had a series of thirty New Zealand views, mostly showing great cleverness in selection and treatment, especially in combining crispness with atmospheric effect. The silver medal he obtained was well deserved. Mr. S. J. Beckett justly obtained the gold medal for a fine *Evening—Verona, North Italy*, a most effective sunset view, clouds and water being ably handled, the red tone of the picture giving it a striking effect. Mr. S. Moore's two interiors of St. Thomas's, Upper Clapton, Mr. S. J. Beckett's photographs in the Polytechnic Schools, the same gentleman's bold *Sunrise in the Hardanger Fjord*, all stood out prominently in this class. A word of praise is also due to Dr. Roland Smith for a picture of *Bricketwood Farm*, in which the commonest objects of the farm side were availed of to make up a fresh, charming, and yet unconventional study. In this class the Judges awarded a silver medal to an obviously poor piece of landscape work, which had not even the now fashionable property of being out of focus.

In Class B (hand-camera pictures, enlargements permitted) Mr. S. J. Beckett showed an interesting picture of the *Fram* (Dr. Nansen's ship) on her way to the North Pole, and Mr. R. Beckett a fine *Sunset—Trondhjem* (silver medal). Mr. Hensler's Ilfracombe views, Mr. T. E. Roofe's entertaining *Pelicans at the Zoo*, Mr. W. L. Barker's really admirable enlargement of *Southend*, and Mr. R. Beckett's other lurid-toned studies were conspicuous.

In Class C (new pictures taken at Club outings) Mr. F. W. Gosling had a view of the river Roding quite in Colonel Gale's style, and a delicate view in Wanstead Park by Mr. T. H. Smith deserved notice.

Class E (unmedalled pictures) included good and bad work. Among the former was Mr. Wellington's *Still Delight* (silver medal). *Sighting the Fleet*, a large picture of a mechanically posed woman "sighting" something "off," was an example of what to avoid in the way of constrained attitude. Other good work in the Class was shown by Messrs. W. England (*The Matterhorn*), W. Thomas, W. M. Warneuke (landscape, bronze medal—a clever unaffected study of ladies in a field of flowers), R. Frost (*Gladiolus* and *White Grapes*), Dresser (No. 369, seascape, being, however, too woolly and lifeless), Birt Acres (two admirable studies of *A Woodland Path* and *Beeches*), F. W. Edwards (architecture).

Class F (portraiture and *genre*) was a small and poor one. Mr. R. Beckett showed a study of a head, that of an elderly gentleman, which appeared as if somewhat over-touched. This year Mr. Beckett shines rather in landscape, &c., than in portraiture.

In the Champion Class Mr. Wellington easily won the gold medal with *Eventide*, a river-side study of great feeling.

Besides two classes for lantern slides there were several pictures not for competition, and among these was a series of clever *Dogs*, by Mr. Fall (by the way, we must quarrel with Mr. Fall for, in a portrait of Mr. Gladstone, having made the Premier look nearer sixty than eighty), some splendid large direct portraits by Mr. A. W. Wilson, jumping horses by Elliott & Son, &c.

Quite a good show of apparatus was on view in the centre of the Hall, Mr. A. P. Chalke having a display of artistic picture frame mouldings; Messrs. W. Watson & Sons, a selection of their well-known specialities; Mr. F. E. Morris, miscellaneous; Messrs. Fuerst Bros., amidol, metol, &c.; Mr. W. Wray, a case of lensee; Mr. H. Park, cameras and apparatus; Platt & Witte, a fine show of lanterns; Wm. Rawlings & Co. and Messrs. Doublet also having stalls.

Our Editorial Table.

Catalogues Received.

Newman & Guardia, 92, Shaftesbury-avenue, W.—Messrs. Newman & Guardia's catalogue is devoted to illustrated particulars of the firm's specialities in shutters, hand cameras, changing boxes, &c. The descriptions given are admirable in clearness and completeness.

M. W. Dunscombe, 10, St. Augustine's Parade, Bristol.—Herein are included details of a large assortment of photographic apparatus and sundries, together with much useful, practical information on the selection of a camera, development, printing, &c.

Chipper's Double Dark Slides.

Mr. W. C. Chipper, of 39, Highgate-hill, N., has submitted to us a sample double dark slide which he is supplying singly or in quantities. The slide is well made, has reeded draw shutters, and is light-tight. Its strongest characteristic is its price, a half-plate costing 5*s.* 6*d.*, other sizes being supplied at proportionate prices. The slides are cheap and efficient.

News and Notes.

Lewes Photographic Society.—Next meeting November 7, Lantern Evening of Members' Slides.

Photographic Club.—November 1, Annual General Meeting. 8, Members Open Night.

Brixton and Clapham Camera Club.—Next meeting, November 7, *Lantern Slides by Reduction*, by Mr. Butler.

Leytonstone Camera Club.—October 28, Members' Lantern Evening, Chair taken at eight o'clock. Members will please bring slides.

London and Provincial Photographic Association.—November 2, Demonstration by Mr. S. Herbert Fry, *The Paget Lantern Plates*. 9, Lantern Night.

Putney Photographic Society.—Monday, November 6, at eight p.m., at Boys' Gymnasium, Charlwood-road, Mr. S. Herbert Fry on *Unconventional Printing Methods*.

By referring to our correspondence columns, it will be seen that an open social meeting of the National Association of Professional Photographers will be held at Coleman's Hotel on November 10, to which all photographers are invited.

Messrs. Hobson & Co., Wellington, Shropshire, will shortly publish an architectural account of *The Churches of Shropshire*, by D. H. S. Cranage, B.A. It will be illustrated from photographs specially taken for the work by Mr. Martin J. Harding.

Liverpool Amateur Photographic Association.—November 2, Lantern Slide Making. *Lantern Slides, Reduction with Magnesium Ribbon*, also *Toning Chloride Slides*, by Mr. G. A. Carruthers. *Lantern Slides, Reduction by Daylight*, by Mr. Harry Holt.

Central Photographic Club.—Friday, October 27, Demonstration of *The Carbon Process*, by Messrs. Elliott & Son. We understand that "one man" shows are contemplated. The rooms are now open all day, an attendant being in charge. The dark room will be ready shortly.

Croydon Camera Club.—Fixtures: November 1, *Harmonising Harsh Negatives*, by J. Macintosh, and *A Chat on Lenses*, by G. R. White, instead of Mr. Gear's paper, postponed to December. 15, Special Public Lantern Display at Braithwaite Hall. Admission by ticket, price sixpence.

Redshaw's Backgrounds and Accessories.—Mr. W. H. Redshaw, of Bourne, Lincolnshire, has sent us numerous photographs of a great number of backgrounds and accessories prepared by himself. These, while being both artistic and tasteful, are of sufficient variety to give photographers great choice of selection, embracing as they do rustic scenes and seats, interiors, landscapes, seascapes, in considerable assortment. Mr. Redshaw's accessories and backgrounds should be very popular.

Death of "Bella Solomon."—We are sorry to have to record the death of Mrs. Abenheim, a lady at one time well known in London commercial circles as Miss Bella Solomon, for many years the reigning spirit in the photographic stores of her father, the late J. Solomon, of Red Lion-square. She was a brilliant conversationalist, an accomplished linguist and musician, and a woman of great natural parts and force of character. She died on Thursday, last week, from blood poisoning, consequent upon a severe internal complaint, from which she had long suffered. She declined permitting the attendance of a doctor till the day before she died.

The Influence of Photography on Modern Literature.—Conversing with a representative of the *Daily Chronicle* on the influences which conduce to the realism by which modern literature is pervaded, Dr. Oliver Wendell Holmes says: "I spoke of the influence of the telegraph on literature. Now, the photograph. It seems to me that the development of photography is largely accountable for the development of realism—the modern realism. You see, if a man wanted to be exceedingly realistic in olden days, to go into large detail, he had to make much trouble for himself. He could not write detail without examination; he had to go here and there to examine his subjects. To-day the photograph brings the fullest details imaginable on to the very desk of a writer. He has merely to look and dip his pen, no matter what the subject—a sewer or a laundry basket, if you like. It is realism made easy. What's easy becomes ultra."

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 19,518.—"Improved Means for Drying Photographic Films when on Celluloid, Paper, or Other Flexible Substance or Material." J. W. T. Cadett and W. Neall.—*Dated October* 17, 1893.

No. 19,566.—"Improvements in Stands for Cameras or other Articles." M. L. Macauley.—*Dated October* 18, 1893.

No. 19,715.—"Improvements in connexion with Projecting Lanterns.' Complete specification. W. C. Hughes.—*Dated October* 19, 1893.

No. 19,781.—"Improvements in and connected with Photographic Printing Surfaces." H. Pearce.—*Dated October* 20, 1893.

No. 19,810.—"A New or Improved Process for Separating Photographic Gelatine Films from Celluloid Supports or Bases." A. A. Barratt and A. J. E. Hill.—*Dated October* 20, 1893.

No. 19,835.—"Improved Apparatus for Facilitating the Development of Photographic Negatives by Daylight." J. F. Hammond.—*Dated October* 21, 1893.

No. 19,836.—"Improvements in Photographic Cameras." Communicated by N. Hansen. H. H. Leigh.—*Dated October* 21, 1893.

No. 19,837.—"Improvements in Transparency Printing-out Frames for Opals, Lantern Slides, and other Inflexible Substances." J. Wilkinson and A. Wilkinson.—*Dated October* 21, 1893.

No. 19,845.—"Improved Means of Indicating the Depth of Water in Rivers, Harbours, Seas, and the like, and Photographing said Depths to Scale or otherwise." J. Dillon.—*Dated October* 21, 1893.

PATENTS COMPLETED.

Improvements in Photographic Washing Apparatus.

No. 16,477. Frank Alston, 211, Ladypool-road, Sparkbrook, Birmingham. *September* 15, 1893.

The object of this invention is to thoroughly wash photographic prints and plates in an ordinary bucket or other domestic utensil. It consists of a straight tube with a taper nozzle fixed at a right angle to the bottom of it, and a syphon, the short arm of which is just over a small hole in the upper side of the nozzle, while the long arm hangs down outside, and the spring holds it firmly in position. When the tube is connected with the water supply by a piece of rubber tubing, most of the water rushes out at nozzle and causes water in bucket to revolve, whilst a fine stream from the hole causes water in tube to rise above level of that outside. When this reaches top, it flows down long tube and starts action of syphon. If, however, the water falls too low in the bucket, the air is admitted through the hole, and the action ceases until the water rises to a sufficient height to restart it. The bottom of the tube is surrounded by a piece of perforated zinc, which prevents the prints being drawn into the syphon.

Improvements in Photographic Shutters.

No. 4081.—John Edward Thornton and Edgar Pickard, Altrincham, Cheshire.—*September* 23, 1893.

The improvements forming the subject of this invention apply to photographic shutters of the roller-blind type that work close before the sensitive plate or film generally known as focal plane shutters.

A shutter of this kind is usually constructed with a narrow transverse slit in the spring blind, through which the light is admitted to the sensitive plate during the passage of the blind from the winding roller on to the spring roller.

The object of our improvements is to so form the blind that the width of the slit can be adjusted when required, which we do as follows :—

The two slides of the blind, which form the edges of the slit, are turned over and stitched (or otherwise fastened) a sufficient distance to form a hem or loop through which a strut is passed. The strut is formed of a piece of thin channelled steel, like a half tube, terminating at each end in a point. A short piece of tube is fitted in or over each end of one of the said struts.

The two struts are connected together by light chains at each side of the blind, which practically form the ends of the transverse slit. These chains are permanently fastened to the two ends of one of the struts, and one of the links of each chain engages with the point on the end of the other strut. The ends of the two chains pass through the two short tubes into or along the grooved strut, and are connected together by an elastic band.

To decrease the width of the slit, it is only necessary to shorten the chains at each side by hooking the points of the strut into other links, the rubber band inside the strut taking up the loose ends of the chains into the hem.

To increase the width of the slit, the chains are each lengthened by pulling out more links through the tube, and hooking on to the points ; in doing so, the elastic band is stretched.

We do not bind ourselves to the exact details of construction hereinbefore described, as they may be varied without departing from the main principle of the invention ; for instance, the strut may be formed of a light tube, instead of a grooved strip with tubes on the end, and a spiral wire spring may be used inside instead of the elastic band. If found necessary, both struts may be provided with elastic bands instead of having the chain permanently fastened at one end.

Improvements in or relating to the Production of Photo-mechanical Printing Surfaces.

(A communication from Asa Phillip Stanford, 409, West 47th-street, New York City, New York, United States of America.)

No. 10,196. Alfred Julius Boult, 323, High Holborn, Middlesex. *September* 23, 1893.

This invention has for its object to provide means whereby printing surfaces can be produced through the aid of certain characters which can be arranged in any desired order, and from which photographs can be taken, and which photographs can be transferred or transformed into the printing surface, and this class of machinery is designated as the phototype machine. The invention consists in a machine in which the various characters can be assembled in a line, and the line properly supported in position while a photograph is being taken of the line, when the characters can be quickly restored to their normal positions, and by repetition of these operations a proper photographic plate produced, from which by any of the well-known processes a printing surface can be made.

An Improved Photographic Dark-slide Recorder.

No. 20,253. John Edward Thornton and Edgar Pickard, Altrincham, near Manchester.—*September* 23, 1893.

The object of this invention is to provide a simple device for attachment to a photographic dark slide, for the purpose of showing whether the sensitive plate or plates in the slide have been exposed or not.

It is constructed of two thin plates of metal, or other suitable material, about $\frac{3}{4}'' \times \frac{1}{4}''$, hinged together at one side. The ends of the plates may be slightly turned up, so as to form bearings for the hinge. A spring is so placed at the hinged side that it will cause the top plate or lid to stand open, or at right angles to the bottom plate. Any suitable form of spring may be used, but we prefer a straight piece of steel wire, held at one end by the lid, and the other end by the bottom plate. The word "exposed" may be printed on the inner side of the lid, so that it is visible only when the lid is open.

The bottom plate is attached to the end of the dark slide in such a position that the projecting part or top of the shutter of the slide (or a projection attached to the shutter) will fit over the lid and keep it closed when the shutter is pushed right in.

When the shutter is withdrawn to expose the plate, the lid flies open, disclosing the word "exposed," and it remains in this position when the shutter is pushed home again.

The lid may be closed by the finger to "set" it at the same time that the slide is charged with fresh plates.

The claims are :—1. The combination with the dark slide of a recorder or appliance for indicating when the shutter has been raised and the plate exposed, consisting of a hinged plate, which is opened by a spring and held closed by the top of the slide, or a projection or catch thereon, substantially as described. 2. A recorder for the dark slide of photographic cameras, constructed of two plates hinged together on a spring wire or hinge, one to be attached to the top of the slide, and the other, with the word "exposed" inscribed thereon, to be held closed by the top of the shutter, or by a projection or catch thereon, substantially as described and shown.

Improvements in Frames for Printing Magic-lantern Slides.

No. 20,679. Claud Syms Scott, Brabourne, The Drive, Walthamstow, Essex.—*September* 23, 1893.

I improve the frames for printing magic-lantern slides from photographic negatives by providing means whereby the position of the negative is adjustable relatively to the slide, whereby the relative positions of the negative and the slide can be readily and exactly reproduced at will, and whereby the adjustment of the relative positions of the slide and the negative is made with greater facility than heretofore.

My improved frame consists mainly and essentially of four parts : first, a frame of wood or other material having a front aperture approximating to the size of the slide for the admission of light, and also having a back rim provided with springs, catches, or other devices of ordinary or special construction for the purpose of holding the back of the frame, the negative, the slide, and other parts steadily in position. Second, a plate of brass or other suitable material of about the thickness of the negative, sliding in the above-described frame, and having an aperture to fit and hold the negative; this plate has one or more lugs or extensions formed on its edges, said lugs or extensions passing through the back rim of the above-described wooden frame, and serving to assist in the adjustment of the said brass plate together with the negative, which fills the aperture thereof ; the lugs or extensions are marked off in divisions on their outer ends, so that any position of the brass plate and its contained negative relatively to the wooden frame and the lantern slide can be noted and reproduced at will. Third, a sheet of cardboard or other suitable material cut to fit inside the back rim of the wooden frame, and having an aperture to fit the lantern slide so situated that the true and proper position of the said slide opposite the light aperture is ensured when it is placed in the aperture of the sheet of cardboard or other material.

Fourthly, a back piece of wood or other material, provided with a pad of cloth or leather, and capable of being fixed and held into the outside frame by the above-mentioned springs or catches.

The light aperture in the front of the wooden frame is chamfered, in order to prevent the casting of any shadows on to the exposed portion of the negative.

I provide set screws in the rim of the outside wooden frame, which screw down on to the lugs or extensions of the brass plate, and serve to hold said brass plate in position.

Brass frames, having lugs or extensions as above described, may also be advantageously applied to printing frames in which it is desired to adjust and reproduce the exact position of the lantern slide relatively to a fixed negative. Further, I may employ two such brass frames, the lug or extension of one passing through the end of the outside wooden frame, and the lug or extension of the other passing through the side of the outside wooden frame, so that the position of the negative or of the slide, as the case may be, can be adjusted and registered in two directions at right angles. By this means any relative positions of the slide and the negative can be obtained and exactly reproduced. It is obvious that when two brass frames are employed the aperture of each must be lengthened or slotted in a direction at right angles to its lug or extension, in order to permit of the adjustment of the slide or of the negative in that direction by the other brass frame.

When two brass frames are used, one of the two may be formed without any lug or extension, but in such a way that it will conveniently slide in the lengthened or slotted aperture of the other, and thereby render possible the adjustment in two directions at right angles. In this case numbered divisions would be marked on the side of the slotted aperture of the brass frame having the lug or extension, and convenient means would be provided for fixing and holding the two brass frames together and maintaining the proper position of the slide or of the negative as the case may be.

It will be seen that, when the brass frames are used to adjust the slide instead of the negative, some modifications of the parts of the printing frame, described in the earlier part of this specification, will be necessary. In order to ensure the proper action of the brass frame or frames on the thin glass of the slide, it may be found advantageous to surround said slide with a narrow frame of any suitable material, and of greater thickness than the glass.

When using this printing frame, all adjustments may be made in ordinary light, and the glass plate, with its sensitive film, which is to form the lantern slide, can then be placed in position in the frame in a totally dark room if the usual photographer's dark room, with non-actinic light, is not available.

A New or Improved Paste for the Prevention of Discolouration of Photographs Mounted upon Bristol Board and the like.

No. 21,622. Hermann Wilhelm Vogel, 124, Kurfürsten-strasse, Berlin, Prussia, Germany, and Jacob Weinberg, 50, Wasserthor-strasse, Berlin, Prussia, Germany.—*September* 23, 1893.

It is a known fact that photographs mounted on Bristol board are liable to become yellow, and all attempts to prevent this have up to the present failed.

Experiments we have made as to the nature of this discolouration show that it can only result from the presence of impurities either in the photographs or in the Bristol board. For instance, the silver prints are often treated with too small a quantity of fixing salt, and the fixing is therefore defective, the following insoluble compound remaining in the pictures :—

$$Na_2S_2O_3 + Ag_2S_2O_3 \qquad (I.)$$

instead of the soluble double salt

$$2\,Na_2S_2O_3 + Ag_2S_2O_3 \qquad (II.)$$

which can be easily washed out.

The compound I contains only half the quantity of fixing salts contained in II, and soon decomposes in the air according to the equation :—

$$Na_2S_2O_3 + Ag_2S_2O_3 + aq = Na_2S_2O_2 + Ag_2S + SO_3 + aq \qquad (III.)$$

Sulphide of silver is thus formed, producing discolouration of the picture.

Again, the fixed pictures are often insufficiently washed out, small quantities of the salt being left, and also producing in time discolouration.

Then, again, pictures properly prepared and washed out are often dried on impure blotting-paper containing fixing salts, or hung on strings containing various impurities, and in this manner again soiled.

The cardboard used for mounts can also contain impurities, the paper used being often bleached with chlorine. This, and the reagent used to remove the excess of chlorine, called antichlorine, ($Na_2S_2O_3$) are according to the following equation :—

$$Na_2S_2O_3 + 3\,H_2O + 6\,Cl = 6\,HCl + Na_2S_2O_6$$

not of themselves harmful to the paper, but unfortunately a superfluity of

hyposulphite of soda is often present, and, according to the above formula, III. causes a precipitate of sulphur which produces discolouration.

Our invention consists now in overcoming the above defects by using a means for removing the sulphurous impurities, thus preventing this discolouration.

We attain this object by employing as a glue a paste of starch mixed with iodine in varying proportions; for instance, 10 c.c. of a solution containing 1 gr. of iodine in 10 c.c. of alkali, are added to 100 c.c. of freshly prepared pure starch paste. This mixture is thoroughly stirred, the paste changing to a dark blue mass, which may be coated on paper or on cardboard by means of a brush.

Our improved glue is employed either for uniting the several layers of paper of which a sheet of cardboard is composed, or for mounting paper photographs upon paper or upon cardboard. This glue will prevent the cardboard and the photographs from yellowing. This yellowing, which is a defect occurring frequently with photographs mounted with ordinary glue or paste, is due to chlorides and sulphurous or other impure admixtures, either contained in the paper or cardboard, or adhering to the photograph in consequence of the previous operations, for instance, owing to defective fixing or insufficient washing of the photograph. Now, iodine is a very efficacious agent for destroying such compounds as are capable of yellowing the photographs. Hyposulphite of soda is caused to combine with oxygen and thus to form hyposulphite of soda, as is represented by the equation :—

$$Na_2S_2O_3+6\,I+3\,H_2O=Na_2S_2O_6+6\,HI$$

Sulphide of sodium is converted into sulphite of soda according to the chemical equation :—

$$Na_2S+6\,I+3\,H_2O=Na_2SO_3+6\,HI$$

Experiments have proved that iodine has no noxious effect upon paper photographs in which the sensitive part of the paper contains silver salts. The experiments have also demonstrated the fact that our improved glue is efficacious in preserving the photographs for any length of time. It has been further ascertained that the addition of ten parts of tincture of iodine (I : 10) to 100 parts of starch paste in the highest proportion which it will be necessary to employ when the paper contains as much as one *per cent.* of impurities. It will be obvious that the amount of iodine which is to be added will in each case depend on the proportion in which impurities are admixed in the paper, cardboard, or photographs.

It will be obvious that our improved glue may be employed with great advantage for uniting the several layers composing a sheet of cardboard, especially if such cardboard is to be used for mounting photographs thereon.

It sometimes occurs that the paste or glue is squeezed out laterally off the photograph to be mounted, thereby occasioning blue spots. In this case we take a small sponge and soak it in a solution of 1 part of chemically pure sulphite of soda in 1000 parts of water. The sponge is pressed, so as to remove the greatest part of the solution it has soaked, and is passed over the blue spots; the blue colour will disappear very rapidly, and it will be sufficient to wipe the moisture away with a clean piece of cloth.

The following are the claims : 1. As a glue for uniting the several layers of a sheet of cardboard, and for mounting photographs, a paste of starch to which iodine is mixed in solution, for the purpose set forth. 2. As a means for removing spots occasioned by a glue containing starch and iodine, the employment of a solution of chemically pure sulphite of soda substantially as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 30	Camera Club	Charing Cross-road, W.C.
,, 30	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 30	Richmond	Greyhound Hotel, Richmond.
,, 31	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 31	Hackney	206, Mare-street, Hackney.
,, 31	Halifax Camera Club	
,, 31	Lancaster	Springfield Barracks, Lancaster.
,, 31	Leith	165, Constitution-street, Leith.
,, 31	Paisley	9, Ganze-street, Paisley.
,, 31	Warrington	Museum, Bold-street, Warrington.
November 1	Edinburgh Photo. Society	38, Castle-street, Edinburgh.
,, 1	Leytonstone	The Assembly Rooms, High-road.
,, 1	Photographic Club (Annual)	Anderton's Hotel, Fleet-street, E.C.
,, 1	Southport	The Studio, 15, Cambridge-arcade.
,, 1	Southsea	3, King's-road, Southsea.
,, 1	Wallasey	Egremont Institute, Egremont.
,, 2	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 2	Camera Club	Charing Cross-road, W.C.
,, 2	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 2	Glasgow Photo. Association	Philoso. Soc. Rooms, 207, Bath-st.
,, 2	Glossop Dale	
,, 2	Hull	71, Prospect-street, Hull.
,, 2	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 2	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 2	Oldham	The Lyceum, Union-street, Oldham.
,, 2	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
,, 3	Cardiff	
,, 3	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 3	Holborn	
,, 3	Leamington	Trinity Church Room, Morton-st.
,, 3	Maidstone	"The Palace," Maidstone.
,, 4	Hull	71, Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

October 24,—Technical Meeting, Mr. W. E. Debenham in the chair.

Balloon Photography.

Captain A. M. Mantell, R.E., read a paper on balloon photography applied to military purposes. He passed round a number of photographs taken from a captive balloon. The camera was placed in the wicker car, and was capable of being tilted. It was a whole-plate Meagher, a rapid rectilinear lens of 16 inches focus, and a Thornton-Pickard shutter being used. Views of from one to two miles' distance were taken. No distortion was perceptible, but in some of the views there was a decided blur, due to movement of the balloon; others showed blur due to the velocity of the wind. It seemed impossible to give a sufficiently short exposure to prevent this blur. They could not, however, expect sharp results in balloon photography. When the wind was travelling at more than sixteen miles an hour it was impossible to take views at all. It would be advantageous to reduce the exposure as much as possible, and therefore the lens must be very rapid and the focus should be obtained with, say, *f*-16. A smaller stop diminished the chances of giving a good exposure. Probably the best lens for the purpose was the Goerz Anastigmat, which Messrs. Ross & Co. had informed him they would soon bring out, so it would be possible to use *f*-11 for balloon work. He had not tried the tele-photo lens as it included such a small angle and was not rapid enough. He had used four different kinds of plates, rapid and ordinary, and found the latter give the best results. The exposure, as a rule, was about half that for sea and sky—that is, with *f*-16, about one-sixtieth of a second. The ordinary folding camera was unsuitable. The car of the balloon swung and danced about rapidly, so that it had been sometimes found advisable to tie the camera to the edge. The camera, therefore, should be strong, being box-shaped and not tapered. It should have a swing back and a shutter capable of giving exposures from one-thirtieth to one-hundred-and-fiftieth of a second. A changing-box should be provided, and sights on top of the camera used as view-finders. For development he had used pyro-ammonia. He had found Nikko paper suitable for printing purposes. When the wind's velocity was less than ten miles an hour, good results could be obtained; but when the velocity was greater, many failures occurred, and at sixteen miles an hour it seemed scarcely possible to get good results. Photography from a free balloon was much simpler, as the balloon moved with the wind without tossing about. The exposure must be as short as possible, and there was not the risk of blur that there was with a captive balloon, the rate of the wind making no difference. A free balloon twisted about and rose and fell. Captain Mantell concluded his paper by referring to the work in the Exhibition done by Mr. Jennings from a free balloon, and passed round a few examples taken from a captive balloon during the recent manœuvres as showing the kind of work which might be done during an actual campaign.

Mr. T. Sebastian Davis inquired why a whole-plate camera was selected; he suggested a smaller one would have been more advantageous. He thought a quarter-plate camera could have been used and enlargements made.

Captain Mantell agreed that a quarter-plate would have the advantage as regards portability. As regards steadying the camera by a weight, as suggested, he had not attempted it.

Mr. H. Wilmer suggested the use of a strong magnet to prevent the camera rotating.

The Chairman, referring to the use of the tele-photo lens for balloon purposes, said it might be made to have a perfectly flat field, although, when used for a great deal of enlargement, the field was curved. If the field were limited, that might be got over by taking three or four photographs in succession. Direct images were better than enlargements, as in the latter the texture was enlarged so as to obscure fine details.

Mr. T. Bolas said he did not think a weight would answer for preventing rotation of the balloon, and suggested Professor Piazzi Smyth's gyroscope system, with a smaller wheel at less speed.

Captain Mantell said a magnet, gyroscope, &c., would be suitable for the purpose, if not too heavy. The tele-photo lens might be of great use under some conditions, but it only included a small angle. They required to get in as large an angle as possible. Overlapping pictures, as suggested, would be of no use.

Mr. W. England said the tele-photo lens was scarcely available for instantaneous work. His experience was that it required about six times the exposure of an ordinary lens, magnifying ten times.

A vote of thanks was passed to Captain Mantell for his paper.

Photo-micrography Simplified.

Mr. W. I. Chadwick gave a discourse on this subject, explaining the apparatus he employed and exhibiting a number of specimens.

We defer our report of this subject until next week.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

October 19,—Mr. P. Everitt in the chair.

Mr. T. C. Hepworth delivered a lecture on *A Photographic Tour in the English Lake District*, illustrated by numerous lantern slides (see page 686). The lecture, which was of a humorous and descriptive character, was highly appreciated, and at its conclusion the Chairman, on behalf of the members, thanked Mr. Hepworth.

Vitro-enamelling.

Mr. A. L. Henderson made a few remarks on this subject, suggested by Mr. Henderson's recent demonstration on the preparation of plaques. He was sorry Mr. Haddon had not given the composition of the enamel he had used. Arsenic was used to get whiteness, but it was a disagreeable substance. It was cheap, and was a flux in itself. He preferred oxide of tin as a colouring matter, and would suggest, as a base, to take two parts of commercial tin enamel, and one part of flux ground up. Tin gave warmth to platinum, and he (Mr. Henderson) could get any sort of colour with it, from steel grey up to

almost brick red. His tones would have been still warmer if he had got more tin in the enamel. For many years he had used an open muffle; but, upon taking up gas, his results were less satisfactory, the blacks and whites both being bad. As regards retouching, it was easier with the substitution process than with dusting on. In reply to Mr. J. S. Teape, Mr. HENDERSON said that, in applying a portion of the same film to the enamel, it fired the same colour.

Mr. TEAPE said he found this was not always the case.

The CHAIRMAN asked Mr. Henderson if he would give a demonstration of enamel work, especially as, during the past few years, a great many new members had joined the Association who had not had an opportunity of witnessing the demonstration Mr. Henderson had already given. He (the Chairman) was of opinion that enamel work opened up a most prominent field for professional photographers.

Mr. HENDERSON regretted his inability to give the demonstration asked for on account of his health, which, though better now than it had been for some years past, was still not what he hoped it would be.

Mr. HADDON remarked that he had gone into the subject of plaque-making in order to draw new people into the field of experiment, and his object in showing how the plaques could be made was to save the cost of buying plaques, which, at a shilling each, would come expensive.

Mr. HENDERSON pointed out that, with spoilt enamels, the images could be used, and the plaque used again.

After other discussion the meeting closed.

Affiliation of Photographic Societies.—The tenth meeting of Delegates was held at 50, Great Russell-street, W.C., on Tuesday, October 17, Mr. E. Clifton (Photographic Club) in the chair.—The minutes of the last meeting were confirmed. The report of the Sub-committee appointed to consider the question of endeavouring to obtain from the railway companies concessions to photographers similar to those to anglers, in which the Committee stated that they had made inquiries, but were unable to recommend any course which would hold out a reasonable chance of success, was adopted. It was proposed by Mr. P. Everitt (London and Provincial Photographic Association), seconded by Mr. Hodsoll (North Kent Amateur Photographic Society), and carried, "That the Secretary be instructed to communicate with the principal railway companies with a view to securing for members holding return tickets the privilege of breaking the journey at any intermediate station." The report of the Conference of Judges was adopted unanimously, and the Secretary instructed to print and publish the decisions arrived at by the Judges. The question of certain additions to the Rules was taken up, and it was decided to submit the following alterations to the Council of the Photographic Society of Great Britain for its approval:—1. "That, after Rules 1 and 2 as at present standing, a Rule as follows be inserted: The object of the Affiliation is to consider and suggest lines of action to photographic societies, and to take any steps it may think fit to encourage or otherwise benefit photographic societies and similar organizations, and their individual members." 2. "That, after Rules 3 and 4 as at present standing, a Rule as follows be inserted: The Committee shall meet at such time and place as the Chairman shall decide. On the requisition of ten delegates, the Secretary shall call a meeting not less than fourteen, nor more than twenty-one, days after receipt thereof. At Committee meetings nine shall form a quorum." 3. "That, after Rule 7 as at present standing, two Rules, as follow, be inserted: *a*. A balance-sheet of the accounts of the Affiliation shall be prepared by the Treasurer up to the 31st December in each year, and shall be audited by two auditors. *b*. The Annual General Meeting of the Committee shall be held during January in each year. At this meeting the balance-sheet, duly audited, and the Chairman's report of the year's proceedings shall be submitted, and officers, consisting of a Chairman, Treasurer, and two Auditors, shall be elected for the current year." 4. "That the Rules be then consecutively numbered." On the proposal of Mr. Everitt, seconded by Mr. A. F. Taylor (Ealing Photographic Society), it was resolved to petition the Photographic Society to remit to members of affiliated Societies the wall-space charges at the Exhibitions, pointing out at the same time that they knew of instances in which other Exhibitions had received exhibits which would have come to the Photographic Society's Exhibition had it not been for the wall-space charges.

Brixton and Clapham Camera Club.—October 17, the President (Dr. Reynolds, F.R.G.S.) in the chair.—At the conclusion of the ordinary business, the PRESIDENT read a paper on the *Diazotype Process*, *i.e.*, printing in aniline dyes. About 1890 a new dye, named primuline, was discovered by Mr. Green, of the firm of Green, Cross, & Bevan. This dye, which is very soluble in water, and yellow in colour, has a strong affinity for all kinds of vegetable fibre, and so strong is this affinity that it is only necessary to soak the fibre for a few moments in a dilute solution of the dye, and a perfectly fixed primrose colour is the result. After the material is dyed, it is immersed in a bath of nitrous acid, and a surface is then obtained which is of a deep orange colour, and very sensitive to light, and if this surface is exposed to the action of sunlight, or a strong light, the deep orange colour bleaches to a pale primrose, and, after washing in water, remains at this tint. If, however, before exposing to light, a portion of the surface is protected by covering with, say, a fern leaf, or a dense carbon positive, it will be found that the portions of the surface so protected are not bleached, but remain of a deep orange colour, which they had upon removal from the nitrous acid bath. If now an alkaline solution of one quarter to one half per cent. of, say, beta naphthol is applied, the portions unacted upon by light will become of a splendidly red colour, the parts acted upon remaining simply a pale primrose colour, requiring only to be washed and dried. Other aniline derivatives applied as developers give rise to other colours, as blue, orange, brown, yellow, maroon. The process is admirably suited for ladies' use, because such articles as tablecloths, curtains, coverlets, panels for doors, mantelboards, &c., of a most ornamental kind can be readily produced. It is only necessary to print in sunlight for a few minutes. It must, however, be remembered that this is a positive process, consequently a positive must always be used to print from. If a material, such as a layer of albumen, stained with primuline, is dried, heated to 212°, and then developed with pyrogallic acid and sulphite, a deep clear sepia stain is produced on a pale yellow ground, and this will bear almost any amount of amplification, and, if a sensitive surface could be obtained quick enough for camera exposure, the negative could be enlarged to any extent without showing a trace of the structure of the substance on which the actinic impression was produced. This would, indeed, be perfection in photography for astronomical or micro-photographic purposes. A practical demonstration which followed proved conclusively the simplicity of the process, and the members present were delighted with the results produced. On being asked by the President, Mr. Cross, of the firm referred to, then kindly gave a thoroughly detailed account of the chemistry of the process, pointing out also the cheapness and uniform success of the results to be produced. His firm would be ever ready to assist those desirous of taking up this beautiful process. It may be mentioned that the materials and necessary chemicals can be obtained from Messrs. Watson & Co., High Holborn, W.C.

Croydon Camera Club.—There was a full attendance on the 18th, when Matthew's Portable Lantern was shown and explained by the Hon. Secretary, Mr. G. R. White. The general feeling was, that the instrument is characterised by several desirable features, and that it is worthy of high commendation. A number of slides were shown on the screen, the work of Messrs. Ryan (*Norwegian scenery*), Price (*Hurlingham*, &c.), Packham White (*The Chutes*, &c.), and Carden (*Croydon Cricketers*, &c.).

Ealing Photographic Society.—October 19.—Four new members were elected, and two more nominated. Mr. S. H. FRY gave a lecture and demonstration on *Paget Printing-out Processes*. Comparing gelatino-chloride with albumenised paper, he claimed for it the following advantages: Being made by machinery, the silver salts were more evenly distributed, it kept better, it gave better results with poor negatives. Its chief disadvantage was, that there was sometimes difficulty in getting even tones, especially when the print contained sharp gradations from light to shade. The methods of toning and fixing were then described. To secure even toning, it was essential to thoroughly wash the print until all milkiness had disappeared from the water, if separate toning and fixing baths were used; any toning bath would do, though the Paget Company preferred the sulphocyanide bath. In using this bath, the points to be observed were, not to exceed the quantity of sulphocyanide given in the formula, and to give the requisite quantity of gold for the amount of paper (one and a half to two grains) per sheet; to place all the prints in the bath as quickly as possible, and to keep them in motion; to judge the colour of the image entirely by transmitted light, and not to stop the toning so long as the slightest trace of yellow was visible in the shadows. The prints must be thoroughly washed between toning and fixing, and no trace of hypo must be allowed to get into the washing water, as hypo, in small quantities, caused brown stains. For the combined toning and fixing bath, the following simple formula was recommended: Water, 4½ ounces; chloride of gold, 1 grain; acetate of lead, 20 grains; hypo, 380 grains. It was most important that the bath should not get acid, and, to prevent this, precipitated chalk or whiting should be used in the bath. In no circumstances should gold be added to the bath after toning had started. The methods of obtaining enamelled and matt surfaces were explained, and a number of prints, opals, and lantern slides on Paget plates and papers were shown. The meeting then adjourned to the dark room, when Mr. Fry demonstrated the development of a partially printed print, which is a speciality of the Paget Company, and afterwards toned the print, together with another which had been fully printed in the usual way. He explained that development must stop considerably short of the required density, as the developed image, unlike the printed one, gained considerably in depth in the toning bath.

Leytonstone Camera Club.—October 18, the President (Dr. W. Pickett Turner) in the chair.—The first demonstration in the new hall and studio took place. Mr. E. A. LEBLANC demonstrated the uses of Dr. Andresen's rodinal and glycin, also metol, amidol, eikonogen, fixing, and tone-fixing cartridges. First, the different qualities of the developers was explained; second, plates and films were developed with rodinal and metol cartridge; third, bromide paper was developed with amidol cartridge; fourth, lantern slides were developed with eikonogen cartridge; and lastly, Eastman Solio, Ilford P.O.P. and Paget P.O.P. chloride papers were toned with the tone-fixing cartridge. A large number of negatives and prints which were passed round amply testified the capabilities of Dr. Andresen's specialities, one of the most remarkable and useful being the fixing salt, a quarter-pound solid bar, dropped into forty ounces of water being dissolved in about thirty seconds. Mr. Leblanc dealt with his subject in a very able manner, and gave most lucid explanations to the various questions put by the large number of members present.

Putney Photographic Society.—October 19, Dr. J. F. Farrar in the chair.—Mr. Baldwin, of the Eastman Company, gave a lecture and demonstration on *Solio Paper*. In the course of his remarks, Mr. BALDWIN said the best results were probably obtained from negatives with a tendency to softness, but good prints could also be made from negatives suitable for any of the other usual processes, as well as from some with which this was not the case. The paper has considerable keeping qualities, but, as with all commercial printing papers, it was advisable to use it when fairly fresh. Damp was a danger to be carefully avoided, and for this purpose the paper should be kept in closed tubes or boxes, and an indiarubber pad should be placed next to it in the printing frame. Printing would be found to proceed rapidly—generally twice as fast as when using albumenised paper, and it would not be found necessary to the depth required by this process. The printing should be regulated with a regard to the subsequent treatment—rather more deeply for prints to be toned in the combined bath, or to be finished with a glossy surface, than for those to be toned and fixed in separate baths, or to be finished with a matt surface. The Solio being an emulsion paper, there was no danger of it staining the negatives when placed on them in the printing frame, as was not infrequently the case with other papers having free silver on the surface. Reference was then made to the various toning formulæ given in the instructions issued with the paper, and their action and characteristics explained. These baths were, after careful experiments, recommended by the Company, but the paper could also be successfully treated with others, and no doubt many workers would find out for themselves a bath which would readily and with certainty give

them the tones which they most admired. With the combined toning and fixing bath no preliminary washing was necessary, and it was also in other respects convenient, but toning beyond the brown should not be attempted, as a greenish tinge would be the result. He recommended that this bath should only be used once, a fresh bath being made for each batch of prints. When working with the separate baths, a preliminary washing was necessary, and upon its thoroughness depended largely the success of the subsequent treatment. Temperature had great influence on the toning bath; forty to fifty degrees had been found advantageous, and in hot weather it was desirable to cool the bath with ice. The use of alum was also recommended for hardening the film. After toning, the prints should be thoroughly washed before being passed into the fixing bath. This should be made up in accordance with the formula, the sulphite of soda helping to preserve the purity of the whites. The washing, after fixing, should be continued in running water for about an hour, and, where running water was not available, in about twenty changes. The prints could be finished in various ways; if simply dried and mounted, they could be burnished, care being taken that the temperature of the burnisher should not exceed 170°; for glossy surface, the prints should be squeegeed on to carefully cleaned plate glass, or ferrotype plates, and, for matt surface, on to finely ground glass. In either case it might be considered desirable to back the prints with suitable paper to preserve the gloss or matt when mounting. Gelatine was, perhaps, the best mountant; any containing indiarubber in any form or degree should be shunned for this paper. Mr. Baldwin went fully into all details, and ably answered a large number of questions addressed to him by the members, who throughout followed his lecture and demonstration with interest.

Richmond Camera Club.—The Annual General Meeting was held on the 16th inst., Mr. C. H. Davis in the chair, when the report and balance-sheet for the year ended August 31 were submitted and adopted, and the following officers were elected for the current year:—*President:* Mr. Cembrano.—*Committee:* Messrs. Alabaster (Lanteruist), Ardaseer (Librarian), Gibson, Huddy, Neville, and Williams.—*Hon. Treasurer:* Mr. Davis.—*Hon. Secretary:* Mr. Eunis.

South London Photographic Society.—October 16, Ordinary Meeting, at Hanover Hall, Hanover Park, Peckham, the President (F. W. Edwards) in the chair.—After the close of the nsual formal business, the evening was devoted to the exhibition of slides in the Society's lantern, to enable members to select and make up the sets which they intend to send in for competition at the Exhibition to be held early in next month. Messrs. A. H. Wall and E. J. Wall were elected honorary members of the Society.

Woodford Photographic Society.—At the meeting on October 19, the Rules, as passed at the preceding meeting, were confirmed. The PRESIDENT then gave his opening address, speaking of the improvement both in methods of working and in final results that always follows the intercourse among photographers that a Society gives. He wished, too, that the members of the new Society would freely bring their work for discussion at the meetings—not their successes only, but their failures. There being no apostolic succession in photography, the only road to success must be through failure, which should never discourage, but be valued for the lessons that they teach. In concluding, he impressed upon the members the necessity of individual work if we wished to be successful, expressing the hope that, by the co-operation and work of the members, the Woodford Photographic Society might take an honoured place amongst the foremost societies. The President then vacated the chair (which was taken by Mr. Caird), and read a paper on *Some Modern Printing Processes*, passing in review albumen-silver, gelatino-chloride, gelatino-bromide, platinotype, and carbon. In regard to gelatino-bromide, he said that almost any class of picture could be obtained, the strength of the light used in printing exercising a powerful influence over the vigour of the finished print. The results, too, might be considered permanent. Descriptions of the platinotype and carbon processes, their simplicity, artistic beauty, and permanence, and the principal points to be considered in order to ensure successful results, concluded the paper. In order to illustrate the various processes, the President showed some of his own bromide and carbon prints, bromide prints by Mr. A. R. Dresser, platinotype by Mr. Frederic Hollyer, and carbon prints by the late Mr. William Bedford, and by the Autotype Company. A discussion followed on the practical working of the different processes.

Aston Natural History and Photographic Society.—The audience of Thursday last had the pleasure of hearing one of the most interesting papers as yet delivered to the Society. Mr. Cracroft was most happy in his description of the district around Cheddar, and the hints as to directions to take, lenses required, and other "tips," were well received by one of the best attended meetings of the session. The lecture was illustrated by some fine mounted prints, and was rather novel after so good a run of lantern views. At the subsequent Committee, the Secretary informed the members present that the General Committee, to whom the hall belonged, had graciously granted the free use of hall and rooms on the first floor for the purpose of the Exhibition on March 1, 2, and 3, which the Aston Photographic Society intend to organize, and which will be rather novel in its way, including "Photographic, Natural History, and kindred manual work." There will be the usual awards of medals and diplomas, and some well-known gentlemen are expected to act as Judges.

Birmingham Photographic Society.—October 17, Mr. J. J. Button in the chair.—About twenty members present. A number of fine photographs, lent by the President of the Society, were on view. They consisted of enlargements made from negatives taken by him on his recent tour in the West Indies and Brazil, which were very much admired, and of a very fine series of Irish views, which were the work of a professional. These latter showed especially wonderful skill in platinotype printing.

Derby Photographic Society.—October 17, Mr. Keene presiding.—The subject for the evening was, *Photography, and its Application to the Detection of Crime*, a paper by Dr. Paul Jeserich, and which was illustrated with about forty lantern slides. The paper was read by Mr. A. H. Bennett in a very able manner, while Mr. C. B. Keene kindly officiated at the lantern, and at the close a vote of thanks was accorded to these two gentlemen for assisting.

Eastbourne Photographic Society.—A good muster of members of this Society gathered to hear and see Mr. FRY upon *Paget Printing-out Processes*, and especially to see the new and interesting process of development of printing-out papers by alkaline development.

Lewes Photographic Society.—October 17, the President (Councillor Wightman) in the chair.—A demonstration of the process of preparing transparencies for the magic lantern was given by Mr. S. HERBERT FRY, who is lecturing on behalf of the Paget Plate Company, of Watford, and demonstrating the use of their manufactures.

FORTHCOMING EXHIBITIONS.

1893.	
October 27–31	*Hamburg. Das Ausstellungs Committé des Amateur Photographen Verein, Schwanenwik, 33, Hamburg.
,, 27–Nov. 11...	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
,, 27–Nov. 15...	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
,, 30, 31	*East London Photographic Society, New Tabernacle, Old-street, E.C. Hon. Secretary, W. R. Gould 61, Gibraltar-walk, Bethnal Green, E.
November 7–11	*South London Photographic Society. Hon. Secretary, C. H. Oakden, 51, Melbourne-grove, Dulwich, S.E.
,, 17–25	*Stanley Show (Photographic Section), Agricultural Hall. Manager, Walter D. Welford, 57 and 58, Chancery-lane, W.C.
,, 20–25	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18–Jan. 22, 1894	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

PHOTOGRAPHY IN NATURAL COLOURS.

To the EDITOR.

SIR,—In your "American Notes and News" (p. 669), referring to Abraham Bogardus' conservatism, you make one statement which I think calls for correction. You say, "that the colours of Nature have, in the works of the latter (Lumière), been produced, is a real fact, and has been demonstrated to those assembled at the Chicago Congress over a month ago." According to my source of information (have I been misinformed?), the photographs of *objects* shown at the Chicago Congress were not by Lumière, but by Lippmann, and were some of the same specimens that Mr. Cameron Swan and myself saw and carefully examined in Paris last year. If so, they did not prove what has been asserted, because the colours, besides appearing unnatural and metallic even in the absence of originals for comparison, were not even confined to the coloured objects themselves, and the high lights of the objects were rendered nearer black than the deepest shadows. In justice to honest sceptics, attention should be called to the fact that there are vitally important differences between the results of Lumière and of Lippmann, and that scepticism as to the claims made for the Lumière results was justified by knowledge of the grossly inaccurate descriptions of the Lippmann results which were published a year before.

There is still a certain amount of mystery about the Lumière productions which makes it impossible to discuss them as intelligently as could be desired, but I have observed some facts in connexion with them which appear to me to indicate an important modification of Lippmann's theory, and also to justify certain instructive comparisons with the photo-chromoscope process. These observations will be published before long; meanwhile, people who like to make comparisons will like to know that the Lumière pictures are more difficult to make than photo-chromoscope pictures, require a light twenty times as powerful to project satisfactorily to a given size on a screen, and are not as true to Nature.—I am, yours, &c., FRED E. IVES.

116, *Charing Cross-road, W.C., October* 20, 1893.

THE ZEISS APOCHROMATICS.

To the EDITOR.

SIR,—I have this morning received from Herr Zeiss a letter in which he expresses a strong and not unreasonable objection to my remarks, as

reported in your last issue, upon Mr. Pringle's paper at the Photographic Society of Great Britain. I am therein made to comment in general terms upon the bad qualities of apochromatics; and, for my own credit's sake, as well as in common fairness to a firm whose lenses I use daily and highly appreciate, I must ask you to allow me to say that my remarks were strictly confined to my experience with one of the earlier apochromatics, the glass of which, having sweated, and it having been returned to the makers for repair, I found on its being sent back to me that it was no longer so good as formerly, its field being absolutely sharp only for a small diameter in the centre, whereas it had previously given a field of about two and a half inches available for photo-micrographic purposes. The glass at present used for the apochromatics is free from the liability to sweat which that used for the earlier ones evinced, and that lens only, of all my battery, has ever shown a sign of it.—I am, yours, &c.,

363, *Old Kent-road, S.E., October* 23, 1893. EDWARD BOUSFIELD.

FILMS *VERSUS* PLATES.

To the EDITOR.

SIR,—Your readers may be interested in the results of trials of films of various makers against plates during a trip in Switzerland, the trials extending over a period of two months, and employing the films of the highest reputation for rapidity as against two brands of plates. The films in every case were so completely distanced by the plates that, while I got fair printing negatives from the latter with the exposure indicated by the Thornton-Pickard focal-plane shutter at $\frac{1}{500}$ and $\frac{1}{1000}$ of a second, the plates broke down utterly as $\frac{1}{100}$. With time exposures the films gave admirable results, but the keeping properties seem to be in an inverse relation to their sensitiveness, and the very rapid films fogged irretrievably two months after they were received from the agents, while the moderately slow ones show no signs of deterioration. The conclusion is that, for the work requiring the highest rapidity, films, as now put on the market and without regard to their make, are no substitute for glass plates.—I am, yours, &c., W. J. STILLMAN.

Rome, October 15, 1893.

WARMING THE DARK ROOM.

To the EDITOR.

SIR,—With your permission I will endeavour briefly to answer Mr. Smith's letter. [In his first letter in the JOURNAL of September 29 he said, with reference to "George's Calorigen," it has the drawback of requiring two openings making in an outer wall, and they will *not* answer connected with an ordinary chimney; "I say they will answer connected with an ordinary chimney. In 1874, wishing to warm a (painter's) studio, I had the grate removed, closed the opening of the fireplace with a sheet of iron, and connected the stove in accordance with Messrs. Farwig's printed instructions (fig. 3). I then required one opening "in an outer wall" to bring in fresh air. If I had pierced the wall at the back of the stove, I should have gone into my neighbour's studio, as the houses are not detached; I therefore carried the pipe "G" under the floor-boards to the front outer wall, pierced the brick, and so it has been ever since with perfect success. That is point one. Point two, I said that Messrs. Farwig's address was in Upper Thames-street, they were there in 1874 and have been there ever since; I said No. 4, Mr. Smith says "No. 1." I copied the address which is stamped on a brass plate on the stoves that I have in use, and you will see it is so on the printed prospectus, and I believe in their ignorance Messrs. Farwig have "No. 4" on their premises, and will, no doubt, be surprised to hear from Mr. Smith that it is No. 1. I can only hope that Mr. Smith will be more fortunate in his "facts" in the future letter that he promises you on syphon stoves. I would never have a syphon stove fitted in a bedroom for use in case of illness, which I would unhesitatingly do with George's Calorigen, backed by the opinion of Dr. Thorne.—I am, yours, &c., L. M.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

To the EDITOR.

SIR,—With reference to our next Council Meeting, to be held on Friday November 10, 1893, three p.m., at the premises of the Central Photographic Club, Coleman's Hotel, Henrietta-street, Covent Garden, London, I have received the following letter from one of our members, Mr. W. P. Marsh, Waterloo-square, Bognor:—

"I venture to suggest that the meeting might be made a little more of a social character.

"Let the members have an opportunity of meeting and making themselves known to one another.

"It struck me, when at the meeting last year, that many of those present were strangers to one another, some coming from a long distance, to meet and part strangers to each other, not having had the opportunity of an introduction.

"I am aware that there is necessarily a considerable amount of business to be got through in one evening, but I think that half an hour's interval, to enable members to have a friendly chat, would do much both to make the evening pass pleasantly and induce more to attend.

"I feel satisfied that a stronger meeting might be got together if the "bill of fare" is more enticing.

"I am, dear Sir,
"Yours faithfully,
"W. P. MARSH."

Now, Sir, I heartily agree with the kindly remarks of our excellent member, Mr. W. P. Marsh. The writing of such a letter is strong evidence of the *possibilities* of the National Association of Professional Photographers in its collective capacity.

No one can for a moment doubt that, if the Association were supported numerously by the profession, as it deserves to be, we should find, month after month, fresh subjects cropping up, suggestions made by members, and questions arising for the action or consideration of the Executive, in the interests of the members and the profession generally.

I beg to be permitted to inform your readers how gladly the profession will be received at the meeting, November 10, three p.m., and that a "General Meeting" of professional photographers will be held at 7.30 p.m. (same place), also that I shall be very pleased to entertain the members of the profession who may desire to co-operate with us at a "friendly tea," &c.—say, five p.m.—if they will honour me with their company.

An early intimation of their intention to be present will contribute to the comfort and convenience of my brother professionals.

I am convinced that social intercourse will not only break down stiffness, and promote kindliness, but that it will bring an accession of members, to the mutual advantage of the entire profession.

I would also take this opportunity of pointing out the advantages offered by the new Central Photographic Club now definitely established at Coleman's Hotel, Henrietta-street, Covent Garden, London.—I am, yours, &c.,

9, *Baker-street, London, October* 21. THOMAS FALL.

WOODFORD PHOTOGRAPHIC SOCIETY.

To the EDITOR.

SIR,—May I ask the favour of space in your columns to call the attention of photographers residing in the neighbourhood of Epping Forest to the formation of a society at Woodford? In commencing, we have nearly twenty members, and shall welcome all who may be willing to co-operate in working to make our Society a success. Our meeting nights are the first and third Thursdays in each month, and our officers for the first year: *President*, Mr. H. Wilmer; *Members of Council*, Messrs. E. B. Caird, Henry Crouch, and H. T. Malby.—I am, yours, &c.,

HENRY W. BENNETT, *Hon. Sec.*

Dacre House, Arundel-street, Strand, W.C.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange grass mat (Marion's) for printing frames.—Address, C. E. PEACOCK, 13, Barnston-street, Hull.

Dallmeyer's 2c fifteen-guinea lens to be exchanged for American organ.—Address, JOHN WEIR, photographer, Moffat.

Will exchange Lancaster's whole-plate Le Méritoire lens for burnisher.—Address, G. GRIMMETT, 38, Rolls-road, London, S.E.

Will exchange circular print-washer, porcelain, 15 in. diameter, 6 in. deep, for landscape background.—Address, J. ALLARD, 2, Werter-road, Putney.

Will exchange Marion's embossing press, cost 5l. 5s., for Adam's binocular pantoscope or camera for making lantern slides.—Address, W. WALKER, Scotholme, Nottingham.

Will exchange a new Optimus burnisher, 8-in. bar, dipping bath in wooden case, frames, dishes, &c., for a good R. R. quarter-plate lens, or books.—Address, K. B. WILLIAMS, Mallow.

I will exchange Dallmeyer's stereographic lens, or whole-plate wide-angle landscape lens and other apparatus, for 12×10 triplet lens.—Address, J. W. HILDER, Matlock Bath, Derbyshire.

Iron-framed background stand, will carry six backgrounds, too large for studio; exchange for one good background (seascape preferred) or nice studio accessory.—Address, OCTAVIUS CARTER, Bournemouth.

Dallmeyer's 2a lens, with Cadett's pneumatic shutter, in exchange for Hume's cantilever eight-and-a-quarter-inch condenser or fifteen-inch globe-enameller. Address, A. SIMMONS, 258, Westminster-bridge-road.

Wanted, a portable half-plate square-bellows camera and six slides, in exchange for modern half-plate camera, conical bellows (all movements), and three slides case.—Address, E. LLOYD, Mapesbury-road, London, N.W.

Half-plate bellows camera, Lerebour's full-plate portrait lens, and mahogany studio stand, in exchange for good three or four-wick magic lantern. Address, ARTHUR WILKINSON, Photographer, Bradford-road, Dewsbury.

Will exchange half-plate camera and lens, three double dark slides, Tyler's metal slides, Lancaster Le Méritoire, for a good half-plate lens and camera, with a little cash.—Address, W. Cope, 88, Needham-road, Edge-lane, Liverpool.

Wanted to exchange a first-class 12×12 mahogany wet-plate camera with one single and two double dark slides, will take 12×10 plates both ways, in good condition, for modern stereoscopic camera and lens.—Address, J. Simmons, 8, Springfield-lane, Salford.

High class quarter-plate camera, latest improvements, three double slides, walnut three-fold tripod, and Taylor & Hobson view finder in exchange for whole-plate camera and slide, good condition.—Address, J. K. Smith, Little London, Rawdon, near Leeds.

Exchange a graduated flatted oil background, seven feet by five feet six inches, for three-quarter figure, lighted from the right, by F. Duran, of Handsworth, Birmingham, quite new, for a good interior or exterior.—Address, W. Jones, 272, Uxbridge-street, Burton-on-Trent.

Answers to Correspondents.

*** *All matters intended for the text portion of this* Journal, *including queries and Exchanges, must be addressed to* "The Editor, The British Journal of Photography," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* Henry Greenwood & Co., 2, *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from 4 to 6, or Thursdays from 9 to 12 noon, when some one of the Editorial staff will be present.*

Photographs Registered:

Edwin Frere, Brighton.—*One photograph of Henry Frederick Plunkett.*

Samuel Beverley, Blackpool.—*One photograph of Blackpool Tower, taken from north-west; one photograph of No. 4 Section, Base Girder, North-west Leg of Blackpool Tower.*

F. F. F.—Mr. W. W. Winter, of Midland-road, Derby.

F. H.—Inquire of Messrs. Winstone & Sons, Shoe-lane, E.C.

Gelatine.—Sensitise the gelatine by immersion in the bichromate.

J. F. Hammond.—Our impression is that the idea is of little practical use.

A. E. Smith.—The address is, Guilbert Martin, 1 and 2 Falcon-street, Aldersgate-street, E.C.

Cymro (Cardiff).—The extra inch in focus accounts for the difference in rapidity of the two lenses.

J. Allingham.—Possibly Messrs. Rayner & Cassell, Chancery-lane, W.C. would meet your requirements.

Nemo.—The latest work on optics advertised in our pages is *The Optics of Photography and Photographic Lenses*, by J. Traill Taylor (published by Whittaker & Co.).

Enquirer.—By all means protect the article. Ask at any Post Office, and you will get the necessary forms giving all the information you require. It would take up a great deal of our space to reproduce here.

B. C. Wilson.—The bright planet seen near the east at night is Jupiter. This you can ascertain for yourself by looking at it through a pocket telescope or a good field-glass, by which the moons will be rendered distinctly visible.

Yorkie.—1 and 2. See The British Journal Photographic Almanac for 1893, in which orthochromatising formulæ and methods of preparing tinted screens are given. 3. Possibly the exposure is increased six or seven times. 4. Ruby glass is preferable.

K. B. says: "Will you tell me where I can find a detailed description of the process for producing relief blocks in half-tone by ruled screens, that is now in such general use for illustrating purposes?"—Yes; in The British Journal Photographic Almanac for 1893.

M. Todd.—Send us two or three examples of the negatives to see. From the description it would seem that some of the marking may be due to the plate not being sufficiently rocked during the development. But that would not account for the "straight line stains at irregular intervals."

J. E. Y.—If the mounts were guaranteed to be free from any injurious action on the prints, and you can prove that they have, you have good cause for action against those who supplied them. As you were not supplied direct from the manufacturer, or had any dealings with him, you must proceed against the dealer.

R. C. S.—The discrepancy between the price of absolute alcohol here and that on the Continent is fully accounted for by the duty that all spirit has to pay in this country. If the foreign alcohol were imported, the duty that would have to be paid upon it would bring the price up to that of English spirit, if not higher.

Hypo.—The glass in the side of the studio can be of little or no use, owing to the proximity of the adjoining building. The lighting would be improved by a large side reflector, which, if necessary, could be placed outside in the eighteen-inch space between the studio and the stores. A movable reflector inside the studio might also be employed with advantage.

A. (Essex).—At the village druggist's is not the best place to get photographic chemicals, especially such as sulphite of soda and other substances that are not improved by long keeping. Dry plates drawn from such a source are not always to be relied upon as being of recent make. We should advise having what is required from some dealer in a large town.

F. Wyllie.—Thanks; we have forwarded your communication to our correspondent.

C. S. S.—The beer and water-glass formula quoted is that generally adopted by those who employ that substratum in collotype. It is not, however, now so much used as it was formerly. The brand of gelatine mentioned is as uniform in quality as most of the foreign gelatines are. It is a good plan to obtain a large quantity at a time, so as to avoid the variation of different batches.

M. Wilson.—The marginal irridescent stain is due to the plates being old. Some makes of plates, indeed most of them, have this appearance after being kept so long as yours. Three years is more than most plates will stand and yet be perfect. We do not see that you have any valid complaint, unless, as is scarcely probable, the plates were guaranteed to keep good for so long a period.

W. Young.—The fault in the portrait arises from the sitter being placed directly opposite the window. This should always be avoided in taking portraits in an ordinary room. The sitter should be posed at the side of the window and a little distance behind it. Then the strong shadows must be softened with reflected light. A table-cloth on the domestic clothes-horse forms an excellent extemporary reflector.

A. X. O.—There is no fixed price amongst London photographers for doing outdoor groups and similar work, any more than there is for portraiture. Every one fixes his charges according to his own idea of the value of his time or that of his *employé*, and sometimes according to what the customer is willing to pay. Some London firms even make no charge for taking the negatives, but simply rely upon orders of copies for their profit.

Great Yarmouth.—Albumen pictures can be toned in the combined toning and fixing bath. Indeed, this was the original method by which prints on albumenised paper were toned. But, to get good rich prints by this system, strong negatives and strongly sensitised paper are necessary, and also considerable over-printing. Under these conditions, extremely rich velvety tones are obtainable. The combined toning and fixing bath was abandoned because it was found that the results by it were not permanent.

T. Thomas asks if "there is any rapid method of drying negatives when prints from them are wanted in a hurry without risk of injury to the film?"—Gelatine negatives can be dried very quickly—in a few minutes, if necessary—without risk in the following manner: First remove the surplus water from the surface carefully with blotting-paper. Next immerse it in strong methylated spirit, keeping it moving about the while, for three or four minutes. At the end of that time repeat the treatment with fresh spirit. Then the negative may be placed in the sun to dry, or it may be dried at a moderate distance from the fire.

F. Browning writes as follows: "I want a very hard and insoluble gelatine to which I intend to add a large proportion of chrome alum so that, when the thick solution is dry, it will form a hard and tough film for a new process to be perfectly waterproof when finished; that it is to be as non-absorbent of warm water as celluloid. The hardest gelatines we know of are "Coignet's Gold Label," and Nelson's "Opaque," but a large proportion of chrome alum cannot be added to a thick solution of either without causing it to coagulate. The effect of chrome alum on gelatine, although it renders it insoluble in warm water, does not prevent its absorbing it and becoming softened with long soaking.

Aq. Vit.—So far as we know, there is no law by which a magistrate can order the withdrawal of a portrait from a show-case or a shop window. We imagine, however, as the exhibition of the picture under the circumstances is causing pain and annoyance, an injunction from the Court of Chancery could be obtained, and that might prove an expensive matter to the exhibitor. If you are the exhibitor referred to in your letter, and we strongly suspect you are, would it not be better, even from a business point of view, to remove the picture than continue the annoyance? In a country town such behaviour is sure to be commented upon, and is sure not to conduce to an extension of business.

Rembrandt asks how the bitumen used by process workers is obtained, which is more sensitive to light than that as ordinarily sold?—The bitumen of commerce is first reduced to a fine powder, and then shaken up in sulphuric ether, which dissolves a large proportion of the insensitive matter. The liquid portion is then poured off, and the treatment repeated with fresh ether two or three times, or so long as matter continues to be dissolved to any material extent. The powder is then emptied out on to blotting-paper and allowed to dry in the dark. It is then ready to dissolve in benzol. Messrs. Mawson & Swan used to keep this extra-sensitive bitumen in stock, and probably do so now, and it would possibly be more economical to purchase it than to prepare it for oneself.

*** Several answers to correspondents, articles, and other communications unavoidably held over.

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FOCUS LAMPS AND OTHER ARTIFICIAL ILLUMINANTS.

By a "focus" lamp we here mean an electric incandescent burner which has been brought out under that name by the Swan & Edison United Electric Light Company.

It is over a decade since we were asked by what sort of burner the electric light could be made to subserve the interests of those who desired to employ the incandescent burner for such optical purposes as recognise the concentration of the light by means of a condenser. The arc light, as every one knows, does this in a perfect manner, but the form of the filament in common use in the incandescent lamps is quite against it. The suggestion we made was to the effect that the carbonised filament should be of a form similar to that of a watch mainspring when released, its diameter being confined to about an inch, and the number of coils limited to, say, four or five. At the time this was proposed we were told that it could not be done. But electrical appliances are growing with a rapidity and in a state of perfection undreamt of ten years ago; and when a few days since, and in course of conversation with Mr. E. P. Robertson, of the Indian Civil Service, we learnt that he had in use such a lamp as we had long desiderated, we very gladly availed ourselves of an invitation to witness its application to projecting, copying, and enlarging purposes. The burner consists of a long carbonised filament folded or bent in such a manner as to form a zigzag surface of presumably an inch square each way, presenting the appearance of a flattened spiral, or suggestive of a small gridiron. The candle power is 100, which for lantern parlour entertainments, with a screen of about eight feet, is quite satisfactory, although Mr. Robertson expressed his intention of having another burner giving an increased intensity of illumination. Burners of this class, we learn, are made up to a power of 200 candles.

We were charmed with the facility with which the lantern was brought into operation. The house in which it was had, like most of those in that district, the electricity "laid on," and gas, colza, and even petroleum seemed things of the past. In some mysteriously hidden corner a wire from the lantern had found a port of entry, and was instantaneously connected with an equally hidden electrical main; a button or its analogue at the side of the lantern was pressed and the lightning was poured forth in a dazzling stream. Several slides were passed through the lantern and were voted to be sufficiently illuminated, that is, sufficiently well for parlour or domestic entertainments, although scarcely so for a schoolroom or lecture hall. Although the candle power was professedly 100, it appeared to us as if this figure might have been somewhat increased without impairing the fact.

Every house is not, alas! yet fitted up with electricity, although prophets, even of the tamest order, declare that many years will not elapse ere at least every hall and public building will be. In the mean time, what is to be done? Batteries are cumbersome, inconvenient things to have around when one wishes to have a little electric lighting. A few years ago, it was stated in a New York newspaper that preparations were being made to deliver a supply of electricity each morning at houses not on the circuit, simultaneous with the morning milk. This certainly is within the range of practical enterprise, thanks to the discovery of storage batteries. But suppose one desires to give a lantern show at some little distance from home, what then? Storage batteries are heavy things and are not amenable to easy conveyance. Hence for this purpose compressed oxygen will still hold its own.

The application of electricity to enlarging and copying as adopted by Mr. Robertson is simplicity itself. There is a background painted white, and on this is directed the light from two burners of less power than that spoken of. The light from these is cut off in all directions save that towards the white background now strongly illuminated. Two cameras on parallel rails are erected on the table; one contains the negative that is to furnish the enlargement, the other and larger one contains the lens and the paper or plate on which the enlargement is to be made. It is much the same as if the negative were directed against a bright sky, but is much more convenient and reliable in practice.

Reverting to electricity for projection purposes, who among electricians is to solve the problem of rendering it applicable for those not so fortunately situated as to have it form one of the regular fixtures in a house?- Fame and fortune awaits him.

The light which we saw tested was, as already stated, of one hundred candle power. This power has already been attained with some kerosene oil lamps, at the expense, however, be it noted, of some discomfort arising from great heat and unfragrant smell. Messrs. Perken, Son, & Rayment claim to have produced a triple-wick oil lamp in which the luminosity is equal to the candle power mentioned, while the light is very pure and the heat less than usual. The principle of construction recognises large air passages leading up to the level of the wicks, and, the air being brought to play upon the flames at their base, more perfect combustion is claimed. The chimney, which is long, aids this combustion. We have been present at trials made with it, and find that their allegations as to purity and intensity of flame are maintained.

TONING GELATINO-CHLORIDE PRINTS.

Although, in experienced hands, the modern gelatino-chloride printing-out papers are capable of producing results in every way equal to, and in many respects superior to, those obtainable with the best albumen paper, there can be little doubt that in the ordinary course of practice there are a larger number of failures or unsatisfactory prints turned out upon the new than upon the older paper. We are not now referring to failures arising from the physical character of the gelatine paper, such as the softening or dissolving of the sensitive surface or similar accidents, which, after a little practice, may be completely guarded against, but more particularly to defects in the colour and gradation of the image.

Indisputably, with gelatine, as with albumen paper, the chief art in printing lies in the toning, just as in production of a negative the result depends mainly upon the development, the remaining operations presenting comparatively little difficulty, or requiring an inferior degree of skill. But in conjunction with gelatine paper it may be said, with certainty, that the toning operation is surrounded by difficulties which do not attend the working of albumenised paper, difficulties arising from the paper itself, and not from any carelessness or want of care on the part of the operator.

For instance, in looking through a collection of prints by the same operator, one cannot but be struck by the great variety of tones exhibited, ranging from any kind of brown to purple, black, and grey; whereas with albumen prints the work of any individual artist will vary but slightly from the particular colour selected in the standard. Those who have had any considerable experience will know that this uncertainty and want of uniformity of tone increases with the number of prints operated upon, and that, while it is fairly easy to get uniform tones in a small batch of pictures, the case is quite different when a large number are treated at one time.

This does not appear to arise from any want of care in the manipulations, but simply from some change in the bath itself, or in its action on the prints, which causes the later prints toned not only to take a much longer time to acquire a given colour, which might be expected, but also to change to a greater degree in the subsequent fixing than is the case with the earlier ones. We have frequently noticed, and the same thing has been remarked to us by others, that, although a batch of prints before fixing may present an appearance of almost perfect uniformity of tone, they will, after fixing and washing, exhibit every variety of colour, from brown to the extreme limit of blackness, that has been attempted; and in such cases close observation will reveal the fact that it is the later-toned prints that have "gone back" most in the fixing bath.

Such results were often obtained, it is true, with albumen prints, but then there were other conditions to which they might be traced. Thus it was a common practice to use the toning bath in a tepid or even warm state, and, unless special means were adopted to keep up an even temperature, the action of the solution would necessarily vary as it got cooler. But this condition is entirely absent in the case of gelatine paper, since the bath is always employed, or should be, at the normal temperature, and is, at least, not likely to vary very much during the toning of a single batch of prints.

Of course the action of the bath must be expected to vary as the toning proceeds, from mere consumption of gold, but most careful operators, in dealing with a considerable number of prints, will take the precaution of gradually replacing the gold abstracted by the occasional addition of small quantities of stock solution. This, in the case of albumen paper—unless we except some brands of "ready-sensitised" that have come under our notice—forms a complete remedy for uneven toning, but unfortunately it does not with gelatine paper; we have ourselves more than once found the bath absolutely refuse to tone after a while, although far more gold has been added than could possibly have been abstracted by the prints toned, and this kind of behaviour is what is generally complained of by others. In fact, so great is the difficulty in this direction that some operators persistently tone their prints in small batches, using a fresh quantity of solution for each.

This, of course, adds very materially to the cost of toning gelatine paper, for, in order to secure the greatest economy, it is desirable to use the same solution over and over again, adding fresh gold as required. This was, and is, in fact, the common practice with albumenised paper, the same solution, with necessary additions to keep up the strength and volume, being often kept in use for months or years. But, so far as our own experience, as well as that of others, goes, such a course is not practicable with gelatino-chloride—under ordinary circumstances, at any rate. Even with the acetate bath, if used once for only a fractional part of the number of prints a given volume will tone, if used again the next day, its toning power seems to have altogether gone, and no amount of strengthening will cause it to work satisfactorily.

We shall not deny that part of this result may be produced by carelessness in washing the prints and similar causes, just as would be the case under similar circumstances with albumen; but it also occurs in spite of every care, and apparently in consequence of some difference in the constitution of the sensitive surface. If we consider for a moment the preparation of albumen and gelatine paper respectively—independently, we mean, of the organic portion of the films—the difference is not far to seek, and suffices amply to explain the difference in behaviour.

Take, first of all, ordinary albumenised paper sensitised at home; that is to say, not bought ready-sensitised. We have a sensitive film composed solely of chloride and nitrate of silver imbedded in an insoluble layer of albumen. Albumenate of silver is usually spoken of as forming an important element in the composition of the film, but whether in this instance it can be considered as a definite chemical compound need not be argued, as it does not concern the question. We have, however, undoubtedly chloride and nitrate of silver to deal with. In the case of ready-sensitised papers of unknown preparation, we have in all probability, besides free acid, other organic silver salts, and it is well known that these papers also present toning difficulties which the freshly sensitised paper does not.

Turning to gelatino-chloride papers, these may be taken with tolerable certainty to contain, besides chloride and a small trace of nitrate of silver, a considerable proportion of citrate, tartrate, or other organic salt of silver, which is undoubtedly the cause of the difference in behaviour. In making that statement, we do not refer to any difference in the printing behaviour of the paper, but to its behaviour in regard to the toning bath, as we shall attempt to explain.

In the case of the albumen paper, when it comes to be immersed in the toning bath, the film may be supposed to contain, besides the reduced material forming the image, only chloride of silver, the soluble salts having been removed by the

preliminary washing. The action of the toning bath, then, is confined to the image itself, gold being deposited thereon, and the chlorine given off combining with the silver it displaces. If, from imperfect washing, free silver remains in the prints, chloride of silver in small quantity will be thrown down in the bath, and a very slight reduction of gold will also take place; but this latter reaction could only occur in the event of great carelessness in washing.

But in the gelatino-citro-chloride film, although citrate of silver is, to some extent, soluble in water, it is so comparatively slowly, so that it is not probable that it is removed from the print before toning, except in the case of very prolonged washing, if even then. Consequently, the toning bath, while exerting a portion of its strength in its legitimate function, further weakens itself by giving up its chlorine to convert the citrate, tartrate, or other organic silver salt, into chloride, a corresponding quantity of gold being thrown out of use, while the displaced citric or other acid goes into the solution. Here we have at once a very serious weakening element, as well as a cause of great uncertainty. But that is not all.

Some of the salts of the organic acids, as well as the acids themselves, notably oxalic, have a very powerful reducing action upon salts of gold in solution; so we can without much difficulty understand how and why the toning bath, after once being used for gelatino-chloride paper, becomes so rapidly useless. It is simply because the unused gold is reduced by the organic matter taken into solution. The presence of the organic salt also explains why the "combined" toning and fixing bath containing hypo, and also those containing sulphocyanide of ammonium, are preferred by many operators for the new papers although they are not perfect in their action.

The simple way out of the difficulty is to ensure the removal or conversion of the citrate of silver before toning. This is easily done by means of a short immersion, after two or three washings in plain water in a weak solution of common salt, which converts the citrate or the salt of silver into chloride. The prints, after this treatment, are again washed to remove the salt, and if care be taken to do this the toning proceeds as rapidly and *more* evenly than if the salt is not used. The bath behaves with greater uniformity, and in the case of the acetic bath can be used over again with perfect safety.

Not only are these advantages gained, but the total removal of the soluble and partially soluble silver salts ensures a more permanent tone, that is to say, one that changes less in the fixing bath, and this in itself is an aid to uniformity.

EQUABLE TEMPERATURES.

Referring to our observations a week or two ago upon this topic, we may say that we have heard quite a large number of discussions upon the use of hot water in preparing the developer, some candidly avowing they had never thought of using it in daily work; others saying there was no novelty in the idea (we expressly deprecated any supposition that we were proposing something new); and others, certainly the minority, again saw nothing to gain; no one, to our knowledge, had any objections to urge. We may now proceed with our batch of developed plates, and see where heat again may be employed. It is matter of common knowledge that the solvent powers of hypo are greatly reduced when employed at low temperatures; hence, if the "fixing solution" be permitted to fall almost to freezing temperature (and saline solutions may be reduced considerably below 32° without freezing), we have two possible evils] to encounter. Firstly, an unnecessary expenditure of hypo is entailed; secondly, if the low temperature be not counter balanced by increased proportion of solution for each plate, there is danger of ultimately stained or fading negatives, for it should always be remembered that the result of fixing in presence of an insufficient proportion of hypo does not necessarily exhibit its evil effects at once. The danger arises from the production of an easily decomposable invisible salt of silver which remains in the film. Our negatives are now finished, and washing is the process next to be referred to. All that may be said is, that the osmotic action takes place more quickly in warm than cold solutions, so that, if the first washings (and all negatives are better with a preliminary "rough wash" before placing in the final washing) be done with slightly warmed water, made, say, by pouring a little boiling water into the bulk of cold, the duration of the washing may be considerably reduced without danger to the negatives. We may dismiss this part of the subject by saying that such a plan adds greatly to the comfort of the operator, especially when there is much washing to be carried out.

We may next consider printing work. At once we will point out that one prime factor, almost a secret, of good printing is to keep the silver bath at an equable temperature. It is impossible to lay too much stress upon this. What a common experience it is in winter weather for printers to tell their employers that the albumenised paper is "not so good as the last," and probably the paper dealers could have something to say on this subject! Yet the true explanation is usually what we have just referred to—temperature. If the silver bath be reduced only a few degrees in temperature, the result with the same time of floating is equivalent to reducing the strength of the bath. Every one knows, when a certain point is passed, what that means—difficulty in toning to a good colour, and a muddy milky appearance in prints even from negatives of the highest printing quality. Of course the remedy, if temperature be disregarded, is to increase the strength of the bath, or else the time of flotation. But, instead of proceeding in this hap-hazard fashion, especially when it is remembered that excess of strength is almost as great an enemy to good tones as defect of strength, a far better, more workmanlike, and equally feasible plan is to keep the silver bath warm. When it is put away for the day, let it be kept in a warm corner, if there be one. If even this convenience be wanting, the cost of a small gas flame, either in a cupboard or used to heat a tray of water, containing the bottle of bath, is an item of absolutely insignificant importance, and to devise a plan to render it available needs scarcely a thought. Some printers that we have seen at work, knowing the importance herein of equable temperature, endeavour to retain it by pouring successive jugfuls of hot water into the tray used for holding the silver bath, and then, after draining, quickly pouring the solution in the latter, when it becomes sufficiently heated to obtain uniformity of temperature.

We will conclude by referring to one other important stage where extra heat is almost essential. We refer to the fixing solution for prints. Our remarks applied to fixing negatives are applicable, but in a very greatly increased degree, to the hypo solution for prints. They apply in a twofold manner. In the first case, negative-fixing solution is not always made afresh each day, while with prints it is (or ought to be), so that in the

former case we have only to do with such differences of temperature as are experienced from day to day. With fixing solutions made afresh each day in winter, the temperature may be so low as to produce the highest possible retardation of the process, owing to the well-known effect produced in the dissolution of hypo crystals, the great reduction of temperature. Recently-made hypo solution should always be assisted by the use of hot water, for even then, and in summer time, the temperature of the solution may still be low. In winter, if no hot water be used, the low temperature, if fixing is to be properly performed, will go near to doubling the hypo bill! We think now we have shown good cause why every photographer should, in his dark room, employ every possible and available means to produce and retain an equable temperature.

Expeditiousness of the Collodion Process.—Some modern photographers have been prone to deery the collodion process without knowing anything whatever about it. However, the members of several of the Societies have of late had the opportunity of witnessing demonstrations of its working, by those familiar with it, for lantern slides and other purposes. The astonishment of most who see the process worked for the first time is generally great that no dishes are used, the developer and fixing solution being simply poured on the plate and flowed backwards and forwards over it. But the thing that usually strikes them most is the rapidity with which the different operations take place. Many of those who have been inclined to disparage the process for its slowness seemed to be quite unaware that, so far as its manipulations are concerned, it is the quickest of all proceses. As a matter of fact, a wet-collodion plate can be prepared, exposed, developed, fixed, thoroughly washed, dried, and varnished ready for printing from or for the lantern in far less time than is usually expended on the development alone of a dry plate. In less than a quarter of an hour the whole of the operation, from cleaning the glass to varnishing the negative, can be completed.

Photographic Dealers, beware!—At an inquest held a fortnight back in the case of poisoning by cyanide of potassium, one of the witnesses is reported to have said that "it was customary in the army to take cyanide of potassium as a 'pick-me-up;'" also that it could be bought "at any shop where they sell photographic appliances." One of the jurors also remarked that he had purchased cyanide of potassium for photographic purposes. The Coroner, in his summing up, said he would lay the facts before the Pharmaceutical Society. Whether the Coroner's action will have any influence on that Society we cannot say, but dealers in photographic chemicals need be very careful as to whom they supply with small quantities of this chemical as well as other poisonous ones used in the art. Every now and then the Pharmaceutical Society becomes very active in prosecuting those who infringe the Pharmacy Act. To obtain, say half an ounce, of cyanide at the chemist's, one has to go through some formalities, while, at the wholesale chemist's, he can obtain a few pounds, or hundredweights, and no question be asked. It is a little strange that in cases of poisoning with cyanide of potassium the salt is always associated with photography, in which its use is really very limited. Where a pound is consumed in photography, a hundredweight is used in electro-plating and gilding; also in other crafts.

Photography and Rioting.—It is at times amusing to note the ideas of the lay public with regard to photography—how it is utilised by novelists, and how it is sometimes applied on the stage. Last week a correspondent in a daily contemporary, commenting on a discrepancy between the evidence given by the two sets of witnesses before the Commissioners at the Featherstone Inquiry, suggests that if the camera had been employed it would have shown beyond question the state of affairs at the time—the peaceable attitude of the colliers, the flight of missiles, and other acts of violence; and, what is of equal importance, it would have afforded the means of identifying the ringleaders. There is one important factor in the use of the camera that writers of this kind overlook, namely, light. The firing by the soldiers at the riots at Featherstone did not take place till just upon nine o'clock p.m., and the light at that time in the month of September is certainly not suited for instantaneous photography. However, the suggestion is good, and one that has been made by ourselves in connexion with previous disorderly gatherings, provided the light will serve. We have frequently expressed surprise that the authorities at Scotland Yard make such restricted use of photography, particularly in the detection of crime.

REPORT ON THE NATURE AND CAUSE OF CERTAIN YELLOW STAINS ON GELATINO-CHLORIDE PAPER.

[*Photographic Scraps.*]

At the request of the Britannia Works Company, I have investigated the cause of the yellow stains which at times appear on gelatino-chloride paper.

The specimens sent to me showed a disagreeable brownish-yellow stain, which quite spoiled the prints, and which in some cases was uniform, whilst in others it was patchy and irregularly distributed. In many cases the stains were more or less apparent on the back of the paper, as well as on the face of the print. The intensity of the stain varied considerably in different cases. The accounts given of the manner in which the paper had been manipulated threw very little light on the origin of thes tains, and seem to indicate that care had been taken in the washings, &c. It may be stated here, however, that this latter indication is not confirmed by the result of the investigation. The most remarkable point, however, and one in which all the statements, with a single exception, agreed, is that the stains *appeared during the washing between toning and fixing*. Their general appearance indicated that the stains were due to the deposition of silver sulphide. In all cases the ammonium sulphocyanide toning bath had been used.

In my own experience of the paper, which has been not inconsiderable, and has involved the use of various toning baths, no stains of this kind have ever been met with, and the investigation was directed with a view to ascertain not only to what cause the stains are due, but also to what causes they are not due.

Experiments were made with paper of the three ordinary colours, white, pink, and mauve, and three distinct samples of ammonium sulphocyanide were used, two of these being obtained from well-known dealers in chemicals, whilst the third had been sent to the Britannia Works Company as being part of a sample that had been used in making up a toning bath, with which the yellow stains had been observed. Many experiments were made, but it will not be necessary to refer specifically to more than a few of them.

Paper was carefully washed until all soluble silver salts had been removed, and was then immersed for some time in solutions of each of the three samples of sulphocyanide of the strength used in the toning bath. The paper was afterwards carefully washed. *No stains.*

Paper *without any washing* was immersed in the sulphocyanide solutions for some time, and then thoroughly washed. *No stains.*

Paper, part of which had been exposed to light, was thoroughly washed, and then immersed in the sulphocyanide toning bath until fully toned, three separate toning baths being made up with the three samples of sulphocyanide. After toning, the prints were washed in the usual way. *No stains.*

Paper, part of which had been exposed to light, was immersed, *without any previous washing*, in each of the three toning baths until fully toned, and was afterwards washed as usual. *No stains.*

Paper, partly printed upon as in the preceding experiments, was carefully washed, toned in each of the three toning baths, and then washed, *a very small quantity of hypo* (sodium thiosulphate) *being added to the first wash water.* The washing was continued in running water for some time, and at first the paper remained perfectly white, but, as the washing continued, *dirty yellow stains made their appearance, and when dried the prints were precisely similar to the stained prints about which complaints had been made.*

Paper partly printed upon was toned without any previous washing. No stains appeared whilst in the toning bath. The prints were then placed in a dish of water containing a very small quantity of hypo, and were then washed in several rapid changes of water, and afterwards in running water. At first the paper remained white, but gradually dark brownish-yellow stains made their appearance.

A portion of a toning bath was sent to me by the Britannia Works Company as being part of a bath used by a customer on one occasion on which had yellow stains were produced. I toned in this bath prints upon the three varieties of paper (white, pink, and mauve), both with and without previous washing, but *in no case were any yellow stains produced.*

From these and other experiments, to which detailed reference is unnecessary, I draw the following conclusions:—

(1.) *The yellow (or brownish-yellow) stains are not due to anything in the paper itself, and with proper manipulation no such stains are produced.*

(2.) They are not due to any impurity ordinarily present in ammonium sulphocyanide.

(3.) They are not directly due to imperfect washing before toning, *but, at the same time, this washing should always be carefully done, for other reasons that will appear subsequently.*

(4.) They are not due to acidity of the sulphocyanide toning bath, even when it is sufficiently acid to turn blue litmus paper decidedly red.

(5.) The stains that appear between toning and fixing appear *only when the paper comes into contact with small quantities of hypo* (sodium thiosulphate) *during the washing that follows toning.* The quantity of hypo required to produce bad stains is very small, and is such as may easily be introduced into the wash water in any one of the ways to which reference will be made presently.

The production of the stains in this way is easily explained. It is well known that when hypo (sodium thiosulphate) comes into contact with silver salts three compounds may be formed, namely, silver thiosulphate, or a silver sodium thiosulphate, or another silver sodium thiosulphate containing a larger proportion of the sodium salt. The first and second of these compounds are insoluble, and are very unstable, decomposing rapidly into dark brown silver sulphide, which when spread out in a thin film appears to be brownish yellow. One or other of these is formed when the quantity of hypo that comes in contact with the silver salt is small. The third compound is soluble and stable, and is not liable to decompose unless mixed with an acid. It is formed when the hypo is present in excess.

If the water into which the prints are put when they come out of the toning bath contains a small quantity of hypo, the change that takes place is as follows: The hypo acts upon the silver salt in the paper, and produces one of the insoluble and unstable thiosulphates, and the latter decomposes spontaneously as the washing proceeds, producing a small quantity of silver sulphide, which imparts a yellow or brownish yellow stain to the paper, the depth of the stain depending on the amount of contamination. At first the change is not apparent, but as the decomposition continues the discolouration becomes more marked, and this explains the statement, made by some of the complainers, that the stain became worse the longer the prints were washed.

There is also no difficulty in explaining the fact that in some cases the first prints put into the wash water showed stains, whilst the remainder show no stains. If the quantity of hypo with which the water is contaminated is small, it is all absorbed and used up, as it were, by the first lot of prints put in, and consequently, whilst these may be stained, those that follow remain white because the contamination has been removed from the water before they get into it.

Several different ways in which the wash water may become contaminated with small quantities of hypo will readily suggest themselves. The following are amongst the most obvious and probable:—

(1.) Using for washing after toning a dish that has been used for washing prints or negatives after fixing, or a dish that has been sued for fixing prints.

(2.) Wiping the fingers on a towel or duster that has been used for wiping up hypo splashes, and afterwards putting the fingers into the wash water.

(3.) Putting the fingers into the wash water after they have been in contact with crystals resulting from the drying up of hypo splashes on the work table.

It should be borne in mind that *a very small quantity of hypo indeed is sufficient to produce the stains.*

In those cases where stains begin to make a frequent appearance, although they have never previously been observed during several months' work, the explanation is probably not so difficult as it might seem at first sight. If, for instance, some hypo solution has been splashed on the bench or table, and has not been wiped up quickly, part of the solution will have been absorbed by the wood, and, even after the table has been wiped down, the hypo thus absorbed will slowly and gradually make its way to the surface in the form of an efflorescence of minute crystals, and it is obvious that these crystals may very easily get transferred into any dishes, &c., that may be used. This gradual oozing out of the salt from the wood sometime goes on for several weeks.

In concluding this part of my report, I can only repeat that I have failed altogether to produce the yellow stains between toning and fixing in any way except by allowing the wash water to become contaminated with small quantities of hypo.

Occasionally, though very rarely, yellow stains appear whilst the prints are in the toning bath. These may be due, and, probably, in most cases are due, to the accidental introduction of small quantities of hypo into the bath. If this should happen when the bath has been partially exhausted of its gold, the effect will be just the same as from the introduction of hypo in the wash water.

Personally, I have been unable to produce yellow stains in the toning bath, except by the introduction of hypo, but from the evidence of others it would seem that if the same bath is used over and over again, the gold being renewed from time to time, it may in the end begin to decompose in such a way as to produce stains on the prints. The probability of such decomposition is greatly increased if the prints are not properly washed before being toned. The practical conclusion to be drawn is that a new bath should be made up at short intervals. Such a course involves merely a trifling expense, since ammonium sulphocyanide is not expensive, and very little is required. Moreover, it is easy to remove, practically, every trace of the gold from the bath by the action of the prints, and this can, of course, be done before the old bath is thrown away.

It is stated that sometimes a toning bath begins to decompose so rapidly that gold is deposited all over the surface of the print, from off which it can be rubbed. If ever this should happen, it can only be due to the toning baths having been prepared with very impure materials.

The appearance of yellow stains either in the fixing bath or after fixing is too familiar in the case of all kinds of printing-out paper, and the causes are too well known to require any very detailed mention.

The stains that appear whilst prints are in the fixing bath are almost always due to the paper having been put into the bath whilst in an acid condition. In other words, the prints have not been properly washed between toning and fixing. Sometimes the stains are caused by the prints being allowed to stick together. They are thus prevented from coming freely into contact with the hypo solution, and, instead of the soluble stable thiosulphate being formed, the insoluble and unstable compound is produced and decomposes with formation of silver sulphide.

The yellow or brownish-yellow stains that appear after removal of the prints from the fixing bath are due to silver sulphide formed by the decomposition of the unstable compound to which reference has already been made so often. That is to say, the stains are the result of imperfect fixation, which may be due to—(1) Allowing the prints to remain for too short a time in the fixing bath; (2) the use of too weak a solution of hypo; (3) the immersion of too many prints in the same quantity of hypo; (4) the use of an old (and consequently a weakened) solution of hypo; (5) allowing the prints to stick together so that the fixing solution does not come freely into contact with them.

It is perhaps scarcely necessary to point out that all the causes of staining referred to in this report will operate in the case of any printout paper containing silver salts.

C. H. Bothamley, F.I.C., F.C.S.

THE NAISSANCE OF ART IN PHOTOGRAPHY.

[*The Studio, London.*]

Since first the world developed a written language, vain attempts have been made from time to time to define the term Fine Art. The reason for this failure is not hard to find; human minds are so variously constituted that no one definition of an abstract quality could be acceptable to all intellects. That what we call "Art" is an abstract or psychological entity is sufficiently proved by this very fact; the concrete we can always define. Definitions covering some phases of art, or representing art as it is accepted by the definer and those who are of his "turn of mind" have, indeed, been formulated. Such terms as "Beauty," "Good Taste," "Fitness," "Truth," "Naturalism," "Idealism," and so on, serve very well to represent one or more aspects of art, but each and all are utterly incompetent to express art as a whole.

Fine art appeals not merely to the senses, nor only to the intellect, though it must not displease either. In music it must not offend the ear by inharmonious discords; in poetry it must not offend the intellect by gross untruth or contemptible bathos; in painting or sculpture it must

not offend the eye by grotesque infidelity to fact or by inherent ugliness But, provided it accept such restrictions, there remains in each of these arts a wide field for imagination, for idealism, if you will; and we take it that in the something beyond mere fact or mere imitation lie the qualities which constitute the essence of fine art. A poem which describes an episode or a material sensation, however elegant the diction, however forcible the expression, however sensuously pleasant the rhythm, is but a triumph of words and no more, unless the indescribable "something" lies behind to appeal to our heart. Although a musical work be composed in strict accordance with every rule of the science, it will not be a work of fine art unless it goes to the soul as well. And so a painting, although it may have in it every element of truth, all the grace of form, all the interest of a deftly depicted episode, will yet not be a true work of art if it lack the "something" not seen, not even understood, which must be present to make the painting a "heartfelt" work of art.

It is necessary to express so far our own opinions, be they right or wrong, facts or dreams, to prevent misunderstanding of what follows. There are many who by no means accept such a standard of fine art; some because they are unable to comprehend it, some because they are unable to act up to it, some because they honestly believe it to be false. The truth or falsity of our idea is of no consequence provided we make clear the claims of photography to rank as a fine art.

Accepting the highest sense of the words, photography has no part in fine art. It has the power to select the fit, and to make the best of what is actually and materially put before it, but when all is done it remains simply a delineator. To photography is denied the capability of bringing together diverse beauties from various sources; we can photograph the handsomest man, or the prettiest woman in the world, and we can even make the most of the existing excellencies of their forms and features; but we cannot photograph a demigod with an aggregate of beauties unknown in any one body, nor an angel, nor a devil. If any one were bold enough to produce a fancy photograph of a "Christ," he would be instantly and justly reproved. We have seen "fancy" studies of Tennyson's heroes and heroines produced by photography; these, even had they not been ludicrous, would have been wholly unsatisfying to the many who hold Tennyson to be almost more than human. If photography could collect the beautiful, the fitting, the perfect, from various quarters, and could endow its graphic productions with the *simulacrum* of what we call art, even then the fact that we knew the production to be a matter-of-fact rendering projected by a lens upon a plate, would of necessity break the spell, and bring the whole performance down to the level of a clever piece of copying. If the capability possessed by the painter, who collects from various sources, and introduces into his work beauties which exist only in his imagination, be called "idealism," and if idealism be the highest phase of fine art, then we say at once that photography cannot aspire to the highest realm of fine art.

But is there any quality inherent in photography which places it for ever and wholly outside the pale of the Fine Arts? We reply without hesitation, No. Much photographic work has been done, and more is daily being done, which is beyond question artistic in the true sense of the word. An exhibition of photographs at the present day consists broadly of the following classes:—First, a great number of topographical prints, technically good, but with no pretence of being pictures. Second, a smaller number showing some intention of the worker to be artistic; occasionally these are more painful to behold than the undisguised transcripts of bare fact, but at any rate they show a good intention. Lastly, we find some few—but in a proportion that is daily increasing—which are pictures in all but the highest sense of the word; quite as good, so far as they go, as the average of those to be seen on the walls of exhibitions of paintings. Leaving out of the question what we have called idealism, what have we to look for in in a graphic representation of any subject? Composition, chiaroscuro, truth, harmony, sentiment, suggestion? All these, and more, are quite within the scope of photography. Photographs of the "impressionist" type have been successfully produced, and this is perhaps the most promising class we have at present. Colour is certainly denied to us; but, on the other hand, we have the power of catching fleeting effects, of securing truth in detail and perspective, and of depicting with ease atmospheric phenomena which can only with difficulty be reproduced at all, even by the ablest painters. The question is not what photographers do, but what photography can do. Photographers commit mistakes, without doubt, but the blame must not be laid at the door of photography. If many who have been trained to art were to express the results of their training by photography instead of with the brush, the capabilities of the camera would soon be better understood and more appreciated. And it is no part of our present object to shut our eyes to the faults of photographers, or to attempt to excuse them; on the contrary, we propose to dwell upon them at some length. Only it must be steadily kept in mind that photographers, and not photography, are thus attacked.

The very facility of the technique of photography has been one of its greatest enemies. In a few days any one of average intelligence can learn to make what is, so far as technical quality goes, a good photograph; consequently we have an enormous number of persons who have no idea of the most rudimentary principles of art rushing about all lands photographing. The science is so full of varied fascinations that it procures many followers, and these become so much enamoured of it that they do not lightly give it up. Every class of person seems to find something congenial in photography; the mechanical genius takes to devising hand cameras and instantaneous shutters; the chemical student wallows in strange combinations of "reducing-agents;" the globe trotter who glories in his travels has a handy means of proving his peregrinations; in short, every one finds photography so easy and so interesting a method to produce graphic and lasting results without lengthy or expensive preparation, that there is little cause for wonder that so many more or less unoccupied persons, having taken to it, stick to it. There is no reason why they should not do so; picture-making is not one of the cardinal virtues imposed upon mankind, and we have every right to make topographic photographs if we see fit. But among the legion of such those which are really pictures are apt to be overlooked. This is, however, the fault of our societies and not of photography. It is true that a few exhibitions have been held where artistic effect alone was supposed to be considered; but, although these showed a distinct advance in the quality of some exhibits, the others were in no way more worthy to be called pictures than are those in ordinary exhibitions, unless we find abnormal merit in mannerism and *réchauffage* of the ideas of others. Yet, amid all the merely mechanical works, one must remember that some "pictures," be they few or many, are also to be found.

There is no denying that not only the general public, but also many who are well qualified to judge of such matters, find one photograph to be "more artistic" than another; it is notorious that on several occasions several photographers have taken the same scene, and that one set of operations resulted in a picture, while the others gave mere topographical photographs. In such a case the artistic qualities can be compared, and have been compared, and it is evident that comparison of non-existing qualities is impossible. Further, there are a few men whose work almost always claims attention as standing far above the average in the matter of pictorial effect; the quality in such work which compels acknowledgment is at least of the nature of fine art. Moreover, it is a fact these men have, in almost every case, systematically studied the principles of art, and can wield a brush or pencil as well as a camera and lens.

ANDREW PRINGLE.

(To be continued.)

THE ALUMINIUM FLASHLIGHT.

[London and Provincial Photographic Association.]

ALUMINIUM has a much higher kindling point than magnesium, and consequently, when aluminium filings are blown or dusted through an ordinary flame, they do not ignite, as they are not in the flame sufficiently long to become heated through. Again, aluminium, if heated in a crucible to a white heat, scarcely oxidises, as the metal does not boil at this temperature, and a very thin film of oxide protects the surface. Magnesium would boil and blaze in a white hot crucible, as the vapour would burn.

If, however, we take the fine powder of aluminium, now so largely sold as a "silver" bronze, and blow or dust this through a flame, it becomes heated to the igniting point, and, weight for weight, yields a more powerful light than magnesium.

The commercial aluminium bronze powders contain, however, a trace of greasy material, which prevents the grains readily separating, and, if the powder contaminated with grease is blown through a flame, or used in an ordinary flash lamp, it tends to blow through in clots, and a large proportion escapes combustion.

This grease may be driven off or destroyed by heating the bronze powder to about the melting point of zinc; and, for operating on a small scale, it is sufficient to heat it in a test tube over a spirit lamp. The powder which I bring before you to-night has been thus heated, and it is readily blown about by the slightest breath. It ignites readily, and burns completely when used in an ordinary flash lamp; indeed, it burns more completely than does magnesium dust, as it is impracticable to use magnesium in an extremely fine state of division, owing to its tendency to oxidise spontaneously. Aluminium, on the other hand, can be stored in a minutely fine state of division without fear of deterioration by oxidation.

One incidental advantage of aluminium over magnesium is the non-iritating character of the fumes of oxide, magnesium, on the other hand, being an irritating alkaline earth.

The sample of aluminium powder before you consists of scales about a five-thousandth of an inch thick, and it is manufactured in Germany, the English agent being Mr. W. C. Horne, of 2, White Horse-alley, Cowcross-street, London. T. Bolas.

SOME PRACTICAL REMARKS ON THE WORKING OF GELATINO-CHLORIDE PRINTING PAPERS.

There can be little doubt that, since the efforts of several enterprising firms to bring before the general public gelatino-chloride printing paper of excellent quality and at a moderate price, the use of albumenised paper has, to a large extent, been superseded. More especially is this the case on the part of a large number of amateur workers who print their own negatives, and also by a goodly number of professionals who aim at keeping pace with the times, and who find that the highly glazed—or, as some choose to term it, patent leather gloss—does go down with the general public, no matter how inartistic others may deem it.

For small work, such as quarter-plate cabinet or half-plate sizes, a more highly glazed paper is preferred by nine out of ten people on account of the fine detail brought out by this class of paper, but for larger sizes the employment of matt-surface papers, such as platinotype or plain salted paper, are decidedly to be preferred, and the leaning on all sides seems to be against albumenised paper. Nor is it to be greatly wondered at when we come to consider the numerous troubles casual workers had to contend with, such as blisters, &c.; hence it is not to be wondered at that so many should hail with delight the introduction of such excellent qualities of papers as the market is now supplied with by at least three prominent firms in the photographic trade.

Notwithstanding the beautiful results obtained by the employment of such paper for printing small sized negatives, there are a very large number of workers who look upon the manipulations necessary to obtain such results with a good deal of doubt, the opinion being freely expressed that it is not so easily worked as albumen, and that, by the employment of glass as the final glazing support, an element of much uncertainty is introduced into the operation, for frequently they find the prints refuse to leave the glass, and become, as it were, hermetically sealed to the surface of the enamelling glass. But are such objections to the working of gelatino-chloride papers well founded? I think not.

I am quite aware that there is a marked difference in the treatment necessary in the case of gelatino-chloride as against that of albumen, and any one who decides upon working the former must make up his mind to discard many of the manipulations resorted to in albumen; but, once the working of gelatino-chloride is properly understood and carefully conducted, the results are perfect, and failures are almost *nil*, for the routine is simplicity itself, and in no sense is it more difficult or troublesome than in the case of albumen.

From time to time, however, we hear of no end of failures and other insuperable difficulties attending the glazing and mounting of these highly enamelled prints, and judging from the numerous queries constantly put forth in the columns of the various photographic periodicals respecting the best way to overcome the trouble of prints refusing to leave the glasses, &c., and the best means to employ for the mounting of them, it would seem as if the proper method of treating these papers was but little understood. At least, I know that, in my experience lately, I am more frequently asked questions relating to these imaginary difficulties on the part of amateur workers than on any other branch of photography.

In the following articles I shall endeavour to pen a few practical remarks on what I know to be a subject of interest to a great many amateur workers, and, perhaps, professionals also.

In the first place, the idea must be discarded that gelatino-chloride will yield good prints from bad negatives. I find an opinion generally held by amateurs that, no matter how poor or thin a negative may be, gelatino-chloride will pull off a good result. Now, this is a great mistake; in a sense, it is quite true that a thinner class of negative, properly treated, will yield excellent results on gelatino-chloride as against albumen, but the best negatives will yield the best results in all cases. I don't know if my experience tallies with that of other workers who, from time to time, pass an immense number of strangers' negatives through their hands for printing purposes; but I am compelled to state that, since the introduction of the hand camera and the indiscriminate use of very fast plates for all purposes, there has been a sad falling off in the average quality of negatives turned out by ninety-nine out of every hundred workers who really pride themselves on the superiority of their work. The great majority of negatives are poor, thin productions, very frequently almost entirely ruined by fog in some shape or other, and from which many printers turn away in disgust, when they remember the pleasure and satisfaction of printing such negatives as were generally produced on plates of a much less exalted degree of sensitiveness, and which were properly timed in exposure and well developed. Alas! this is entirely changed, and the bulb-squeezer's, or button-presser's negatives of 1893 are as unlike such as can well be imagined; but it pays the plate and camera makers, and, so long as a moderate degree of pleasure is experienced by those who practise it, I suppose it is all right, and will continue, but do not let it be supposed that gelatino-chloride, or any other class of printing papers, will yield satisfactory results from such productions. The best results are got from the best negatives, and at this season of the year a word of warning is not out of place to those who are about to undertake the printing of good negatives by means of gelatino-chloride paper. In the summer season, when the atmosphere is drier, and the weather not so liable to sudden changes of dampness and humidity, the same precautions are not so necessary, but in early autumn or winter-time considerable precautions ought to be taken to avoid bringing the surface of any gelatine negative, that is in the slightest degree damp, in contact with gelatino-chloride paper as a printing medium. In all cases, when a negative that has been stowed away for any length of time is brought out for printing, such should be carefully warmed, and assimilated to the temperature of the printing room, and on no account should the frame be exposed at a window or outside all night, whereby dampness would be liable to affect the surface of the paper as well as the negative. With those casual workers who are not able to give the necessary attention to the printing of a negative during the business hours of the day this is a practice very frequently resorted to, so as to get the benefit of any morning light that may offer; but such practice, sooner or later, will ruin the negative, and, on the other hand, tends to prevent the best results in tone being arrived at. I have said that the best negatives will yield the best results. As a rule, however, negatives that are judged too thin or weak for good printing by means of albumen may be made to turn out fairly good results with gelatino-chloride, and thin negatives may be further improved by a judicious use of a ground-glass varnish, which has been caused to assume a greenish hue by means of a suitable pigment or pigments.

In my practice, whenever a negative comes to hand that is judged too weak or thin for good printing, it is treated to a coating of green ground-glass varnish. This I make up by adding to a good sample of ground-glass varnish a sufficient quantity of yellow and blue oil paints (gamboge and Prussian blue) so blended, and in quantity sufficient, as to yield the desired density of tint. Small tubes of these oil colours can be bought for a copper or two from any well-appointed artist colour shop, and any novice can strike a good green by judiciously mixing a little of each on a glass slab, and afterwards adding the green colour to the sample of ordinary ground-glass varnish. This coloured coating is, of course, flowed on the glass side of the negative, and if the proper quantity of colour is added the varnish will set with its usual matt surface and of a delicate green tint, that materially improves the printing quality of an over-thin negative. The bottle should, however, be well shaken after standing for a time. Sheets of green glass may be substituted for the varnish in such cases, but the varnish applied to the negative is the most convenient form, and a golden rule to follow is not to over-tone a print made from a weak negative. T. N. Armstrong.

AMMONIA AS A FIXING AGENT.

Despite the rapid advances which in recent years have been made in the art of photographic reproduction in permanent pigments, and notwithstanding the beauty of the results that in many cases have been obtained, there is, nevertheless, no room for doubt that the old-fashioned silver print on albumenised paper still occupies the leading place in the popular favour and preference. Public taste, so frequently founded on mere caprice, seems, in this particular instance, to have formed a fairly just estimate of the merits of the case.

The question of colour apart, there exists in the silver print a certain depth, a certain grateful combination of richness of tone with clearness in detail, which few of the more permanent processes have succeeded in imitating with any degree of success. Indeed, were only the resulting print of a lasting character, there seems little reason to doubt that the silver process would be the process of the future, as it has been the process of the past.

The question of the want of permanence of the silver print leads

us naturally to the consideration of the subject of fixing agents, and, from the very narrow range of fixing agents in general, it is but a step to the consideration of sodium thiosulphate in particular.

The disadvantages of sodium thiosulphate as employed inthis connexion are so widely known, and have been known for so long, that it is somewhat remarkable that no one seems to have thought of providing anything in the form of a substitute. It has always seemed to the writer that such a substitute might be found were a careful and systematic course of experiments instituted with that object.

Since the date when this salt was adopted as a fixing agent, the science of chemistry has made gigantic strides, both in theory and in practice, and in many of its applications has proved so beneficial to photography that it may be confidently expected to render important service in any inquiries in this particular direction.

There is a singular absence of intelligible data on the subject of the merits and demerits of fixing agents, and what little information there does exist, being chiefly to be found in the scanty records of the infancy of the art, is necessarily seldom seen and still more seldom read by the average photographer. This being so, any inquiries which may be made as to the feasibility of finding a substitute for sodium thiosulphate must be almost wholly tentative.

The employment of liquor ammoniæ as a solvent for the unreduced silver salts remaining in the toned trint is probably no new suggestion; but the writer, after considerable trouble, has not succeeded in finding that the results of any regular series of experiments on the fixing power of that alkali have ever been made the subject of communication to the photographic world.

In qualitative chemical analysis this solvent property of liquor ammoniæ has for long been taken advantage of in the well-known test for salts of silver. Hydrochloric acid, in neutral salts of that metal produces a white, curly precipitate of argentic chloride, *readily soluble in liquor ammoniæ*, and reprecipitated by the addition of an excess of the acid. This important reaction suggested to the writer that application of the article which forms the title of this paper, and a number of experiments made by him at intervals during the last three or four years have resulted in demonstrating the value of this reagent for fixing purposes.

A brief sketch of these experiments and their results he now proposes to lay before the readers of this JOURNAL.

At the beginning of this inquiry, with the object of testing the effect of ammonia on the untoned silver image, a print was taken in the usual way upon sensitised albumenised paper. This, after preliminary washings in several changes of water, was immersed for twenty minutes in a fixing bath composed of equal measures of concentrated liquor ammoniæ and water. The fixed print was well washed in cold water until it no longer showed an alkaline reaction. The resulting picture was of that disagreeable orange-yellow colour characteristic of an untoned silver print which has been fixed in a solution of sodium thiosulphite. In addition to this, the strong ammonia solution was found to have acted detrimentally on the albumen coating of the print, which it rendered slimy and irregular. Subsequently, a weaker fixing bath, containing only twenty-five per cent. by volume of the concentrated ammonia solution, was employed, and was found to have no sensible action on the albumen surface; but the prints so fixed still retained the former unpleasant orange hue.

The action of ammonia upon the toned silver image was the next branch of the inquiry. A print, similar in all respects to the first, was washed and toned in the ordinary manner, the borax bath being employed. It was then fixed in the twenty-five per cent. ammonia solution for twenty minutes. The resulting print, though agreeable enough in tone—being of a shade of warm brown—was found to be very weak, the ammonia bath having to a certain extent undone the work of the gold solution. The obvious remedy, a prolonged immersion in the toning bath, was then tried, and the prints so treated, after fixing were found to resemble in all respects those fixed with sodium thiosulphate. A corresponding increase in the time of printing was made at the same time, in order to maintain the strength of the image under the lengthened reducing action during toning.

The results of these latter experiments, in so far as mere appearance was concerned, were, as has been shown, fairly satisfactory; but that very important end, the permanence of the image so formed—which, after all, was the real object of the inquiry—proved to be less readily attainable. In the course of a few months a marked deterioration was visible in the majority of the prints so fixed. It showed itself as a reddish discolouration, appearing in the form of large irregularly shaped discs, and extended over the greater part of the surface of the print.

This discolouration was most apparent in the prints which had received toning previous to immersion in the ammonia bath, but was more or less visible in all. Careful examination of this phenomenon disclosed a fact which seemed to give an important clue as to the cause of the change. The original image in all cases retained its purity of tone and depth of colouring. The discolouration seemed to have no effect upon the finished picture otherwise than to show as a red stain or fog superimposed, so to speak, on the original colour foundation. This seemed to indicate that the markings were not due to chemical changes taking place in the metallic image. That fact being admitted, the inevitable conclusion presented itself, namely, that the discolouration was due to the decomposition of the albumen surface of the print. This conclusion the subsequent experiments fully confirmed.

A thin and tough sheet of unsized paper was taken, salted on a bath of sodium chloride, dried, and sensitised in an aqueous solution of nitrate of silver of a strength of fifty grains to the ounce. Prints were then taken on this paper, and, after washing, immersed untoned in the ammonia fixing bath for fifteen minutes. As there was no longer reason to dread the dissolving action of the concentrated alkali, the strength of the bath was slightly increased, a thirty per cent. solution of strong liquor ammoniæ being employed. The finished prints were of the same orange hue as those produced on albumenised paper by the same treatment.

Pursuing these experiments on the same lines as before, the action of the ammonia solution on the toned image was next investigated. The borax bath was again employed, and the washed print (previously rather over-printed) immersed therein until it assumed a deep purple tone. It was then washed and fixed in the same way as was its untoned predecessor. The picture so produced could not be distinguished in appearance from a silver print on plain paper fixed in the usual way.

After a sufficient number of toned prints had been so treated, they were well washed to remove the free alkali, dried, and, when dry, subjected to severe tests as regards their permanence. The method of procedure was as follows:—

An unmounted print was fastened at the corners to a thick cardboard mount by means of little triangles of gummed paper. The card was then placed in a situation where it was exposed day after day to the full strength of the sun's rays, and was occasionally shifted to the end, that the surface of the print might receive as much of the light as possible.

This treatment was the means of revealing some interesting and hitherto unsuspected facts, which may perhaps throw some little on those much-discussed reactions of which the fading of the silver print is the visible outcome. Certain of the finished prints had been a comparatively short time in the toning bath, and, after leaving the ammonia solution, were of a warm shade of brown. These, after continued exposure to sunlight, visibly altered. The purity of the high lights became slightly tinted, and at the same time the shadows suffered from a faint blurring, which was still more apparent on further exposure to the light. On the other hand, the prints which had been for a lengthened period in the gold solution, and which, when finished, were of an agreeable purple tone, showed not the slightest trace of deterioration. They were again subjected to the full strength of the sunlight for a number of days. On examination afterwards the most careful scrutiny failed to reveal any diminution in the purity of the whites, or any detectable increase in the depth of the shadows or half-tones. This exposure to light has been continued up to the present time; but, so far, not the slightest change has resulted. Time will, of course, be required to demonstrate the actual permanence of the prints fixed in this way. All that can be said or legitimately inferred in this matter is that, under certain conditions easily complied with, toned silver prints on plain paper may be fixed in a solution of liquor ammoniæ in such a manner as to resist the severest tests that can be applied within a certain limited period.

It is to the conditions for the successful working of this process a few words may be said for the benefit of such readers who may feel inclined to devote their attention to the practical side of the inquiry.

In the first place, in respect to the quality of the paper used, the writer has found that one of a thin character is to be preferred, as being more readily sensitive to the solvent action of the ammonia bath. Care must also be taken to choose a paper with a perfectly smooth surface, as prints taken on a coarse-grained paper have been found to require a prolonged immersion in the fixing solution.

For sensitising, a silver bath of not less than the normal strength of sixty grains to the ounce should be employed. If the fibre of the paper be sufficiently tough, the strength of the bath may be slightly increased, say, to seventy grains per ounce.

As has been already said, the operations of printing and toning (more

especially the latter) must be prolonged beyond what is thought necessary in ordinary circumstances. Upon the length of the toning process the permanence of the finished image seems, in a great measure, to depend, and, accordingly, prints should not be removed from the gold bath until they exhibit a deep purple tone in the shadows, which remains unaltered by the subsequent treatment in the ammonia solution. Prints which, when finished, are of a reddish-brown colour should be rejected, as unlikely to resist the action of light. The fixing bath is made by adding to ten fluid ounces of water four and a half fluid ounces of concentrated liquor ammoniæ. Prints should remain in this solution for a quarter of an hour.

Half an hour's washing in repeated changes of water, with constant agitation of the prints, and a final rinse in warm water, has been found amply sufficient to eliminate all free alkali. In this respect the advantages as to saving of time and of trouble, which the new process presents in comparison with the old, must be obvious to all photographers.

Such, then, are the few conditions which seem indispensable to the obtaining of satisfactory results.

Prints produced with due regard to these conditions have been found to resist the few influences which, under the ordinary condition of things, are brought to bear upon the finished image. Resistance to these influences must ever be regarded as the most satisfactory test of permanence. That term, being a strictly relative one, must always be understood as referring to the normal conditions and causes which it withstands. The abnormal, being capable of almost indefinite extension, must ultimately reach the degree beyond which the stability of the print becomes endangered, and, accordingly, it has been considered unnecessary to subject the finished picture to any severer tests than those likely to be met with under the ordinary circumstances of wear and tear.

Regarded from an artistic point of view, prints by this process have a certain charm of effect which is lacking in prints produced by the carbon and other pigment processes. On the other hand, it cannot be denied that the absence of the albumen coating is, in some degree, detrimental to the richness of the image. The greater advantage of permanence should, however, prove to the photographer an ample compensation for the slight loss in brilliancy ensuing from the non-employment of the unstable organic body.

In conclusion, the writer desires to point out to those interested the necessity for further experiments in the direction indicated in this paper. By experiment only can any additional light be thrown upon this rather obscure subject, and such a line of research is rendered still more desirable by the fact that the question of the permanence of the silver print has not yet received that amount of attention which, in the interests of photography, it seems to deserve.

MATTHEW WILSON.

ON THE PHOTOGRAPHY OF THE LUMINOUS RAYS OF THE SHORTEST WAVE-LENGTHS.*

(Chemical News.)

THE extension of the ultra-violet spectral region is in close connexion with the invention of photography and the discovery of fluorescence. The main region of the ultra-violet light was opened up with the aid of fluorescence, but in its exploration photography has given brilliant evidence of its superiority. The fluorescence method of observation has since gradually lost ground, whilst the efficacy of sensitive plates in the ultra-violet region has increased.

The first observations in the ultra-violet region were undertaken by Edmond Becquerel (*Bibliothèque Universelle de Genève* (new series), vol. xxxix. pp. 341 to 367 [1842]), when he was studying the chemical action of the solar rays upon Daguerre plates. The solar spectra of Becquerel were formed, however, under the influence of the absorption of the glass, and they extended, therefore, only to Fraunhofer's P line.

Stokes, who recognised the greater transmissive power of quartz for light (*Phil. Trans.*, vol. cxlii. pp. 463 and 559 [1852]; vol. cliii. pp. 599 to 619 [1862]), succeeded with prisms and lenses of quartz in following the ultra-violet of the solar spectrum to an extent which, measured from Fraunhofer's H line, was twice as long as the total visible spectrum. Still more surprising was his result with the electric light. The ultra-violet of his spark spectra extended from six to eight times the length of the visible spectrum. The most refrangible rays of all substances were given by aluminium, the spectrum of which bounded the region of the smallest perceptible wave-lengths with a strongly luminous pair of lines of the wave-lengths 160·0 $\mu\mu$ and 185·2 $\mu\mu$. More strongly deflected rays do not seem to have been ever recognised in this region by Stokes and his successors. On the same day (June 19th, 1862), when Stokes submitted to the Royal Society of London his treatise on the above subject, W. A. Miller gave in to the same Society his no less important memoir "On the Photographic Transparency of Various Bodies," &c. (*Phil. Trans.*, vol. cliii. pp. 861—887 [1862]).

Both these memoirs pursued the same object—ascertaining of the ultra-violet spectra of electric origin, and the behaviour of these spectra with substances in all three states of aggregation. But, whilst Stokes made his observations with the aid of fluorescence, Miller utilised the photo-chemical action of the rays and took photographs of his spectra. The method of fluorescence showed itself strikingly preferable to the photographic method in one point: Stokes arrived at the wave-length 185·2 $\mu\mu$, whilst Miller did not get beyond the wave-length 202·4 $\mu\mu$. Miller afterwards, induced by Stokes, repeatedly attempted to photograph the remaining rays, but always without the desired result (*Phil. Trans.*, vol. cliii. p. 882: 52 aluminium). The fluorescence spectrum retained here and in the sequel an advance which extended to the considerable extent of 172·0 $\mu\mu$.

This photographic ill success in the extreme ultra-violet excites hesitation if we see that L. Soret, Edouard Sarasin, and others, in their extensive researches, observed this part of the spectrum only by means of fluorescence. Hence it might seem as if photography was not suitable for the observation of the most refrangible light. Such an assumption is, however, completely refuted by the fact that Cornu made use of photography for determining the wave-lengths of the most refrangible rays of Mg, Cd, Zn, and Al (*Archives des Sci. Phys. et Nat.*, III. Période, vol. il. pp. 119—126 [1879]).

Cornu, driven to photography by the feeble light of his grating, adopted here the moist process, but, in contradistinction to Miller, he used the precaution of bathing the sensitised collodion plate in distilled water before its exposure to light. In this manner he obviated the most important photographic hindrance which the most refrangible rays encounter on a plate which has not been bathed, and secured at once a better photographic result.

A further difference between the experimental arrangements of Miller and Cornu deserves notice. The apparatus of these two investigators differed widely in their focal lengths. The focal distance of Miller's apparatus was by far the longer of the two. Hence the absorption of the rays in the air must have come into play to a different degree whilst the proof was taken. The experimental arrangement of Cornu was consequently preferable also in this respect.

The photographic result of Cornu for the smallest wave-lengths seemed to open out a favourable prospect for the investigation of the ultra-violet region which had hitherto been neglected. Unfortunately the future did not answer this expectation. Experimental hindrances of an unknown kind have again estranged the region of the most refrangible rays of aluminium (198·8—185·2 $\mu\mu$) from photographic spectroscopy. The majority of all researches extends even at present to the neighbourhood of the most refrangible lines of cadmium (226·55—214·41 $\mu\mu$), and only occasionally the region of the most refrangible lines of zinc (214·41—198·8 $\mu\mu$) is taken into consideration. This phenomenon is the more striking, as since Cornu's investigations spectroscopy has obtained, in silver bromide gelatine dry plate, an auxiliary which throws into the shade, in every respect, all the results of the collodion plates formerly employed.

The gelatine plate has for a series of years conferred invaluable services upon spectral research. It is only since its introduction that photographic observation has made successful way in spectroscopy; with it the conviction has been secured that a study of the visible spectrum alone does not suffice for the comprehension of spectral processes, but that there is required as thorough a knowledge of the invisible spectral regions, especially the ultra-violet. In recent observations this necessity is taken into account wherever possible.

In view of the fruitfulness of the efforts in the ultra-violet regions which recent years have matured, it seemed to me desirable and highly remunerative to open up to photographic study the remaining ultra-violet, as far as the wave-length 185·2 $\mu\mu$, by means of a more suitable process than those hitherto applied, and at the same time to consider the extension of this region of observation in the direction of greater deviation.

For several years I have been approaching the execution of this thought. My task resolved itself into two portions. The first was the photography of the spectral region between the wave-lengths 231·35 and 185·2 $\mu\mu$; the second was the opening up of the unknown region beyond 185·2 $\mu\mu$.

The present report discusses the first part of the work, and at the same time the preliminaries for the second.

Its results, as also the representations of the apparatus used and of the

* From the Reports of the Session of the Imperial Academy of Sciences at Vienna (*Mathemat. Natur. Class.*, vol. cii. part 2, April, 1893).

spectre obtained, will form the contents of a brief subsequent second report.

Each of these portions has engaged a considerable time, and the second portion still awaits completion.

If I now venture upon publicity with the results already obtained, although years must probably elapse before the completion of my work, the step has been induced, on the one hand, by the requests of a number of eminent physicists to whom I have had the honour of submitting my chief results; and, on the other, by my own wish to bring the facts ascertained to the knowledge of the most extended circles.

Photography of the Spectral Region between the Wave-lengths 231·35 *and* 185·2 $\mu\mu$.

A. With ordinary apparatus permeable for the ultra-violet.

The Photographic Spectral Apparatus, with particular reference to its Optical portion.—The photography of this spectral region requires an apparatus of great permeability to light. Glass (G. G. Stokes, *Phil. Trans.* 1852, cxlii. Art. 202), which keeps back most of the ultra-violet rays, is unfit for the prisms and lenses of such an instrument. Calcareous spar is not much better (L. Soret, *Archiv. des Sci. Phys. et Nat.*, lxi. 334 [1878]). Its availability for the ultra-violet ends where the above-named region begins. The only media which can be taken into consideration are quartz (L. Soret, *ibid.* p. 332, and G. G. Stokes, "On the Change of Refrangibility of Light," *Phil. Trans.*, 1852, Art. 204) and white fluor spar (W. A. Miller, "On the Phot. Trans. of Various Bodies," *Phil. Trans.* clii. p. 865 [1862]; A. Cornu, *Archiv. des Sci. Phys. et Nat.*, III. Période, ii. p. 119).

Fluor-spar in its white variety—all other kinds of fluor-spar are coloured and less permeable for the ultra-violet—is more transmissive than quartz; but it has hitherto been applied only in isolated cases on account of its rarity and as it frequently contains defects in crystallisation which imperil the clearness of the image (H. Deslandres, "Spectres des Bandes Ultra-violet des Metalloids avec une faible dispersion," p. 32. Paris: 1888).

In the photography of the ultra-violet region, quartz presents, upon the whole, greater advantages than any other medium. It yields spectra of faultless definition, and its lower transmissibility—just mentioned—is according to present experience, not so important as seriously to impair the photographs.

The Quartz Prism.—Not every quartz prism is fit for spectral photography. Every prism whose refractive edge runs parallel with the optical axis is unsuitable. The reason lies in the partial superposition of the ordinary and extraordinary ray, and in the circumstance that the photographic result on the extinction of one or other of the two spectra, which is certainly practicable with a Nicol prism, is destroyed by the non-transmissive character of the calc spar.

The relations are more favourable with a quartz prism, the refractive edge of which is cut at right angles to the optical axis in such a manner that the latter forms equal angles with the refractive planes. If the rays traverse the quartz in the direction of its optical axis, they no longer experience the ordinary double refraction, but they undergo circular polarisation, and in so palpable a degree that, *e. g.*, in a prism of 60°, every line of the spectrum is split up into two very nearly adjacent but clearly resolved components. It is plain that such a spectral image must be uncertain even if the lines are mutually isolated, but must be completely obscure in the case of crowded lines. This scission of the lines may indeed be avoided if a system of lines is cancelled by a quarter-wave plate with a Nicol inserted in the emerging ray. But the plate, as it consists of mica (W. A. Miller, *Phil. Trans.*, clii. p. 865 [1862]), is so impervious, that it absorbs almost all rays beyond the wave-length 325 $\mu\mu$, and, without considering the inconvenience in photographing occasioned by the impervious nature of the Nicol, it renders any photographic result in the ultra-violet at once impossible.

The only expedient to preserve the image from the disturbing effect of linear and circular polarisation, without interfering with brightness, consists in the use of a double prism (A. Cornu, *Comptes Rendus*, 1885) composed of a lævo- and a dextro-rotatory quartz, each of an equal refractive angle (30°). In preparing such prisms care must be taken that the optical axes of the semi-prisms are placed vertically to their common plane of contact. To avoid the loss of light the semi-prisms may be joined together with glycerine or distilled water; but this is not necessary. Double prisms of this kind, whether single or when several are connected in a circle, give spectra of a faultless definition.

The Quartz Lens.—The lenses for the collimator and the camera are best of a plano-convex form. They may either be of a like or of an antagonistic rotary power. It is, however, essential that the geometric axis has the same direction as the optical axis of the crystal, or, as the opticians call it, are cut at right angles to the axis. Quartz lenses consisting only of one part never double the image. Therefore double biconvex lenses, composed like the double prism just mentioned, of lævo and dextro rotatory plano-convex quartz lenses, afford no advantage in spectral photography.

The focal distance of the lenses must be equal, and not exceed one metre. If larger, it may easily happen that the aperture of the apparatus is too small. Although lenses of sufficient diameter can be procured without too great difficulty, the aperture of the prism still remains; but quartz prisms with a rather large aperture rank among rarities. Insufficient apertures easily occasion the formation of inflection fringes, which appear on both sides of the brighter lines of the spectrum, and may easily prove serious in interpreting the spectrum.

On the other hand, the focal distance must not be reduced too far, not below three-quarters of a metre, as the spectrum is otherwise too short. An increase of dispersion by the application of several prisms is not to be recommended. With a combination of several double prisms the spectrum appears clearly defined only for a short extent. The greater the number of prisms the shorter is the clearly defined extent. The simultaneous photography of extensive spectral regions should therefore be effected at the outside with a few, but preferably with a single double prism. This applies especially to a general photograph of the ultra-violet region.

It will be understood that the selection of crystals from which prisms and lenses have to be cut has to be effected with great care. Distortions, which are not rare in quartz crystals, make every crystal unfit for use.

As great attention must be given to the nature of the refractive planes, curvatures which, on account of their moderate size, have in glass prisms no effect on the spectrum, may greatly interfere with the effect of a quartz prism.

Quartz prisms with faulty planes always give an impure image of lines, though less when used singly than when several are associated in a circle. Such a circle is capable of bringing the spectrum into complete confusion.

Excellent prisms and lenses of quartz are made by the optician, Bernhard Halle, of Steglitz, near Berlin. As a proof of the excellence of his work, the fact may serve that a circle of nine double prisms supplied to me by Herr Halle, in which the rays have to traverse thirty-six refractive planes, gives in an extent of 3¼ mm. all the eighty-five lines which H. C. Vogel's Atlas of the Solar Spectrum shows between the lines H and K.

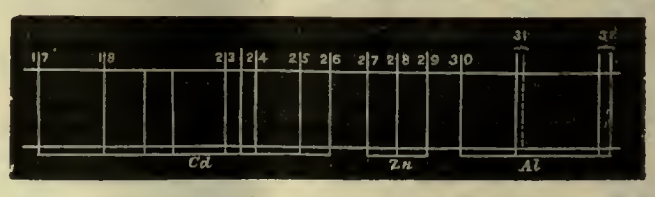
The moderate sensitiveness of the spectrum to certain defects of the lenses is remarkable. This applies to the centering and the direction of the optical axis of the crystals. I have been able to use continuously, without disadvantage, a pair of quartz lenses which showed unusual deviations for resolving dense groups of lines.

This circumstance deserves attention the more as the spectrum is very sensitive to all kinds of faults in the quartz.

The adjustment of the prism and the lenses is effected in the same manner as in the spectral apparatus.

The slit tube of the photographic spectral apparatus is of the ordinary construction. Only the photographic part of the apparatus differs from well-known instruments, and this only as regards the holder of the dark slide, by which I understand that part of the camera which serves for the reception of the dark slide.

The slide-holder is much more capable of being turned than in the ordinary camera, for the following reason:—Quartz lenses, as their focal lengths decrease considerably with the wave-length, require frequently, in photographing the spectrum, a very unusually inclined position of the photographic plate to the axis of the camera lens. If, *e.g.*, the focal length of the sodium line, D (589 $\mu\mu$), is 1000, the focal length for the most refrangible line of aluminium, No. 32 (185 $\mu\mu$), is only 806·2 (E. Sarasin, *Archives des Sci. Phys. et Naturelles*, lxi. p. 109, 1878). This oblique position is not constant; it varies with the dispersion and with the



proportion of the focal lengths of the collimator and the camera. If the focal length of both is equal (the usual case), the angle between axis and plate, measured on the more refrangible side of both, varies from 22° in a single prism (60°) to about 90° for twelve double prisms (two circles of

prisms placed the one behind the other). But the angle is not constant, even for one and the same prism-body. It varies here with the selection of the rays for which the prism is adjusted as at the minimum of deflection, also requirements made for the resolution of single parts of the photograph. Under these circumstances it varies in a single double prism from 28° to 22°. According to a circuit of the angle above named, the plate, with the dark slide and the slide-holder, must be capable of rotating on one of the middle lines of its sensitive side, and have such a position that this medium line forms a parallel to the refractive edge of the prism cutting the optical axis of the camera lens.

VICTOR SCHUMANN.

(To be continued.)

Our Editorial Table.

EDWARDS' NEW DARK SLIDES FOR FILMS.

B. J. EDWARDS & CO., The Grove, Hackney, N.E.

IN the dark slide for films or plates which Mr. Edwards has invented will be found many points of novelty and utility, in addition to lightness and portability. The slides are made to take two films, or two thin glass plates. The draw shutters are made of xylonite, one side being black, the other dark red; the latter, when facing outwards, indicating that the film or plate next it has been exposed, and also serving for the inscription of memoranda.

The holder, too, containing the plates, is easily removable. It has an end piece, which folds back, thus allowing of the insertion of the plates or films back to back, a sheet of black opaque material being placed between them. The end piece being replaced, the two plates are held in position, and the carrier is then easily returned to the slide proper. The new slide is very compact and small, and should acquire a great popularity among those anxious to reduce bulk and weight in camera impedimenta.

Mr. Edwards has also designed a simple film-carrier for ordinary dark slides. In this, a thin metal frame, with turned-back edges,

holds a stout card, which, to insert the film, is removed by being slightly pressed on the centre through the opening in the frame. The film is then placed half way in the groove, the card put in under the film, and both pushed home together. It should form a useful, as it is, undoubtedly, a simple and effective film-carrier.

BURNET'S ART ESSAYS.

MESSRS. PERCY LUND, & Co. have issued a reprint of these excellent essays at a very cheap rate. The three essays comprise "Hints on Composition in Painting," "Practical Hints on Light and Shade in Painting," and "The Education of the Eye." These were originally published separately; the first in 1822, the second in 1826, and the third in 1837. The original price was 2*l.* 18*s.* 6*d.*, while that of the reprint, including the photo-lithographic illustrations, is half-a-crown. Although written for painters, they afford invaluable information for photographers, and we are glad to see a good book issued at so low a price.

NEGATIVE-MAKING.

By CAPTAIN ABNEY, C.B., F.R.S., &c.

MESSRS. PIPER & CARTER have published a second and revised edition of this primer, which is written with Captain Abney's well-known accuracy, while it is couched in simple language, for it was originally contributed in the shape of articles to the *Boy's Own Paper*. It is eminently practical, and has been brought up to date. Price 1*s.*

AN INTERCHANGEABLE SCRAP ALBUM.

MARCUS WARD & CO., LIMITED, have published a series of albums adapted for holding unmounted photographs, when properly

inserted, which can be done with great readiness. The accompanying cut shows the appearance of one of those albums when the scrap photographs have been inserted, in all but one from which will be seen the mode of insertion. Its utility is undoubted.

News and Notes.

LEEDS CAMERA CLUB.—November 9, Lantern Lecture, *Old and New Flanders*, by Dr. Thresh.

WIDNES PHOTOGRAPHIC SOCIETY.—November 8, *Flashlight Photography*, by W. Priestnall, at Bedford Chambers.

THE BRISTOL EXHIBITION.—Intending exhibitors are requested to note that form A need not be sent in till *December* 1.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—November 9, Lantern-slide Competition Slides.

OUR readers will be pleased to know that the Exhibition of the Photographic Society of Great Britain has so far beaten the record, both in a financial sense and in point of attendance.

WE understand that Mr. F. E. Ives will shortly address the Photographic Society of Great Britain on the subject of the recent advances in colour photography by M. Lumière.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.—November 7, Ordinary Monthly Meeting. Discussion on *Printing Processes*, opened by Mr. J. P. Gibson. 21, Lantern Evening. Exhibition of prize slides.

WOOLWICH PHOTOGRAPHIC SOCIETY.—The second annual Exhibition of this Society will be held at the Polytechnic, William-street, Woolwich, on Thursday, Friday, and Saturday, February 8, 9, and 10, 1894. Entry forms and prospectuses will be ready shortly.

HARRINGAY AND FINSBURY PARK PHOTOGRAPHIC SOCIETY.—November 9, Metol Demonstration, by Mr. E. A. Leblanc. 23, Cresco-Fylma Demonstration, by Messrs. Hill Bros. December 14, *Photo-autocopyist*, Americo-European Company. 28, *Conversazione.*

LEYTONSTONE CAMERA CLUB.—November 4, Open Social Evening at eight o'clock. 7, Last day for receiving Entry Forms for Exhibition. 8, Demonstration, Wheatstone's Stereoscope, and how to make pictures for it, illustrated with models, diagrams, &c., by Mr. A. P. Wire.

CROYDON CAMERA CLUB.—November 15, Prize Slides, at Braithwaite Hall also Croydon Cricket (Foss Challenge Cup Final), and various slides by members of the Club. Tickets now ready, sixpence each. 29, *Modern Developers*, by Mr. Leblanc. December 13, Lantern Night. 20, *Various Methods of Slide-making*, by Mr. John H. Gear.

N.A.P.P.—Members are requested to note following arrangements:—Friday, November 10, 1893, at the Central Photographic Club, Coleman's Hotel, Covent Garden, London, Council Meeting at 3 p.m.; Friendly Tea and Social Meeting, by the kind invitation of the President, Mr. Thomas Fall, London, at 5 p.m.; General Meeting at 7.30 p.m. The Photographic Society of Great Britain, and the Photographic Salon, will both be open during this period. All members of the profession will be welcome on presentation of business address card. Early intimation of intention to be present is requested. The Secretary is Mr. D. J. O'Neill, 47, Charlotte-road, Birmingham.

Messrs. Elliott & Son, of Barnet, are issuing gratis, a pamphlet on the carbon process. It is capitally written, and comprises, within a small space, a practical introductory guide to printing and enlarging by this admired process.

Ashton-under-Lyne Photographic Society.—November 7, Lantern Exhibition. Delineator, C. E. Redfern, Esq., J.P. Chairman, J. W. Kenworthy, Esq., J.P. 15 and 16, an Exhibition of Cameras at the rooms. They will include Mr. S. Wooley's own made hand camera, the British, the Frena, and several others. 22, A Demonstration by Mr. William Moss, entitled, *Micro-photography*. Chairman, Dr. Hamilton. 29 and 30, Exhibition of Negatives and Prints by several members.

The Polytechnic.—The twelfth session of the photographic classes commences with Mr. Howard Farmer's introductory lecture, *Can Gradations be Varied: Can Incorrect Exposures be Corrected by Development*, on Tuesday, November 7. There are over twenty classes for all branches of instruction, conducted by well-known men in the trade. There are also classes for photogravure, collotype and process blocks.

Central Photographic Club.—October 27, a Lantern Evening by Messrs. Acres & Wellington, when a large number of really good slides were shown by these two gentlemen. To-night, Friday, November 3, there will be a general show of hand cameras, and firms are invited to bring up their latest developments in this way. Messrs. Teape, Snowden-Ward, Wall, Acres, Wentworth, among the members, will bring up the ones they use, which will be supplemented by well-known firms sending. The first "one man show" will take place about the middle of the month, November, when Mr. Fall will exhibit. Messrs. R. Keene and F. W. Edwards will follow suit at later dates. The Club premises are now open all day, and the Hon. Secretaries are always ready to enlist new members. November 10, Mr. S. H. Fry, on *Print-out Processes*.

The Photographers' Benevolent Association.—Mr. A. Mackie in the chair. Two applications for assistance. First case, the Secretary reported that the applicant had called personally. He was resident in a London workhouse, had been out of work for some months, and seemed to have no definite prospect of obtaining any. On making personal application he gave two references, who had been applied to, and who had replied favourably of the man. Secretary had given him food to the value of fourpence, and advised him to continue in the workhouse till his case should be considered. Applicant had been advised to attend the meeting, but did not appear, and had not sent a written application. Case referred back to Secretary. Second application, from an assistant out of work, who had been confined to the house for five months through serious accident, and since recovery had had only one temporary situation. The testimonials from recent employers were satisfactory, but applicant, who had been advised of the meeting, was not present. The case was referred back, and Secretary empowered to grant immediate relief. An advance of five shillings made by the Secretary to an operator to enable him to reach a situation was confirmed by the Committee. The Secretary reported *re* several cases that had been dealt with, and was instructed to press for payment of two loans that were made some time ago, and which it was thought applicants were now able to repay. Subscription of six shillings collected in the box of the editorial office of The British Journal of Photography was acknowledged. Final arrangements were made for the lantern evening at the room of the Photographic Society of Great Britain, 5A Pall Mall East, on November 10.

Is That the Law?—Frank Smith *v.* H. Bown. On Tuesday, October 26, before the Registrar at Southwark County Court, Frank Smith, photographic assistant, of Hanley, Staffordshire, sued H. Bown, 43, New Kent-road, for 4*l.* salary due, and salary in lieu of notice. The Plaintiff was represented by Mr. Henry Philcox (Chipperfield, Ingham, & Philcox), and Defendant was also represented by solicitor. The Plaintiff stated that he saw an advertisement as follows in The British Journal of Photography, August 25, 1893:—"Wanted, a respectable Operator and Retoucher; must be good and quick. Few hours on Sunday. Close at five on Thursdays. Wages, 40*s.* per week. No duffers need apply.—H. Bown, 43, New Kent-road, near Tarn's." In reply, he wrote a letter on August 28 (produced in Court), stating his experiences, giving particulars of his former situations, agreeing to the terms of the advertisement, and enclosing a sample of his work. On September 6 Plaintiff received a telegram (produced in Court), which said:—"Yes, you can, at once. Wire reply, Bown, 43, New Kent-road." The same day the Plaintiff wrote a letter (produced), saying that the telegram was received too late to reply by wire, as office closed at eight p.m., and accepting the situation. On Thursday, September 7, Plaintiff called at Defendant's studio, and was told to commence work the next day. On Saturday evening, September 9, Plaintiff received 12*s.* wages for two days, and Defendant told him to come to work on the following day. On Sunday, September 10, Defendant came into the studio, stated that the Plaintiff was no good, and ordered him to leave the place, refusing to pay him any salary. For the defence, the facts as stated were admitted, but Defendant stated that when Plaintiff arrived on Thursday, September 7, he—Defendant—had offered to give him a trial. It was contended that the advertisement, letters, and telegram did not constitute an engagement, and that, therefore, there was no liability to pay salary or necessity to give notice. The Defendant had not paid Plaintiff's fare from Hanley, and swore that he had no idea that "Hanley, Stafford," was very far from London. For the Plaintiff a witness was called to prove the custom as to engagements. For the defence two *employés* of the Defendant were called to prove that they heard him say to Plaintiff that he should "have a trial." Verdict for the Defendant, with costs of two witnesses.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 19914.—"Improvements in or connected with Photographic Cameras or Apparatus." Complete specification. H. Gamwell and C. Gamwell.—*Dated October* 23, 1893.

No. 20,042.—"Improved Sensitive Paper for Photographic Purposes." Complete specification. A. Hesekiel.—*Dated October* 24, 1893.

No. 20,181.—"Improvements in or relating to the backs of Opaline Photographs and Photograph Frames." P. Campbell.—*Dated October* 26, 1893.

No. 20,264.—"Improvements in Mounts for Photographs and the like." F. Wilkinson.—*Dated October* 27, 1893.

No. 20,277.—"Improved Camera, forming complete Apparatus for taking and finishing Photographic Pictures without aid of a separate Dark Room." L. Nievsky.—*Dated October* 27, 1893.

No. 20,297.—"Improvements in Cameras." Communicated by J. Zion. A. J. Boult.—*Dated October* 27, 1893.

No. 20,342.—"Improvements in Half-tone Negatives for Photo Processes." Complete specification. F. J. M. Gerland, W. C. Hespe, and M. Levy.—*Dated October* 27, 1893.

No. 20,372.—"Improvements in Photographic Apparatus." J. H. Balfour.—*Dated October* 28, 1893.

No. 20,379.—"Improvements in Magazine Cameras." S. D. Williams.—*Dated October* 28, 1893.

No. 20,405.—"Improved devices for Mounting Photographs or the like." M. Lake.—*Dated October* 28, 1893.

PATENTS COMPLETED.

Receptacle for Refilling Camera Magazines with Photographic Plates without the use of a Dark Room.

No. 16,126. Ladislas Nievsky, 14, Gransden-road, Shepherd's Bush, Middlesex.—*September* 30, 1893.

The general object of this invention is to provide a simple and efficient means for refilling the magazine in a magazine camera with plaques or sensitised dry plates in broad daylight without the use of a dark room. Another and special object is to further expedite and facilitate the use of my so-called simplex photographic machine, described in the Specification of my Patent dated October 19, 1891, No. 17,860. By that machine or apparatus each plaque delivered from the magazine to the camera proper is, after being exposed, opposite to the lens and the object to be photographed, conveyed into a tank, where it is expeditiously and conveniently developed, fixed, and washed, and can then be removed from the tank as a finished photograph. But, by my present invention, I do away with the necessity for going into a dark room each time the magazine has to be refilled, and the machine can thus do much more work in the same number of hours than heretofore, because the speed at which the machine works is so very great that the magazine has to be refilled very frequently during a busy day.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 6	Camera Club	Charing Cross-road, W.C.
,, 6	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 6	Peterborough	Museum, Minster Precincts.
,, 6	Richmond	Greyhound Hotel.
,, 6	South London	Hanover Hall, Hanover-park, S.E.
,, 6	Stereoscopic Club	Brooklands Hotel, Brooklands.
,, 7	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 7	Bolton Photo. Society	10, Rushton-street, Bolton.
,, 7	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 7	Exeter	City Chambers, Gandy-st., Exeter.
,, 7	Hackney	206, Mare-street, Hackney.
,, 7	Herefordshire	Mansion House, Hereford.
,, 7	Keighley and District	Mechanics' Institute, North-street.
,, 7	Lewes	Fitzroy Library, High-st., Lewes.
,, 7	North London	Canonbury Tower, Islington, N.
,, 7	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 7	Paisley	9, Gauze-street, Paisley.
,, 7	Rochester	Mathematical School, Rochester.
,, 7	Rotherham	5, Frederick-street, Rotherham.
,, 7	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 7	York	Victoria Hall, Goodramgate, York.
,, 8	Ipswich	Art Gallery, Ipswich.
,, 8	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
,, 8	Leytonstone	The Assembly Rooms, High-road.
,, 8	Munster	School of Art, Nelson-place, Cork.
,, 8	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 8	Southport	The Studio, 15, Cambridge-arcade.
,, 8	Stockport	Mechanics' Institute, Stockport.
,, 9	Birkenhead Photo. Asso. (An.)	Y.M.C.A., Grange-rd., Birkenhead.
,, 9	Camera Club	Charing Cross-road, W.C.
,, 9	Cheltenham	
,, 9	Glossop Dale	
,, 9	Hull	71, Prospect-street, Hull.
,, 9	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 9	Manchester Photo. Society	36, George-street, Manchester.
,, 9	North Kent	Gravesend.
,, 9	Oldham	The Lyceum, Union-st., Oldham.
,, 10	Bristol and West of England	Rooms, 28, Berkeley-sq., Bristol.
,, 10	Cardiff	
,, 10	Central Photographic Club	Coleman's Hotel, Henrietta-st., W.C.
,, 10	Croydon Microscopical	Public Hall, George-street, Croydon
,, 10	Halifax Camera Club	
,, 10	Holborn	
,, 10	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 10	Maidstone	"The Palace," Maidstone.
,, 10	West London	Chiswick School of Art, Chiswick.
,, 11	Hull	71 Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 26,—Mr. A. Haddon in the chair.

Mr. J. T. Truscott was unanimously elected a member.

The HON. SECRETARY, in drawing attention to the forthcoming Lantern Evening at the Exhibition Gallery of the Photographic Society of Great Britain, in aid of the Photographers' Benevolent Association, stated that the Association was in great need of funds.

DEVELOPED GELATINO-CHLORIDE PRINTS.

Mr. R. BECKETT showed a developed print on gelatino-chloride paper, the image having been just barely visible before development. It had from five to ten minutes' exposure. He thought that a better print was obtained than would have been the case by printing right out, and that the process gave a tendency to greater softness. Control was obtainable over development by diminishing or increasing the alkali. The prints were toned.

Mr. E. J. WALL had tried the development process with the Paget, Ilford, and Solio gelatine papers, and found that it proved more successful than by printing out in the ordinary way, as it gave greater command over the results. Development with a brush enabled one to get almost any effect one liked. He had satisfactorily used the method with rough paper. One must be careful not to develop too much, and to well wash the last traces of the developer out before toning. He thought that the "toning" should be called an intensification process, as he did not think in this case the action was entirely a toning one. The image, when developed, was very faint, but, when put into the toning bath, it developed up rapidly. The paper should not be exposed to white light. In reply to a question, he said the process gave pure whites with vignettes. There was besides a decided absence of double tones. By the process he had printed, developed, and toned sixty-four whole-plate pictures in one day from eight negatives.

ACETATE OF LEAD IN A HYDROQUINONE DEVELOPER.

Mr. L. MEDLAND referred to a published formula for a hydroquinone developer which contained acetate of lead, and asked what its action was supposed to be? With ordinary water it gave a milky precipitate, but, with distilled water, no such precipitation took place.

The CHAIRMAN said that it must be due to the impurities in the ordinary water if a clear solution were only obtained with distilled water.

THE ALUMINIUM FLASHLIGHT.

A paper by Mr. T. Bolas on the subject was read [see page 702.]

Mr. J. G. HUDSON pointed out that aluminium would ignite in an ordinary Bunsen burner if blown straight through the centre of the tube. He did not, however, see any advantage in aluminium over magnesium. In reply to a question, he said the magnesium fumes could be done away with by using casing.

Mr. WALL alluded to some experiments which showed that aluminium was decidedly inferior to magnesium in actinic power.

Mr. R. CHILD BAYLEY thought that aluminium leaf burnt in oxygen would be better for photographing interiors than magnesium.

Mr. HUDSON showed a portrait taken by magnesium light with three seconds' exposure.

The CHAIRMAN thought the paper showed the possibility of using metals other than magnesium for illuminating purposes. It had been stated that aluminium did not tarnish, but that was a mistake, as, when exposed to the air, it became covered with a very thin film of alumina, which was transparent, and allowed the metallic lustre to be seen through it.

"LADIES AT THE LONDON AND PROVINCIAL."

The meeting then became a special general one, consequent upon a formal requisition asking the Hon. Secretary to convene it for the purpose of virtually deciding whether ladies were eligible for nomination as members or not.

Mr. W. E. DEBENHAM proposed the following addition to the rules: "That ladies are eligible for all the privileges of membership."

This was seconded by Mr. STEINMETZ.

Mr. THOMAS BEDDING proposed an amendment the effect of which was to make the rule read, "That gentlemen only are eligible for the privilege of membership."

This was seconded by Mr. C. H. COOKE, and, upon being put, was carried by twenty to six.

The inclusion of the word "ordinary" before membership having been formally moved and carried, the amendment was put as a substantive motion, and carried.

MANCHESTER PHOTOGRAPHIC SOCIETY.

OCTOBER 12,—Annual Meeting.

The following gentlemen were elected members of the Society:—Messrs. J. B. Pettigrew, W. Donyan, and W. T. Burrows.

The report of the returning Council recorded a quiet but generally successful year's work, many of the ordinary meetings having been devoted to the examination and discussion of the various brands of plates, &c., and newly introduced developers, the social part of the evening at tea preceding the formal business, continued an enjoyable feature of the ordinary meetings. The exhibition of members' work, held in March, was very successful, and showed marked advances in technical work. The lantern meetings had all been open to friends, the lecture and other acts of slides displayed being of good quality and well received. The outdoor meetings had, with the exception of one or two rambles, been disappointing both in attendance and results. The Society had lost two members by the death of Mr. C. Duval, a local professional, and Mr. J. Kershaw, of Buxton, one of the earliest members, and well known as the inventor of the roller-blind form of shutter. Although the membership remained about the same, the Council would welcome a few more friends as a slight increase in the number of members would be an undoubted advantage in enabling them to provide better for the general requirements of all.

The Treasurer's statement was adopted, and the election of officers for the coming year proceeded with. During the necessary interval for counting the votes, the meeting resolved into a *conversazione* for general discussion and the trial of slides in the lantern. The election resulted as follows:—*President:* Mr. J. Wood.—*Vice-Presidents:* Messrs. A. Brothers, F.R.A.S., T. Chilton, T. R. Cobley, A. Heywood, and H. M. Whitefield.—*Council:* Messrs. W. Blakeley, J. Brier, C. H. Coote, S. L. Coulthurst, F. Edwards, H. V. Lawes, J. Peddie, W. Tomlinson, J. Warburton, and J. Whittaker.—*Hon. Librarians:* Messrs. C. H. Coote and H. V. Lawes.—*Hon. Curator:* Mr. H. V. Lawes.—*Lantern Committee:* Messrs. Coulthurst, Edwards, Lawes, and Whittaker.—*Hon. Treasurer:* Mr. W. G. Coote.—*Hon. Secretary:* Mr. W. H. Farrow.

Croydon Microscopical and Natural History Club (Photographic Section), October 27, Mr. Sparrow in the chair. Subject, *Mounts and Mounting.*—As the annual *soirée* of the Club would shortly be held, when there would be an exhibit of the work of members, the opportunity was taken of assisting them in the mounting of their prints. An extensive selection of the newest patterns of mounts for exhibition and general use was sent down by Messrs. Adams & Co., and the evening was profitably spent in inspecting and comparing them. A very effective mount, said to be an old pattern of forty years ago now revived, was one consisting of a tinted cut-out mount, the opening being surrounded by narrow strips of the same tint, but of a different shade, edged with white or black. Several specimens were shown of the new "slip-in" albums, particularly adapted for glazed prints, as no mounting was required. Mr. Gower showed some mounts tinted by spraying with a comb and toothbrush, a plain centre being left for the print by masking. An example of platemaking on drawing-paper, produced in a copying press, was also shown.

Hackney Photographic Society.—October 24, Mr. E. Puttock in the chair.—Mr. Guest showed two bromide prints (enlargements), one at twenty minutes' exposure with gaslight, and the other with half-an-hour. The former was developed with amidol, the latter with hydroquinone. The one developed with amidol was stained, and the reason asked. Several members stated it was not due to the developer, but contamination with dirty dishes or hypo. Mr. DEAN showed an over-printed view on P.O.P., fixed direct with hypo, without toning, and asked the cause of black spots upon the face of it. Mr. BECKETT said that the print must have been imperfectly washed, and the citric acid left in paper in combination with hypo produced sulphur toning.

Leytonstone Camera Club.—October 25, Mr. W. J. Parsons in the chair.—The President (Dr. W. Pickett Turner), assisted by Mr. A. J. Newton (instructor, People's Palace), gave a very elaborate demonstration on the *Collodion or Wet-plate Process.* The lecturer having gone very fully into the theory, giving all the formulæ for the various solutions, and the necessary appliances required, a negative glass was cleaned, coated, dipped, exposed, developed, intensified, and varnished, the whole of the operation being done before the members, making a most complete exposition of the process, particular reference being made as to its advantages for transparency work, and a large number of lantern slides passed round, showing results of various defects, such as over-exposure, under-exposure, and different conditions of the bath, and the result of different mistakes made in preparing the negative, the most noticeable being the coating of the plate, the lecturer observing that the man who hesitates at this operation is lost. Saturday, October 28, first members' Lantern Evening of the season. A large number of slides were put through the lantern on the new screen, made by one of the members, Mr. F. F. Weeks, who also showed a number of carbon slides from his own drawings, those of the legend of the willow plate being very beautiful. Mr. D. G. Riddick manipulated the lantern. The new studio only awaits the painting of the background on the screen already prepared to be ready for operations. Several new members were elected. The meetings wil be held in future twice weekly, every Wednesday and Saturday.

Richmond Camera Club.—The second "Ladies' Night" of the season took place on Monday, the 16th ult., when the President described a *Trip to Spain with the Camera*, which he illustrated with a series of slides depicting scenes in Valencia, Cordoba, Madrid, Toledo, and Seville.

West London Photographic Society.—October 24, Ordinary Meeting.—The PRESIDENT, Mr. J. A. Hodges, delivered his inaugural address. For a full review of the year's programme he referred members to the address of Captain Abney before the Congress of Photographers at the Society of Arts. He would mention as of special interest the recent improvements in lenses, notably the new anastigmatic lens of Goerz, which was a remarkable production, giving marvellous defining power, with large aperture, compared with the older types of lenses. His own experience of some recent new lenses of the anastigmatic type was that their power was over-rated, and he considered that they show their superiority only when the objects are approximately in one plane, a condition of things not usually met with out of doors. Mr. Dallmeyer's photo-telescopic lens the so-called artist photographer would find a useful instrument, particularly in mountainous districts. Referring to the Photographic Salon at the Dudley Gallery, at which was to be seen the work of several members of the West London Photographic Society, the President said that it was apparent that to the teachings of Dr. P. H. Emerson, once a member of this Society, was to be ascribed the present position of photography as a graphic art. "Naturalistic" photography fell like a thunderbolt at the feet of photographers. Coming to the Society's own affairs, the President referred to its success at the National Photographic Exhibition in obtaining the challenge cup from a much stronger Society. The Society's own Exhibition had succeeded in a gratifying manner, and he looked forward to still better things. He hoped *every* member would send at least one print. The present fine weather was favourable to those who had neglected the opportunities of the late summer. The postponement of the date of the Exhibition for a few weeks later would also assist them. He would suggest that the proposal of another member,

that the technical social meetings be utilised for demonstrations for the benefit of the younger members of the Society, be put into practice, and promised to co-operate by himself conducting one such demonstration. Referring to the survey work being undertaken by the Society, he said that the prints already contributed more than justified the starting of the scheme. Already some of the buildings photographed had disappeared. The work faithfully carried out would redound to the credit of the Society, and give it a status it could in no other way attain.

Woolwich Photographic Society.—Annual Meeting, October 26.—The chair was taken by the President (Rev. E. Chettol) at eight p.m. The report of the Council, together with the balance-sheet, were received and adopted. The officers and Council were then elected for the ensuing year, and are as follows:—*President:* Rev. S. E. Chettol.—*Vice-President:* Major C. D. Davies.—*Council:* Messrs. Maskell, Penson, J. Calder, W. H. Dawson, P. Hobson, and B. G. Kimber (the last four named were the retiring members of the Council).—*Treasurer:* Mr. H. H. Barker.—*Hon. Secretary:* Mr. J. B. Panting. During the evening Messrs. A. Stone, Ludworth, H. Lawson, H. Dalby, Newman, and Harris were elected members of the Society.

Birmingham Photographic Society.—October 24, Ordinary Meeting, Mr. G. F. Lyndon in the chair.—Mr. CHUBB read a paper entitled *The Naissance of Art in Photography*, which was written by Mr. Andrew Pringle, and appeared in the *Studio*. He also read a number of letters by eminent artists of the day in reply to a question addressed to them by the Editor of the *Studio* as to whether they considered photography had been on the whole a help to art or not. The opinions expressed were very various, and they may be summed up by saying that photography is a help to the artist or not, just according as it is properly used or not.

Hull Photographic Society.—A special meeting was held to receive a demonstration and lecture upon *Paget Lantern Plates*, the *pièce de résistance* being printing-out slides and development of same. In the course of his remarks, Mr. FRY stated the characteristic qualities of a lantern plate to be (1) the stain like character of image, (2) translucency of the shadows, (3) the power of giving brilliant density and clear glass shadows if required. The printing-out plates of the Paget Company give an image without perceptible grain, and the shadows do not block up. In this they are fully equal to the best collodion, but they are not suitable for reduction in the camera. With partial printing and development the result can be modified in the direction of greater contrast by a preliminary bath of five per cent. (of each) solution of carbonate and bromide of ammonia in place of the ten per cent. bromide bath as given in the Paget Company's instructions. Less contrast can be obtained by using a dilute developer, or less of the actual reducing agent, in the developer. Mr. Fry passed through the lantern some examples of the process, and also an interesting set of slides, all from one negative, and illustrating the range of colours from black through brown and red to yellow, which are possible with the Paget lantern plates.

Leeds Camera Club.—October 26.—Mr. A. HOMBUBO gave a lecture on *Flashlight Photography* in the club rooms of the above. The lecturer, in a most interesting, instructive, and amusing discourse, gave his experiences, his successes, and his failures from his first commencement up to the present time, and, in plainly worded terms, gave the flashlight aspirants some valuable hints how to go on and what to avoid as a means of success. Practical illustrations of methods, together with a collection of prints and negatives, the results of his endeavours, were shown by Mr. Homburg, and received with interest. A vote of thanks to the lecturer was proposed by Mr. Irwin, and seconded by Mr. Vevers, and was enthusiastically responded to by every member present. The above Club, which has only been formed a matter of nearly two months, may now be deemed a success, having on its list over sixty members, six new ones being elected last Thursday, and has every prospect of being one of the strongest in this district. On Thursday evening, November 9, the President, Dr. T. Thresh, P.L.D., L.R.C.P., will give a lecture, illustrated by magic-lantern views, describing his recent trip to Flanders, and it is requested that every member, in addition to attending himself, will bring a friend interested in photography.

Liverpool Amateur Photographic Association.—October 26, the President (Mr. A. J. Cleaver) in the chair.—Messrs. F. A. Schierwater and Benjamin Cookson were appointed Auditors for the year. Special mention was made by the President of the success achieved by the Association in the recent lantern-slide competition in London, and a special vote of thanks was accorded to the six competitors who represented the Association, Messrs. Fred. Anyon (silver medal), Joseph Earp (bronze medal), G. A. Carruthers, Anthony Dod, Harry Holt, and T. Sutton. Mr. ADOLPH W. BEER then gave a lecture entitled, *By River and Hill*, some by-ways among the Ardennes and in Rhenishe Prussia, illustrated by 130 lantern slides, made from negatives taken by the lecturer and Mr. J. H. Day. The slides were of high quality and artistic merit, and were very graphically described by the lecturer.

Newcastle-on-Tyne and Northern Counties Photographic Association—The Annual Meeting was held on the 24th inst., Mr. T. P. Gibson (President) in the chair.—The Secretary's report showed the Association to be in a flourishing condition, the membership being 155, and the attendance at both outdoor and indoor meetings having greatly exceeded any previous year. The Treasurer's report showed a small balance in hand. The election of officers resulted as follows:—*President:* Mr. J. Pattison Gibson.—*Vice-Presidents:* Messrs. M. Anty, W. Parry, J. H. Robinson, and Lyd. Sawyer.—*Council:* Messrs. J. Arnott, J. S. B. Bell, W. E. Cowan, G. Hall, J. J. Kirkwood, E. G. Lee, T. O. Mawson, G. L. Snowball, L. Williamson, and John Watson.—*Treasurer:* Mr. Frederick Park.—*Secretary:* Mr. James Brown, 31, Market-street, Newcastle-on-Tyne.—*Assistant Secretary:* Mr. W. P. Brewis.

Widnes Photographic Society.—October 25, Open Meeting, Mr. V. C. Driffield presiding.—A large number of the members present brought negatives and prints, which were handed round and commented on. The question-box contained questions which gave rise to some interesting conversation and discussion. They were: 1, "What is the cause of the yellowing of the whites of gelatino-chloride prints in toning?" Mr. NEWBURN suggested that it was caused by traces of hypo in the washing water. Mr. Warner did not consider the reasoning set forth in the Britannia Company's publication, *Scraps*, satisfactory, as he had found yellowing of the whites to take place when using the combined toning and fixing bath. 2, "What is the best way to burnish Ilford P.O.P., and what is the best lubricator?" A number of members expressed the opinion that P.O.P. prints needed no burnishing, and the CHAIRMAN said that, if it was considered advisable to burnish, it was necessary that the prints should be perfectly dry, and he recommended white curd soap as a good lubricant. 3, "What is the best method for illuminating, by artificial light, a whole or half-plate negative in reducing to lantern-plate size; and what exposure should be given with this light, using a negative of average density with a bromide lantern plate?" Mr. DRIFFIELD pointed out that, no matter what means of illumination were employed, the exposure would depend on the density of the negative and speed of the lantern plate, the value of the light being ascertained. Illumination by condenser was the best method. 4, "What is the rule for ascertaining the time of exposure to artificial light by reduction, the time required for the same plate by contact being known?" No definite answer to this was given, but the Chairman said it would be necessary, by means of a photometrical observation, to ascertain the value of the light upon the sensitive plate, and measure the density of the negative. 5, "Does pyro and soda make the best developer; if others are better, then, in what respect?" This question produced a lively discussion. It was considered by those who joined in it that less exposure was required with amidol and metol developers. Mr. DRIFFIELD advocated strongly ferrous oxalate. While admitting that pyro was a grand old developer, he had found that, with different plates, it gave different colours, and even with the same plates behaved differently with modified solutions, and this occasioned much trouble when working by calculation, whereas, with ferrous oxalate, the results were always constant. Question 6, addressed to the President, "What is the ratio of exposure required for two negatives of equal density, one developed with pyro, the other with ferrous oxalate?" produced the reply, as 0·8 is to 1·0. The President exhibited a print showing the relative size of a photograph taken with an ordinary rapid rectilinear lens, and one produced by the new tele-photographic lens.

FORTHCOMING EXHIBITIONS.

1893.		
November 3-11	.....	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
,, 3-15	.....	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
,, 7-11	.....	*South London Photographic Society. Hon. Secretary, C. H. Oakden, 51, Melbourne-grove, Dulwich, S.E.
,, 17-25	.....	*Stanley Show (Photographic Section), Agricultural Hall. Manager, Walter D. Welford, 57 and 58, Chancery-lane, W.C.
,, 20-25	.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December	.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18-Jan. 22, 1894		*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☛ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE BRISTOL EXHIBITION.

To the EDITOR.

SIR,—In reply to an invitation to contribute to the Bristol Exhibition, I have felt it necessary to send the following reply. As my letter may have more than this single application, and be of general interest, I forward it to you for publication.—I am, yours, &c.,

Wimwood, Tunbridge Wells, October 27, 1893. H. P. ROBINSON.

[COPY.]

To the Hon. Secretary, International Photographic Exhibition, Bristol.

DEAR SIR,—I am obliged for your invitation to contribute to the Bristol Exhibition, but I regret that among your very numerous classes I cannot find one to which I, or those who think with me, could contribute. The loan collection is out of the question. It is the universal experience that, where there is a large competition, the pictures marked "not for competition" are neglected by the press and public, and, perhaps, rightly, for the hunt after medals is the chief amusement for which recent exhibitions seem to be instituted. There are some capable photographers who possibly may not object to contribute to the Champion class, but are barred by your rules. No picture may be sent to this class that has not already taken a medal, and none may be sent to the other classes that *has* taken a medal. Nearly all the best pictures for the year are shown for the first time in the Salon or the Exhibition of the Photographic Society of Great Britain, and therefore they have little or no opportunity o

qualifying for competing in the Champion class by taking medals elsewhere and even if they had had time and opportunity very few of those who produce really good work feel inclined to send in competition in the minutely assorted classes into which some exhibitions are now divided. The present Exhibition of the Photographic Salon seems to show that the best pictures are attracted to those exhibitions which offer no medals. For these reasons, then, I must decline to accept your invitation to exhibit.

But there are also other reasons for not exhibiting, and now I am on the subject I may, perhaps, be excused for going a little further into it.

It is agreed by all those who give the matter sufficient consideration that the awarding of large numbers of medals is encouraging bad work, and doing injury to the best interests of the art. Many attempts have been made to check the evil with indifferent results; at last the Photographic Society of Great Britain endeavoured to formulate a set of rules for the use of exhibitions. Many who do not agree with the Photographic Society of Great Britain in some things, heartily agree with them in this attempt. The result was that twenty-four of those who have had practice in judging undertook not to act when the rules and recommendations they formulated were ignored. The almost immediate reply was the issue of your prospectus, in which nearly all the recommendations are disregarded, and not even the usual discretion as to the awards is left to the judges except in the apparatus department.

Now I quite admit that you have every right to conduct your Exhibition as you please, and, except for the regard I have for the progress of the art, that I have no right to object; but it will, of course, be impossible for any photographer who agrees with the action of the Photographic Society of Great Britain to contribute to an exhibition which ignores its rules.—Yours truly,

H. P. Robinson.

FILMS.

To the Editor.

Sir,—Mr. Stillman's experience with films is so completely at variance with mine that I venture to send you my experience. I have used films almost exclusively since the time of Vergara films, before the introductions of celluloid, seven years or more. About four years ago I took a large number of ——'s celluloid films to Egypt; they were fairly rapid, about 22 Warnerke. Some of these were brought back, and exposed more than eighteen months later. They had not deteriorated in any way. Other makes, the most rapid obtainable, after nearly or quite a year, were as good as ever.

In the last few months I have used several different makes, all very rapid, and no perceptible deterioration in two months. Films developed several weeks after exposure have been as good as ones done at once. Negatives stored with no more than ordinary care show no alteration, any more than ones on glass.

One word more as to exposures. I admit I have not given exposures of one-thousandth of a second; with double or more than double that exposure, and developing with amidol, it is difficult to get fairly exposed negatives on glass or anything else.—I am, yours, &c.,

H. G. M. Conybeare.

6, *Courtenay-place, Teignmouth, October* 29, 1893.

HEATING DARK ROOMS BY ELECTRICITY.

To the Editor.

Sir,—I observe that the subject of warming dark rooms and studios is at present under discussion in your columns, it may therefore interest your readers to know that electricity may now be employed with great advantage for that purpose; this is a practical realisation of electric heating which I have long hoped for. Two or three years before Prof. W. K. Burton left for Japan, he gave a brilliant demonstration on the subject, "Electricity the Light of the Future," before a crowded audience, at the Kensington Town Hall, at which I was present by his kind invitation. The Duke of Argyle presided, supported by Prof. Huxley and other eminent men, and the lecture was received with great applause. Since then, electric lighting has made gigantic strides.

I went yesterday to the "Cookery and Food Exhibition," which was opened on Tuesday by the Baroness Burdett-Coutts, to see the demonstration of "Cooking by Electricity." At the tables a lady was engaged cooking a dinner; she looked as nice—and everything was as clean and tidy—as if she had been entertaining her friends in her own drawing room. There was a large cooking oven which can be heated up to 500° or 600°, and saucepans, stewpans, frying-pans, grills, and kettles, all at work cooking the various dishes, yet not a particle of smoke or dust to be seen; the heat was under complete control, and could be turned on or off instantaneously, and the pans be moved easily about; a great success. Mr. H. J. Dowsing, M. Inst. E. E., presided, and afforded popular explanations to those who desired them, on behalf of Messrs. Crompton & Co., the engineers, of Mansion-House Buildings; show-rooms 148 Brompton-road. He favoured me with the following information. The cost, he said, would, on an average, be about the same as gas, but that would depend on your district, as some companies charged less or more than others. The electric light is the purest known, and does not burn or contaminate the air; it is also the safest when properly installed. It does not injure our pictures or household gods, books, and decorations. The current may be used for driving sewing machines, coffee mills, ventilators, &c.; the advantage to health is very great.

It is a well-known fact that electricity, if obstructed in its passage through a conductor, will produce heat; and this knowledge has been turned to account in causing electricity to generate heat in a most convenient form. With electric heating there is no combustion, and consequently warming apparatus made on this principle requires no flue to carry off products of combustion and foul gases, which are given off by all other systems of heating. In fact, heating by electricity revolutionises our ideas of stoves and other heating apparatus, for, up till the present, no system has been employed which did not entail combustion. If the cost is a little more than gas, less heat is required, as there is no waste of heat in the room or up a chimney. Water for breakfast or tea may be made on the table, without vitiating the air and with perfect cleanness. The dangerous spirit lamp may then be discarded.

I think these advantages will give a great impetus to the supply of electric lighting to private houses throughout the kingdom, which will receive a still further impulse from the fact that the Edison incandescent lamp patent expires on November 10, when the present price of 3*s.* 9*d.* will probably be reduced to one-third that amount. The advantage to photographers will be obvious. Personally, I have suffered dreadfully from gas and other stoves in my studios.—I am, yours, &c.,

October 26, 1893. Palette.

WARMING THE DARK ROOM.

To the Editor.

Sir,—A very few words and I have done, for the discussion between "L.M." and myself has now reached a point where it can have no possible interest to the general reader; and were it not for his open sneer at my "facts" I should not now have thought it desirable to make any reply.

Surely it is the veriest quibble to contradict my statement that these stoves require "*two* communications with the external atmosphere," and proceed to prove that he is right by saying he only required one opening because he had used the chimney as the other. One and one usually make two.

I am aware No. 4 is on the name plate, and is also printed upon the prospectus; but if L.M. had been as careful to substantiate his statements as I have been to verify my facts, he would have learned that there is such a thing in this world as change, and that, when I courteously corrected his slight error in the address, I only stated what is absolutely true. As L.M. has sheltered himself under a *nom de plume*, I have no means of communicating with him direct; may I therefore ask you, Mr. Editor, to have the kindness to forward to him the enclosed telegram, the date stamp on which (October 7) will prove that before I made the correction I had taken the necessary steps to be certain of the accuracy of my "facts."—I am, yours, &c., Edward J. Smith.

Park Royal, Halifax, 30 *October*, 1893.

Copy of Telegram.

"Calorigen Works 1 Upper Thames-street London correct address will write to-day Farwig."

NEWCASTLE-ON-TYNE & NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.

To the Editor.

Sir,—Will you kindly permit us to notify through your columns that we purpose holding an International Exhibition of Photographs in April 1894. We will offer medals in the following open classes:—Landscapes, Portraits Genre, Architecture, Instantaneous, Enlargements, Hand-camera work, Lantern slides and Stereoscopic slides; and in a Champion class we will offer medals in three sub-classes, viz:—Landscape, Portraiture and *genre*. Our prospectus will be out in a few weeks, and I shall be glad to forward one to any intending exhibitor.

I may say that we intend to observe the "Judges Conference 'Regulations'" in their entirety.—I am, yours, &c., Jas. Brown,

31 *Market-street, Newcastle-on-Tyne.* *Hon. Secretary.*

JUDGES AT LEYTONSTONE.

To the Editor.

Sir,—Will you please make known through your columns that, owing to ill health (a fact which, I think, all who know him will deplore), Mr. Andrew Pringle has been ordered abroad by his medical adviser, and consequently will be unable to assist in the judging of the exhibits sent in to this Exhibition. The Rev. F. C. Lambert has kindly consented to take his place, and will act with Colonel Gale and Mr. F. P. Cembrano, jun. May I also call attention to the fact that Tuesday next, November 7, is the last day for receiving entry forms.—I am, yours, &c.,

Albert E. Bailey,

Rose Bank, South West-road, Leytonstone. *Hon. Secretary.*

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange lantern, 3½-inch condenser in case, and 17 Newton's slides on *Agriculture*, for camera extending to 20 inches.—Address, S. E. KELF, 189, Southampton-street, Reading.

Wanted oxygen gas bag, 8 or 10 feet, in good condition, in exchange for landscape lantern slides of high class, values adjusted.—Address, H. EARL, 47A, Broad-street, Worcester.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

H. G. MC.—Received; thanks.

W. M.—We have forwarded your letter.

E. H. D.—Protosulphate of iron will precipitate the gold.

TYRO encloses no name or address, hence his query is not attended to.

CALCIUS.—Messrs. Tunny & Co., Edinburgh, undertake vitro-enamelling.

E. H. BOOTY and L. J. STEELE.—Thanks for your suggestion, which we will bear in mind.

SAXON.—We do not think development of carbon prints in an enamelled tin vessel would injure the prints.

L. NIEVSKY asks, "Can you oblige by telling me what is the principle of Elishau Grey's telautograph?"

C. CARTER.—Potassium chloro-platinite is listed in most dealers' catalogues. We presume the sodium salt can also be obtained from them.

L. M.—Twenty-six feet approximately is the distance at, and beyond which, using a five-inch lens at *f*-8, all objects would be in focus.

D. S.—In our last and the preceding volumes will be found articles on copying Daguerreotypes which may possibly help you.

COL. SPENCER NICHOLL.—The solutions should be kept separate. You do not specify the one in which the precipitate occurs. Kindly say, and we may be able to assist you.

MISS C. PARKS SMITH (Quarry Lodge, Lichfield).—We have no entry forms for the Madras Exhibition. Perhaps some correspondent seeing this may be able to supply one.

W. ROWLAND desires to know the address of the head-quarters of Green's, Landscape Photographers. They publish series of views of England, Scotland, Wales, the Continent, &c.

A. M. L. SHIELDS.—Such an adapter will be useful. It is not, however, a subject for registering, but for patenting. Nothing in which there is "a combination of parts" can be registered.

T. BROWNING.—If the solution of pyrogallic acid, prepared with old sulphite, works all right, that is all that is required. What matters it if it be a little discoloured; it is wanted for use, and not to look at.

ALPHA.—1. You had better obtain the 1891 volume, which has numerous references to the subject. 2. Divide the equivalent focus of the lens by eight. The answer will be the diameter of a stop working at *f*-8. 3. No.

R. S. O.—Your Lerebour lens requires no alteration to enable it to be used with the optical lantern, but a ten-inch focus lens will only give a small disc unless it is removed to a considerable distance from the screen.

AJAX asks: "Could you tell me by what means a tone like that of the 'Ferrier et Soulier' slides of thirty years ago is produced? Of course I know they are albumen pictures, but the tone I get by development with gallic acid is not at all the thing."

A. W. W.—A varnish composed of dammar resin, dissolved in benzol, makes a very good protective for negatives, and it can be applied cold. Dammar varies much in quality, and only the finest should be used. Some are almost as brittle as common rosin.

H. C.—There is no definite position for the stops of a single lens, but the deeper the curvature of the front surface, the nearer may the stop be placed to it, and *vice versâ*. There is one position by which a flare spot may be produced, but this can only be discovered by trial.

ALF. COLLINS.—Eosine can be obtained from most of the drysalters or dealers in dyers materials. There are many kinds of it. In one manufacturer's list, now before us, nearly twenty varieties are quoted. If it is required for photographic purposes, better get it from such a house as Hopkins & Williams. The right sort will then be ensured.

EXPERIMENTALIST.—Yes, it is a fact that by far the larger proportion of those who work photo-mechanical processes do very much prefer, in some cases will use no other than, collodion negatives. It is not, as you infer, a question of economy at all, it is the fact that it is found in practice negatives by that method answer the purpose better than those by any other.

T. C. H.—You have been correctly informed. Plates that have been accidentally exposed to light can be restored by treatment with bichromate of potash. But it will not pay, now that plates are cheap, for any one to go to the trouble of treating a dozen or two of small plates. So far as we are aware, there is no simpler method than that referred to of restoring exposed plates.

S. O. C.—Yes, it is the same thing over again. Some of the illustrated periodicals are very unscrupulous in the matter of photographs. They know quite well that photographers rarely take the necessary steps to make their work legally copyright, hence so much piracy by them. In your case we doubt whether your copyright would, in a court of law, hold good if contested.

H. H. H.—If you want a plate to cover the quarter-plate size, with the full opening, up to the corners, you must have one of considerably longer focus than that you have, whoever may be the maker. No lens of four and a half inches equivalent focus will cover a quarter-plate sharply to the corners with an aperture of *f*-6. Of course there is a great advantage in a lens that will work with such an aperture over one with an aperture of *f*-8 for winter hand-camera work.

G. SIMMONS.—It is impossible to say what exposure will be required to make an enlargement on bromide paper on such data as "fair light," "average negative," "medium stop," &c. The simplest way for a novice to arrive at the correct exposure is to make one or two trial exposures on small strips of paper, giving different times to each piece. After a few experiments in this way, sufficient experience in judging the light will be gained to time exposures with comparative accuracy.

G. EDWARDS writes asking if one is allowed to photograph any of the objects in the British Museum, and, if so, is special permission necessary, and by whom is it granted?—Special permission has to be obtained to photograph anything in the Museum. This is obtained by writing to the trustees, who seldom, if ever, refuse. There is an excellent studio and dark room, the use of which can be obtained. It is scarcely necessary to say that nothing can be removed from the building, though, upon application, some objects can be taken from their place to the studio.

PROVINCIAL AMATEUR.—We cannot say how you can sell the negatives unless by advertising them in the columns devoted to such purposes. In the mean time you might communicate with some of the large publishing firms, such as Frith, Valentine, and others. We, however, do not think the negatives will meet with a ready sale if the prints sent are a fair sample. The work is very second-rate, and the subjects, though good, are of no real interest. Country lanes and woodland scenery may be had everywhere, and are very similar all over the country. We note that you sign yourself an amateur; but, in taking negatives for sale, you are not entitled to style yourself as such.

E. BONNER writes as follows:—"I have lately been practising the carbon process, which I like very much on account of the variety of effects obtainable. Up to the present, acting on the advice usually given to beginners, I have only worked by the single transfer method, and have been fairly successful on the whole, but I often meet with this difficulty: On attempting to develop the picture, the backing paper will not strip off in the warm water, even when it is very warm, and after ten minutes' soaking. On using force, the tissue comes entirely away from the transfer paper. Of course I use a safe edge on the negative. Can you help me at all?"—The trouble is clearly due to insolubility in the tissue, from some cause or other—possibly from its being kept too long after sensitising, or through its being dried too slowly. The solubility of tissue can easily be tested before using by placing a small piece in water at about 110° Fahr., when the pigmented coating should slowly dissolve away. Unless it does so, it is useless to attempt to use it.

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THE BRITISH
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CHLORIDE PAPER FOR PRINTING OUT OR DEVELOPMENT.

One of the most recent photographic novelties consists of a positive paper which may be used either for printing out or for development, as circumstances or convenience may decide, and we have recently given an account of a visit to the Paget Plate Company's factory to witness the working of the new paper.

Although to the latter Company belongs the credit of the first introduction of an article specially adapted to the dual purpose, the idea is by no means a new one, as for several months past formulæ have appeared in these and other pages for the development, up to proper depth, of prints that have been accidentally under-exposed in the printing frame. But, as a practical process for converting such under-exposures into prints at all equalling in quality those produced in the legitimate manner, development cannot hitherto be said to have proved a conspicuous success, whereas those who have carefully tested the newest method pronounce it to be equal in the character of its results, if not, indeed, superior, to the direct printing process.

Whether there is any radical difference in the nature or preparation of the new paper, we are, of course, unable to say; but at least a great portion of the success secured with it must be set down to the method of after-treatment of the print when it comes from the printing frame. The Paget Plate Company must, in fact, be awarded the credit of having shown the way to success, in the development, or partial development, of print-out papers generally. For, while we are not yet prepared to assert that we have produced results equalling the very perfect specimens exhibited by the Company on their special paper, we have, with the ordinary gelatino-chloride paper of commerce, and even with sensitised albumen paper, succeeded in developing images that it would be difficult to distinguish from those printed out and toned in the usual way. A few remarks on the *modus operandi* may not be out of place.

Developed positives on gelatino-chloride paper are, of course, no novelties; but such as have been hitherto produced have been on specially prepared papers of the "Alpha" type, whose sole function is development. The "print-out" papers differ from these in that they are prepared with and contain at the time of printing a certain quantity of free silver, that is to say, of a salt of silver in a more or less soluble condition, without which the chloride alone will not give the necessary vigour of image. The soluble silver salt also continues to form more or less of an organic compound in the paper, which, under the action of light, confers on the image qualities that cannot be obtained with the chloride alone. This organic reaction may take place between the nitrate of silver and the gelatine itself, or it may result from the presence of organic salts purposely added; but in any case the best results are only obtained when the sensitive surface contains a trace of soluble silver salt.

It is this last circumstance that has formed the chief stumbling-block in the way of the successful development of such papers hitherto, the difficulty having been to preserve the purity of the whites and half-tones. In our own attempts, we have previously succeeded the best with developers of the "physical" kind, that is to say, in which a reducing agent, such as "pyro," gallic acid, or hydroquinone, is employed in the acid state, with the addition of a minute trace of nitrate of silver. Under such treatment, it is true that fair results may be achieved with care, but they cannot be said to resemble in any way, either in brilliancy or tone, those obtained by the ordinary routine of printing out.

When the "chemical" methods of development have been resorted to, that is, when the reducing agent is employed in conjuction with an alkali, the difficulty of entirely freeing the print from all traces of soluble silver salt, as well as the extreme ease with which silver chloride is reduced under such circumstances, have combined to render the production of a perfectly clean print almost, or practically, an impossibility. The treatment of the print with a soluble chloride to convert the silver salts availed but little, as the unreduced silver chloride retained its proneness to reduction; but it is worthy of note in conjunction with the Paget Plate Company's method of treatment that, when an old spent negative developer is used, containing a large proportion of soluble bromide, the purity of the half-tones and lights is vastly improved.

It is in the employment of the preliminary bath of bromide of potassium that the secret of success lies. This converts all the soluble and organic salts of silver in the paper into bromide of silver, and, although, unless the action is very protracted, it can scarcely be supposed to have the same action upon the whole of the silver chloride, it must undoubtedly tend in that direction, and by decreasing the liability to abnormal reduction it renders clean development perfectly easy. A developer heavily loaded with soluble bromide works in a similar manner, but its retarding action is very much greater, with the consequence that, if there be enough bromide present to preserve the purity of the lights, the half-tones suffer and hardness results.

If prints upon Solio or Ilford paper be treated with a ten- to twenty grain solution of bromide of potassium, they will be

found readily amenable to development by means of any of the reducing agents commonly used for negative purposes of suitably reduced in strength. It does not seem very material whether the prints are immersed directly in the bromide solution or subjected to a preliminary washing, nor does it greatly matter how long the immersion is continued unless it is sufficiently long, as occasionally occurs with a very feebly impressed print, to almost remove the impression. Two or three minutes' immersion in the bromide solution, followed by a very thorough washing to remove the excess, will probably suffice in all cases.

The immediate effect of this treatment is to change the image to a bright yellow, and, in the case of light impressions, to very considerably weaken them, to the extent, in some cases, of nearly removing them. But whatever detail was visible before the treatment with bromide appears to be capable of reproduction by the developer. Whether details not visible to the eye when the print comes from the printing frame can be brought out by subsequent development or not, we are not prepared to decide, our own observation inclining to a negative view, though we have heard others assert the contrary.

After careful washing, the print is ready for development by almost any of the usual developers, though naturally those which most recommend themselves for bromide-paper work will be better for this purpose. Thus amidol, metol, hydroquinone, and ferrous oxalate are to be preferred to pyro, although the latter may be used, if it be the favourite; the choice may rest with the individual, but we have succeeded best with amidol and hydroquinone. The developer must, however, be much weaker than for negative or even bromide-paper work, though the conditions will vary to some extent with the degree of exposure and the tone required. The exposure does not, however, make such a marked difference in the character of the developer required as might be imagined, or as would be the case with a bromide print. The action in this case seems to be more in the nature of an intensification of the image already produced rather than of actual development, and the process is more or less protracted accordingly.

The chief effect of variation in the strength of the developer is on the tone of the resulting image. If too strong, it will be black and heavy, and incapable of satisfactory toning; but, if properly diluted, the process of development is easy and gradual, and the colour will be practically indistinguishable from that of an image printed out in the usual way. A very careful washing must now follow, bearing in mind that any of the developers named will promptly reduce the gold in the toning bath if allowed to remain in the film, and the print is then toned and fixed in the ordinary way.

So far as we have found, moderate exposure of the paper to diffused daylight, in examining the progress of the printing, has no effect upon the after-development.

GLASS POSITIVES.

The old, and by many despised, wet-collodion process has engaged some little attention at Society meetings before which it has recently been demonstrated. This has been chiefly in connexion with negatives or the making of lantern slides. There is another phase of the collodion process that is seldom referred to nowadays, although it is still an important one amongst a large number of humble workers. We allude to the glass positive process. Those who only know this process in connexion with the itinerant beach operator, or the man who, with perambulator tent, stands at cross roads to photograph "'Arries and 'Arriets," traps, &c., on bank holidays, may be surprised at such a process being alluded to here. But to such we would say that the collodion positive process is not one to be despised even now, as it is capable of producing exceedingly beautiful pictures, and with this advantage, that the portrait can be finished and delivered within a few minutes of the sitting.

In America the positive process always assumed greater importance than it did in this country, and, at one time, there was in New York a society composed entirely of "positive" workers. Here the process, after the earlier days of it, was generally looked down upon as being *infra dig.* to work by the better class of photographers, though there was really no reason why it should have been. The pictures were good, and considerable skill was necessary to produce them in high perfection. They were exceedingly soft and brilliant, while the detail was much finer than can be obtained in a paper print. We have in our mind just now a series of stereoscopic glass positives of the Crystal Palace, interior and exterior, published in its earliest days by Messrs. Negretti & Zambra. These pictures were wonderfully fine in detail, and, by treatment in the development, they had a metallic-like lustre not unlike a Daguerreotype. Indeed, we were shown some of these identical pictures only a few months ago, and were told that they were Daguerreotypes.

The collodion positive process is essentially the same as the negative process, but with slight modification in the working. It may be mentioned that a glass positive is both a positive and a negative at the same time. It is the former when backed by any dark material and seen by reflected light, while it is a thin negative when viewed by transmitted light. In working the positive process the silver bath is usually made a little weaker than for negatives, seldom exceeding thirty grains of the nitrate of silver to the ounce of water. It is also more strongly acidified, nitric being the acid used. The collodion is also made a little thinner than that employed for negatives, and requires to be tolerably ripe, that is, iodised some time before it is taken into use. The exposure is only about half that required for a good negative, so that it is a more rapid method of taking pictures. The developer is very similar to that for negatives, namely, an acidified solution of proto-sulphate of iron. But the proportion of acetic acid is less, from one to three or four minims of nitric acid being added to take the place of a larger quantity of acetic. The proportion of nitric acid in the developer has a marked effect on the character of the image, the greater it is the brighter and more metallic it becomes, and an excessive quantity causes the deposited silver to assume almost a crystalline appearance, with a lack of half-tone in the image. The development is very brief, for as soon as there is an indication of the deepest shadows it is stopped; this is often only a question of a few seconds. The picture is then fixed in a solution of cyanide of potassium, again a question of seconds only, and after a minute or two's washing under the tap it is finished.

The picture may be varnished or not. If it is varnished, it is better protected, but some varnishes, to an extent, deteriorate the purity of the whites. The best varnish for positives is Dammar resin, dissolved in benzole, as this does not degrade the picture as a spirit varnish is liable to do.

A glass positive may be reversed as regards left and right or not, at will. If it be backed up with black velvet or black varnish on the glass side, the picture will be reversed; but, if the backing be applied to the film side, it will be as seen in nature. The reason why this was not always done was, that the delicate half-tones were not so well preserved when the image was seen through the glass.

Sometimes these pictures were treated with a solution of bichloride of mercury, either with or without the addition of other substances. They then assumed a pearly whiteness in the lights, which gave them an additional charm. They were then termed "Alabastrine" pictures. Some of the most successful workers, instead of using the proto-sulphate of iron for development, preferred the proto-nitrate. This they formed by adding a solution of proto-sulphate of iron to one of the nitrate of baryta, and then filtering out the precipitated sulphate of baryta. This developer certainly did give a different character of image from that obtained with the proto-sulphate, which in some respects was decidedly better, but this developer was not extensively employed.

The above brief outline of the positive collodion process is sufficient to indicate to those who have seen the negative process demonstrated wherein the two processes, though identical, differ in manipulatory details. To those who are not familiar with the fine positives that used to be produced five-and-thirty years ago, we would say, Judge not the process from the standard of the itinerant worker of it at the present time.

Convention Finances.—We are pleased to hear that the Photographic Convention of the United Kingdom, thanks to good management, possesses a balance on the right side of the ledger. At its last meeting the Council voted a sum of 10*l.* to be sent to Birmingham as a contribution towards the deficit incurred there when the Convention was held in that town five years ago.

The Photographic Salon.—The Photographic Salon closes to-morrow (Saturday) at ten p.m. Thanks to the energy displayed by the executive and Mr. Maskell, the honorary secretary, it has proved very successful. A considerable number of the best pictures bear in the corner the pleasant word "Sold." The object of the Salon-ists has been accomplished. They have emphasised the fact previously recognised by many, that pictures, real pictures, may be made by photography.

The Photographic Club.—We understand that this old-established and excellent body has decided in future to communicate its technical proceedings to the photographic press. Such a step cannot but redound to the advantage of photographic progress, inasmuch as the Club numbers among its members some of the foremost men in photography, while we also hope that it will result profitably to the Club itself.

Non-Shrinkable Wood.—One of the great difficulties experienced by the photographer in damp, hot climates is the swelling of his camera or slides, which is apt to occur with even the highest class of work. If, however, we can rely upon the statements of the *Indian Textile Journal*, there is a kind of wood named "billian" which grows plentifully in Borneo, and is famous for its strength and durability both on land and water, and is quite unaffected in bulk by the action of water. It is exceedingly weighty, being nearly as heavy as water (sixty pounds to the cubic foot). It is half as strong again as oak, and still stronger compared with Borneo teak. It is deep red when seasoned, and after long exposure becomes as black as ebony. It resists the white ant, and is almost indestructible. If these statements prove founded on fact, and the wood is of a workable texture, it would be simply invaluable to the camera-maker whose products are to travel in the far East.

A Novel Use of Oxygen. — If there is one point more strongly impressed than any other upon the tyro in the use of oxygen and hydrogen, it is that he must be most careful to prevent any possible admixture of the two. The advice is most desirable, although it is well known that for explosion to take place the proportion of the mixed gases to each other must be within certain well-known limits. Outside those limits no explosion will take place. The knowledge of this fact underlies the novel application we refer to. At Huddersfield, Brin's Oxygen Company have erected oxygen plant for the purpose of supplying that gas to mix with the illuminating gas to be issued to the public. About six per cent. is added just before it enters the station meter, and is then stored in special holders. The Corporation gas is enriched to the extent of five and a half candle power by this addition, a fact which is most singular when it is remembered that atmospheric air is looked upon as a deleterious adulterant of ordinary coal gas.

Geographical Longitude by an Ordinary Camera.—Herr O. Runge, of the Hanover Technical High School, has recently published an interesting account of his success in obtaining, by an ordinary camera, furnished with a Steinheil group antiplanat lens, of about ten inch focus and *f*-13 stop, and a watch as his time-keeper, the exact longitude of a place. The camera was pointed to the new moon (on June 17). Eight exposures were made, at intervals of about two minutes. Then, in half an hour's time, the camera remaining unmoved, another series of exposures were made on the same plate, the objects this time being some stars in the constellation Leo. They were allowed to act on the plate for about an hour and a quarter, with regular intermittent breaks of five seconds. The measuring of the plates was done with an accurate micrometer, and the accuracy of the method was such that the declination of the moon was given to twenty seconds, and sometimes still more exactly. Using the same apparatus, he obtained the local time and the latitude with excellent results.

Novel Photo-astronomical Instruments at Manila.—An important astronomical observatory will soon be established at this place, the chief instruments being a novel photographic meridian instrument and a large 19·2 inch Merz refractor, the latter being provided with a photographic correcting lens. According to the October number of *Astronomy and Astro-physics*, as quoted by *Nature*, the instrument will consist of two telescopes in the same tube or what is equivalent to that. There will be object-glasses, one at each end of the tube, their foci coinciding. These will be of the same diameter (six inches) and focus (three feet), the tube being equal to the sum of the two focal lengths. The sensitive plate is placed in the focus of the two objectives, *i.e.*, in the centre of the tube. The upper objective throws the image of the first star on the upper side of the sensitive film, while, by the help of a basin of mercury below, and the lower objective, the trail of the second star is recorded on the under side of the same film. Besides visual work, the Merz refractor will be used for photographic observations of double stars, spectrographic work, photographic parallax, &c.

Possible Cause of Fire.—Professor Vivian B. Lewes, in his lecture on Spontaneous Combustion at the British Association Meeting, gave some interesting data which reveal a little-known danger of fire. From stove pipes highly heated, high-pressure water pipes, steam pipes, and so forth, it is not uncommon to see semi-charred timber in the vicinity which is thought to possess no danger on account of the heat never approaching the ignition point of wood. But

Professor Lewes pointed out that it had been experimentally determined that, when wood had been charred at a temperature of 500° it would take fire spontaneously when the temperature was raised in the presence of air to 680°, but that, when wood had been carbonised at so low a temperature as 260°, it was quite sufficient to raise it only to 340° to cause its spontaneous ignition. He thus shows a very grave danger to exist, where, at first sight, the charring might be looked upon as perfectly innocent. "If a beam is in contact during the winter months with a heated flue or even steam pipe, it becomes carbonised upon its surface, and during the summer it absorbs air and moisture, and during the next winter it again becomes heated and further carbonised, whilst the moisture and air are driven out, leaving the pores in a condition eminently adapted for the absorption of more air as soon as the temperature is allowed to fall, and in many cases sufficient heat is generated to cause the charred mass to smoulder, and when air is freely admitted to it to burst into flame." It is enough to call our readers' attention to these remarks to induce every one using heat in this manner to look to a possible source of danger.

GREAT TELESCOPES OF THE FUTURE.

[Congress of Astronomy and Astro-Physics, Chicago.]

I HAVE been asked by the local committee, through their secretary, to prepare a paper for the Astronomical Congress, embodying my ideas on the future possibilities in the construction of great telescopes. I accepted the invitation somewhat reluctantly, for, while I appreciate the honour extended to me, I feel that the subject chosen by the committee is a somewhat delicate one to deal with, as I may say many things which do not coincide with the preconceived ideas of some that may be present. I beg therefore that they will regard the subject of this paper as simply the embodiment of my ideas. I shall endeavour not to state anything as a fact that has not been demonstrated as such by repeated experiments.

Much has been written and more said regarding the great telescopes of the future. It seems to me that the best method of studying the subject is by a careful consideration of what has been accomplished with the instruments already made. From my personal comparisons I find that most of the important original discoveries in the truly visual line have been made with the largest telescopes in use at the time. In making this statement I would say that I do not include such discoveries as have been made from observed irregular proper motions of stars, such as, for instance, the companion to Sirius, which was known to exist some years before it was seen, although this required the largest refracting telescope then in existence to show it to the human eye. When once seen, however, with the large glass, it was readily seen with small ones. Nor would I ignore the many double stars discovered with smaller telescopes. These discoveries have been made with instruments of superior defining power, under fine atmospheric conditions, and are valuable contributions to astronomy, yet I do not believe that a small telescope was *necessary* to make these discoveries. I am of the opinion that, had the discoverers had at their command the largest telescope, the discoveries would have been more numerous and important. When the two 15-inch telescopes were made in 1846, one for Pulkova, the other for the Harvard Observatory, they were considered monsters. I believe it was thought by most astronomers that the limit in size had been reached. No larger refracting telescope was made for a period of more than fifteen years, the next largest being an 18½-inch. I mention this fact to show how and at what time the demand for larger telescopes came. I think that the order for the 18½-inch was given in 1860. As soon as the companion to Sirius was discovered with this glass, at once there seemed to be a desire for something larger. The next larger telescope was made for R. S. Newhall of Gateshead, England. Then came the 26-inch for the U.S. Naval Observatory, and then Leander J. McCormick presented the University of Virginia with one of the same size. After that, the 30-inch for the Russian Observatory was constructed, and, finally, the 36-inch for the Lick observatory. Besides, there is now in process of construction, and well under way, a 40-inch telescope for the University of Chicago.

I have always been a believer in large telescopes for special work. I have had great experience with them, and it is from testing these instruments that I have been convinced that large instruments are needed to make original discoveries, such as new satellites to planets, and faint companions to bright stars, in fact to any stars, as well as for studying the planets and nebulæ. For astro-physical work they are vastly superior to smaller ones. The trouble that early opticians experienced in procuring good discs of glass seems to have passed away, and we are now able to procure discs of almost any size, the only obstacle being the time required to make them, and the money to pay for them.

Having given you some of my reasons for believing in large telescopes, I will now proceed with the subject of this paper, viz., my ideas of the future possibilities in the construction of great telescopes. It is my idea that the great telescopes of the future will be refractors, not reflectors, and I shall confine myself entirely to the refractor. I would not wish to say anything that might lead you to suppose that I under-estimate the value of the great discoveries made with reflecting telescopes, or the great minds that have made and worked with them, yet one person of eminence did remark that *large* reflecting telescopes have never accomplished much except in the hands of the opticians who made them; and my own experience has been sufficient to convince me that the reflector is extremely sensitive to any changes, either of temperature or air currents, or more particularly to flexure, and that, while the refractor is also affected by these changes, it is by no means so injurious to the definition.

As I have said, I believe that good discs of any size, both crown and flint, may now be procured. Having once procured them, all that is required is an optician to work them. He must be an artist in light and shade, and in colour also, for the very best correction of the chromatic aberration. As in the light and shade we search for and locate the spherical aberration, so we work among the different colours for the chromatic corrections. It is a very difficult task, and, as the size is constantly being increased, the difficulties also increase. Personally I do not believe this work can ever be accomplished by machinery. Not that machinery might not be made available for the rough work and the first polishing, for we ourselves polish all our large surfaces in a machine in a preliminary way. The fine grinding and smoothing, however, is always done by hand. It is after the first machine-polishing is done, and the glass appears to be finished, that what I have referred to as artistic work begins; that is, the work to locate the errors from observations, and correct the surfaces of the glass by the tentative method till all the light from a point at an infinite distance will be refracted to a point at the focus of the objective so accurately that the image there formed will bear the highest magnifying powers without showing any distortion. I believe that this can be accomplished only by most careful study of the light that has passed through the objective, and that all the errors must be worked out by what is termed local corrections.

When the time is ready, I think the man capable of making the necessary observations and locating the errors with precision, as well as skilful enough to work them out on much larger objectives than have yet been attempted, will be found. The simple preliminary grinding and polishing of large lenses is not a very difficult operation; this, with the centering is purely mechanical; but, if the glass itself has the slightest unevenness in its density, be it ever so small, the refraction will be different through the different densities. This cannot be determined with certainty until the discs have been worked into an object-glass, or at least, ground and polished for that purpose. If, after this grinding and polishing has been done with the greatest care, we find the image produced by the lens which is achromatic is not symmetrical, and that a star at the focus is not round, but possibly is elliptical, rectangular, or in fact of any shape, what is to be done? After so much expense and labour, shall we condemn the glass, and wait perhaps years for other discs, which, after going through the same process, may give no better result? I will state here that of all the large glasses, that is to say, over 18½ inches aperture, that have been made by Alvan Clark & Sons, only one, viz., the Princeton 23-inch, came from the polishing machine giving a perfectly round image. All the others we had to round by local work.

I believe the optician that is to make the large telescopes of the future, as well as the present, must be able to do this work. In my opinion it is not more difficult than the correction of the spherical aberration proper, though, if much out, it may prove more laborious. Surely I believe this work should be done rather than condemn the discs and try others. Each glass can be rounded separately. For this purpose set the combined lens in front of a collimating mirror. An artificial star is produced from a lamp by reflecting the light from a minute lens within the eyetube, and close to the optical axis and focus of the objective. The light from this artificial star passes through the tube to and through the object-glass, then on to the collimating mirror, which should be as flat as possible. From the mirror the light returns to all portions of the objective in parallel rays. There must, however, be a little off-set, so that the returning ligh from the star will not fall on the minute lens where the star was first formed, but the deviation from the true optical axis is but a mere trifle. Of course it would be almost impossible to secure perfect definition under

these circumstances with a very large glass, as the combined errors or imperfections are made to appear twice as great as they really are, from the fact that the light has passed both ways through the objective, so that the imperfections in the material, that is, the glass itself, and workmanship also, are made to appear double what they will be when used as a telescope for viewing celestial objects direct. Nor is this all, for we have the imperfections of the mirror to contend with, and who can conceive of a mirror of five or six feet in diameter resting on its edge being perfectly symmetrical? You may thing it strange if I say that, while I should much prefer to have everything perfectly correct for this work, I believe it impossible, and we must do the best we can under the existing circumstances. I remember a time when a distinguished professor was shown by my father our apparatus and methods of testing lenses. The professor asked, "Which are you testing, the mirror or the objective?" My father's reply was, "We are testing both, and surely we can test both by the method used."

After observing all the appearances in one position, the next thing to be done is to give the whole or combined glass, that is, the crown and flint together, a partial turn. If appearances are changed, it is certain there is some error in the objective, for, if the glass worked perfectly, no matter what imperfections were in the mirror, they would be the same whichever way you turn the objective. Having ascertained that the combined glass is not round, or rather does not give a round image of a star a little out of focus, the next thing is to locate the error or errors. Are they in the crown or flint lens? Probably in both. This is, however, ascertained by first revolving one glass. If an irregularity is detected that rotates with the glass, it must be corrected by skilfully working the surfaces, so that the portions that are of short focus shall be lengthened, and those of long focus shortened, until the rays shall come together at the general focus. After having rounded this lens so that no apparent change is visible by rotation, this glass must remain fixed, and the other must be examined and worked in the same manner. This work having been carefully carried out on both crown and flint lens, they are surely round, though they may not give a round image from the mirror. After the glass is rounded, the mirror itself may be corrected in the same way, but this is not absolutely necessary, as we already know the errors. This rounding of a large glass is very laborious, and sometimes requires months to accomplish. Yet the party that is to make great telescopes in the future, as well as the present, should in my opinion make himself familiar with all these tests, and have the ability to work out the errors that I have described, together with those that may arise from concentric rings of different foci.

Having stated my ideas as to the necessary requirements to make large telescopes, I will now call your attention to my idea of the great telescope itself. As before stated, I am of the opinion that it will be a refractor, and that its size will progressively increase. It will be mounted equatorially, and provided with the best driving clock that can be devised. I am in favour of the long polar axis, known as the English plan, for such an instrument, my reasons being, first, that a large driving wheel may be applied without setting the telescope to one side of the axis. The polar axis itself may also be braced in any or all directions, without interfering with or obstructing anything. This axis can be made exceedingly stiff by bracing, and the tube itself can be braced to the axis in any position. Such mounting could be easily provided with all the clamps and slow motions that are needed. To make it all complete, we should have two telescopes, one for visual and the other for photographic work, so hung on trunnions as to counterpoise one another, thus requiring very little or no extra weight. I think an instrument mounted in this way would be much more stable than the style Americans have generally adopted in the case of great telescopes.

Now that I have spoken so favourably of these instruments, I must say in conclusion that very much will depend on the localities in which they are placed. To ensure the best results, the best places should be selected as the result of thorough preliminary examinations. Doubtless there are many places, both at ordinary and high altitudes, of fine atmospheric conditions. A great telescope, even when used under ordinary circumstances, must be productive of great results, but under the very best conditions of still greater. The increase in size of even our present great refractors is not a possibility, but a fact, and with this will come large acquisitions to our present stock of knowledge. The new astronomy, as well as the old, demands more power. Problems wait for their solution and theories to be substantiated or disproved. The horizon of science has been greatly broadened within the last few years, but out upon the borderland I see the glimmer of new lights which wait for their interpretation, and the great telescopes of the future must be their interpreters.

ALVAN G. CLARK.

ON THINGS IN GENERAL.

It is late in the day, perhaps, to make many comments on the Photographic Society of Great Britain's show, but it teaches so many lessons that I cannot refrain. Very much has been said of late years about the uselessness of awarding medals, and now we have the Photographic Salon Exhibition to show the kind of collection that can be brought together with no medals in prospect. Pall Mall has adopted the very best plan possible to discredit medal-giving, for it is an unmistakable fact that this year the awards are a complete fiasco. There seems to be a considerable diffidence—or, should it be called, fear to wound the adjudicators' feelings?—displayed by those whom all are accustomed to look up to as authorities in expressing in plain language a fair judgment on the awards, some of which, in the almost unanimous opinion of outsiders, are simply ludicrous. Medals have been awarded to photographs which would cause any professional photographer to discharge a junior operator if he had exhibited them as a sample of his ability. Why have such awards been made? The nearest guess is, because the medalled prints have aimed at producing something as unlike an ordinary photograph as possible. Workmanship has been utterly disregarded, feeble attempts to imitate a texture, or to copy the *motif* in a well-known painting, have been crowned with laurel. Photography has been made a laughing-stock, and any possible claim to a photograph being a work of fine art killed by the ridicule that must fall on such medalled photographs as representing the utmost that photography has been able to attain in the year eighteen hundred and ninety-three. In the "Forewords" of the Photographic Salon catalogue may be read, "the dull diagrammatic pose of the earlier types of work is giving way to a more subtly suggestive style of treatment, and the initial blankness of wonder at its possibilities has been, or is being, gradually replaced by a clearer perception of what it can do well, and can do for certain classes of subjects and effects with a perfectness unapproachable by other methods." "The initial blankness of wonder" will most truly overcome most spectators when they see the magic word medal against some of the Pall Mall photographs, especially upon one characterised by "Palette" as a miserable abortion of photography.

It must not be understood that this condemnation applies to all the awards. Some of the adjudications are very proper. I do not like to mention names, still I cannot but express the pleasure I experienced in examining some of the nude studies that are hung on the wall almost facing the visitor as he enters the Exhibition room.

Even the hanging must come in for severe condemnation. If we take some of the trash that is hung as representative of a higher class of work than the rejected, the latter must be very poor. Yet, when we hear the names of the producers of these rejected pictures, we know them to be incapable of doing bad work. What is the moral? I would rather leave that for my readers to decide.

I mentioned the name of "Palette" just now. I do not know if he is the same writer who gives an interesting letter upon electric heating. If so, I am afraid his sanguine hopes about the economy of electricity for heating purposes will be doomed to disappointment. He had been informed that the cost of heat from electricity would be about the same as gas. This is moonshine. Let him turn on the electric lights in any apartment for an hour, and then, after ascertaining the increase in temperature, burn at an ordinary gas burner, gas costing, say, less than one-fourth the electricity, and see which gives the greater increase. I am one with him in his praise of the cleanliness and healthfulness of eletricity, but it is a toy for heating when any ordinary comparison of cost is instituted. I should like "Palette's" informant to tell him what it would cost to heat enough water for a hot bath, and then to ask Mr. Fletcher what he would undertake to do it for with gas.

"Is that the Law?" is the heading to a paragraph in last week's JOURNAL describing how an assistant went from Hanley, in Staffordshire, to a situation in London, and failed in the County Court to get compensation for wrongful dismissal, without notice, after a few days' work. The employer, among other things, swore that he did not know Hanley, Staffordshire, was very far from London! Of course from a brief report it is not possible to form a correct judgment as to what really were the merits of the dispute, but my strong opinion is

that it is a case not of "Is that the Law?" but of "Is it not the absence of a lawyer?"—on the assistant's side, that is to say.

I am very anxious to learn what the general verdict will be upon the remarkably interesting process for treating gelatino-chloride prints by development suggested by the Paget Company. If what we are credibly told about the matter really turns out not to be an overstatement of the case, it amounts to a great assistance in printing. The question of permanency will, of course, have to be considered, but there is no *à priori* reason to apprehend failure in that direction.

"As close an approach to permanency as possible" should be the watchword for every photographer, hence I view with a certain amount of disfavour all such silver-printing methods as that described by Mr. W. Lindsay a month ago. Let it be understood I refer only to doing such prints other than as an occasional thing for some special purpose. For serious work they should be avoided. The plan is good and practicable, as I can say from experience of certain enlargements more than twenty years ago; but, at its best, it never equals platinotype, so again I would advise, "Leave it alone," except for a casual experiment or trivial print. FREE LANCE.

PHOTOGRAPHS IN NATURAL COLOURS PRODUCED BY THE IMPROVED PROCESS OF L. LUMIERE, AFTER PROFESSOR LIPPMANN'S INTERFERENCE METHOD.

(Photographic Congress.)

THANKS to the great kindness of M. L. Lumière, of Lyons, we are able to examine to-night the latest results obtained by him. A few explanatory remarks are necessary to make the method of their production generally intelligible. About two years ago Professor Lippmann, of the Sorbonne in Paris, succeeded in producing photographically a coloured image of the solar spectrum, based on the well-known principles of interference. He used for that purpose a plate coated with an albumen, collodion, or gelatine sensitive film. This sensitive film was, during exposure, brought into contact with metallic mercury, the image of the spectrum being projected on the film through its glass support. The light, after penetrating through the thickness of the film, was reflected back from the surface of the mercury, the direct light-waves encountering the waves of reflected light, producing the phenomenon of interference in the thickness of the film. The waves of light propagating in opposite directions cause the vibrations at certain intervals to be neutralised, while at others they are intensified. If such a plate could be developed, fixed, and dissected we should find it to consist of strata of the black deposit of silver, produced by the developer in the parts corresponding with the maximum of light succeeded by transparent strata, corresponding to the minimum of light where the developer had no action. The distance between the strata is equal to half the wave-length, which is 600 ten-thousandths of a millimetre for red light, 583 for orange, 551 for yellow, 475 for blue, and 423 for violet. In a film of $\frac{1}{20}$ mm. thickness there will be about 200 such strata. It is evident that, on examining such a plate by reflected light, we shall observe the colours, because it is formed of a series of films of the thickness requisite to produce colour sensations. Subsequent experiments proved that, by using a gelatine film sensitised with a chromium salt, a similar result is obtained, the action of interference producing strata of soluble and insoluble gelatine.

The exposure of the plates produced by Lippmann was very long, and, owing to the variation of sensitiveness of different rays of the spectrum, necessitated the masking of the portions exposed to the more actinic rays while the others are exposed. L. Lumière succeeded in producing coloured images in one operation, and in last May, in a paper read before the Paris Académie de Science, gave full particulars of the process as follows:—

ABSTRACT.

To prepare the emulsion the following solutions are made:—

A.

Distilled water	400 parts.
Gelatine	20 „

B.

Distilled water	25 parts.
Potassium bromide	2·3 „

C.

Distilled water	25 parts.
Silver nitrate	3 „

One-half of A is added to B, and the other half to C. These two solutions are mixed by adding the silver to the bromide. A suitable sensitiser is added, such as cyanine, methyl violet, erythrosine, &c. and, after filtration, plates are coated on a tourniquet at a temperature of 40° C.

When the emulsion is set the plate is immersed in alcohol for a very short time, and washed in a continuous stream of water. The film being very thin, the washing is soon effected. This emulsion should not be washed in bulk, lest coarseness of the particles of silver be produced by reheating results, and in order to have the films as transparent as possible; for the same reason a great excess of bromide is to be avoided. The plates are dried, and just before use are immersed for two minutes in—

Water	200 parts.
Silver nitrate	1 part.
Acetic acid	1 „

This bath helps to produce brilliancy of the image, and to increase the sensitiveness; but the plates cannot then be kept long because the sensitive surface soon deteriorates. When the plate is dry it is ready for exposure *à la* Lippmann, viz., with a reflecting surface of mercury next to the film.

For the developer the following solutions are made:—

I

Water	100 parts.
Pyrogallic acid	1 part.

II.

Water	100 parts.
Potassium bromide	10 „

III.

Ammonia D. 0·960 diluted to 18°.

Solution I.	10 parts.
„ II.	15 „
„ III.	5 „
Water	70 „

The degree of concentration of the ammonia has a great influence on the result, even a slight alteration destroying the brilliancy of the colours. For fixing, the plate after washing is immersed for from ten to fifteen seconds in a five per cent. solution of potassium cyanide, washed, and dried.

In order to lessen the action of the ultra-violet, violet, and blue rays, a parallel faced bath of Victoria yellow, uranin, or primuline is used in the camera.

The pictures lent by M. Lumière are 6 by 8 cm. in size, and when seen at a certain angle show colours of unsurpassed beauty—beyond anything we are accustomed to see in the way of the reproduction of colours—somewhat metallic in appearance, but very bright and of a very decided and definite colour.

To examine them direct the best plan is to use the reflected light of a bright sky, or if a lamp must be used it is preferable to have the light reflected from a white shade or opal globe.

To fully appreciate all the beauty of these photographs the image should be lit by a powerful light, preferably electric, and a projection made on a screen by means of a portrait lens (four inches diameter). The result is then of such beauty as to defy description—it is not like an oil painting or a water colour, it is like real nature on a bright summer's day. Seeing these first photographs in natural colours we feel we are in the presence of one of the greatest inventions of the nineteenth century, and we may sincerely congratulate our friends on the other side of the Channel upon so splendid an achievement.

LEON WARNERKE.

"SOME PRIMARY CAUSES OF FAILURE.

DURING the past few months, including some weeks of the finest weather of recent years, I have made the acquaintance of some amateur workers, who appear to have fallen on dismal times with regard to their experiences of photography; who, in fact, in spite of the beautiful weather aforesaid, and, from a casual glance, averagely good apparatus, have exhibited a crop of failures such as I have not met with for a long while—failures which would be enough to make most men give the thing up in disgust, and, it must be admitted, failures for which, on the whole, they can hardly be held responsible.

If we look at photography as a serious pastime, as a healthy change of work, designed to refresh the brain and to enrich our portfolios, we shall take a serious view of our apparatus. From this standpoint it is obvious that much of the cheaper varieties of outfits are, *as sent out*, practically useless for the purpose of doing clean and satisfactory

work. The design is usually good enough, but the outfit often exhibits that condition of things known as "spoiling a ship for a ha'porth of tar." The pity of it is when a good design is spoiled for the want of, say, a little more velvet in the construction of the apparatus.

One of my friends was working with "a guinea detective." I need hardly remind my readers that a most excellent hand camera *fitted with three double slides*, is to be bought for a guinea; but the one I refer to just now has an arrangement of sheaths. As supplied, the back door of this set was very ill-fitting, letting, as any experienced person could see, light in all round; the result was foggy negatives, until, at my suggestion, a velvet cover was made for the "hinder quarters" of the camera; this done, more satisfactory results appeared. I would suggest that the back door referred to would be much safer, and would cost no more, if made of one single piece, and made to slide in in velvet-lined grooves, and then buttoned.

I am doubtful as to whether the metal sheaths are as good as they might be; the principle is all right, but I have many reasons for believing that, where a lot of these loaded sheaths are exposed one after the other, light often overleaps the foremost plate, and makes a slight impression on the one behind. The plates would be much safer if placed in little wooden frames, shut in all round, securely buttoned in. This method would mean, of course, a slightly increased size of camera; but that is a trifle compared to the risk of fog. I have lately adopted a plan similar to this in a home-made hand camera of my own. Lancaster's make an excellent quarter-plate carrier, which takes two quarter-plates, back to back, a thin blackened partition intervening. Six of these I have had cut down to within a quarter of an inch or so all round; The plates are secured with buttons let into the wood and flush. The camera has at the back a long sleeve, and the plates are shifted by hand in a well-known manner. When the six *front* plates have been exposed, I turn the pile bodily over, and start away on the "backs." However, whatever we do, too much importance cannot be laid on the necessity for every precaution against "light," other than through the lens, reaching the plate. If the camera on receipt shows any defects—and, unfortunately, only an expert would be able to detect them—they can mostly be put right by at once having a thick velvet cover made, which should be put on the apparatus after loading and while in the dark room. The shutter may prove a source of trouble; it will not always work when wanted to, unless purely mechanical. Not only this, but we want to see that it works, or can be worked, without exposing a plate; in other words, we want to be able to cover the lens at the back, during the time we are trying the shutter. Of course, this is provided for in the better-class and higher-priced hand cameras. It is no troublesome matter, however, to make and fit, at home, what we want. I make a small blind roller of suitable length, and fit this up inside the camera, then adjust over the roller a length of American cloth, in which have been cut two apertures. A piece of string is fastened to each end and passes through the bottom of the camera, a tiny patch of velvet inside and out making the small holes safe. When the strings hang down the same length, the lens is uncovered. Pull one down, and it is covered again. This little arrangement is also useful for time exposures. It undoubtedly prevents failures from the shutter going off in an untimely manner by the giving way of an elastic band or from other causes.

Another of my amateur friends experienced the hardest luck with a five-guinea set. He fitted his slides and started off. Arrived at the scene of operations, he rigged up the apparatus—no easy matter—focussed his view, then, with considerable trouble, inserted a dark slide. This little business required so much strength that the camera was quite put out of position, and consequently the operation of focussing, &c., had to be gone through again. The next trouble was to *withdraw* the shutter. This proved an impossible task. We had not a bag of tools with us, and our fingers were quite unequal to the effort. I am not exaggerating when I say that the shutter could only be drawn by using a pair of pliers! Now, I think nothing rouses the "Old Adam" in a man so much as experience of this kind. To get the most enjoyment out of photography, everything must be kept in good condition for work; easy-working apparatus, made of hard, well-seasoned wood, tried in the house and found perfect before going into the field, is of paramount importance. We may think it a simple matter, but this is where the error lies. Too much attention cannot be given to details; therefore, on purchasing a camera, see that it opens out easily, without sticking anywhere. The front should give a good range up and down; this is, I consider, of much more importance than a swing back. The front should move up and down over a strip of velvet inlaid on the fixed front. See that the struts hold the camera back and reversing frame firmly in position; the latter should fit perfectly, and take out and put in easily. Try the slides, which should move into place with easy pressure, and do not forget the shutter. We want to be able to pull these out and put in again without disturbing the arrangement. Any "sticking" is most trying to the temper, almost fatal to any good results, and, in spite of a liberal application of black lead, is sooner or later sure to be troublesome. A reversing frame has now become almost a necessity, but I often think with regret of the beautifully made horizontal cameras of little more than ten years ago; there must be hundreds about in old stores and places, scorned and despised maybe. Would that many of our cameras of to-day were made of such stuff, they would then be perfect, or as nearly so as we want them. The ingenuity displayed on apparatus nowadays is really wonderful, but no display of brass and French polish will make a bit of green wood anything but a fertile source of failure.

J. Pike.

A PAINTER'S VIEW OF THE PHOTOGRAPHIC SALON.

When we hear of "the Salon," we naturally think of the great national exhibition in Paris of the fine arts of France, to which the best artists from every civilised country in the world are glad to contribute, or of the Triennial Exhibition, sometimes called the Brussels Salon, representing the fine arts of Belgium and other countries. Having in mind the magnitude, importance, and grandeur of "the Salon," I could not suppress a smile when I heard that a new exhibition was about to be opened under the somewhat pretentious and arrogant title of the "Photographic Salon." It does not appear that this show is representative of any society or club; it seems to have been got up by a committee of eminent amateur and professional photographers, animated by the very laudable desire of promoting the study of pictorial quality in their art. They had to find some sort of title, and, in the exaggerated, self-puffing fashion of modern advertisement, they borrowed one of high-sounding, artistic associations. They might have selected a more expressive title—one more characteristic of their aims and more consonant with their status. "The Photographic Art Exhibition," or "The Photographic Art Saloon." Saloon is a good English word, meaning "a large, lofty hall;" but that would not have been sufficiently pretentious, so they must needs import a title from Paris, and call their little show, "The Sahlong."

I found the exhibition in a room at the Egyptian Hall called the Dudley Gallery, and a capital show it is. There are 285 prints on the walls, most of them small, many displaying cultivated artistic taste combined with the highest technical skill, resulting in splendid examples of legitimate photographic art. The general average is high, but I regret to observe the prevalence of that photographic epidemic which has obscured the better judgment of many good operators, and caused them to forsake the splendid qualities of photographic art in the vain attempt to produce manufactured imitations of the mere technique of oil and water-colour paintings—to neglect the substance for the shadow—in the feverish pursuit of that rank in the fine arts which must ever be to them a "Will o' the Wisp."

The mighty services rendered by photography to science, to literature, and to art; its vast employment in commercial enterprise, in portraiture, in pictorial delineation, and innumerable other fields, give photographic art a high and distinctive character and a dignity of its own, which place it above any necessity for demeaning itself by crowing in self-assertion around the precincts of the Temple of Fine Arts, and ignobly appealing for recognition and admission within its portals:—

"Oh, restless spirit! wherefore strain
Beyond thy sphere?"

A photographic picture is a production of the old-established and highly respected firm of "Chemicals, Lens, Camera, Operator, & Co." (Limited), of which the Mr. Operator is the managing director and ruling spirit. No one of these partners could withdraw from the firm without inflicting ruin and collapse on all the others. Mr. Operator would be stranded and left utterly helpless without Chemicals, Lens, Camera, & Co.; he could go nowhere and do nothing, much less obtain a position for the work of the firm—as representative of fine art—on the walls of the Royal Academy. Volumes might be written in discussing the various theories which have been propounded in the attempt to give an absolute definition of the term "fine art," but for practical illustration it may be enough to deal with the living fact.

The Royal Academy represents the fine arts of the British Empire. It embraces under the shadow of its wings the fine arts of painting, sculpture, architecture, and engraving. On the titlepage of the Academy catalogue for the present year is the motto and definition: "Fine art is that in which the hand, the head, and the heart of man go together."—Ruskin. No admission for mechanical products in that incontrovertible definition of fine art; it must be the pure and unalloyed product of the hand, the head, and the heart of man—a definition under which photography can never come.

The spirit of art, or, in classic phraseology, the Muse, cannot be projected through a photographic lens, to be transfixed on a transparent film within a camera, at the will of any operator; the impalpable qualities of poetical and artistic feeling and sentiment would vanish before they could undergo *that* ordeal.

I will venture on a wild hypothesis for the sake of argument. Suppose the President and Royal Academicians agreed to form themselves into a little private photographic club with the object of practically testing the value of photography as an auxiliary to art in the way of taking studies and accessories, no doubt many finely composed and thoroughly artistic works would be produced; but would even the high artistic skill and status of the Royal Academy operators entitle even the best of these to be regarded as works of fine art? No; they would at best remain the products of mechanical art-science, of chemicals, lenses, cameras, and printing frames, no matter what amount of technical skill and artistic taste had been brought to bear on them. Even the great achievement of securing the reflections of Nature in the natural colours would still be the same—it would not be fine art.

I shall not here attempt to discuss the subjects of poetry and music as branches of the fine arts, but I may appropriately mention that a few weeks ago—shortly before his lamented decease—Gounod, in conversation with a writer on *La Vie Contemporaine*, remarked: "Artists are men to whom God has given greater visual power; they see more of the infinite than others." But photographers are not the only aspirants to rank as professors of fine art. I went last week to see a demonstration of cooking and heating by electricity at the Food and Cookery Exhibition. I have since read a long and ably written preface to the official catalogue by George Augustus Sala, in which he remarks: "Naturally, being myself a strong believer in cookery as one of the fine arts—and a humanising and refining art to boot—a competent knowledge of which can only be acquired by sedulous study and lengthened experience," &c. Verily, good food well cooked is of far more importance to the human race than good pictorial photography.

Turning to the catalogue, I find on the first page an advertisement, commencing, "Take your pictures with the Kodak, a most compact and portable camera. No previous knowledge of photography necessary." Over another leaf I find the preface, to which is (rather affectedly) added a second title, "Forewords." It merely amounts to a very brief essay on photography, containing nothing new, except some remarkable statements which must be noticed. The last paragraph commences in these words: "Perhaps the greatest curse of photography, in the sense now under consideration, is the fatal ease with which indifferent work may be produced by its means." This assertion is as incorrect as it is ungenerous. Ease of production is not a fatal curse, it is a vital blessing. Everything must have a beginning. Did not the gentlemen responsible for this statement produce indifferent work at first? Did not the ease with which they could produce it encourage them to go on until they could produce better, and still encourage them to persevere until they can now produce the excellent work which adorns these walls? Is it not a fact that travellers, with no practical knowledge of art, with but slight knowledge of photography, yet with cultured taste, can and do bring home with them photographic illustrations of their travels in far distant, unknown, and almost inaccessible regions—illustrations of the highest value in the promotion of human knowledge? The ease of production is not the greatest curse of photography; its greatest curse is the ease with which it can be prostituted by bad people for the vilest of purposes, thus becoming the instrument of unspeakable evil and wide-spread depravity. I have heard Captain Abney say that, if you wish to give a boy a scientific education, you cannot do better than start him with a lens and camera. No better advice could be given. Provide an intelligent lad with a good set of apparatus, the necessary materials, and half a dozen lessons from a good operator; he will be astonished and delighted by the ease with which he can produce beautiful and useful results. He will not be content to do a certain thing by rule of thumb, but will want to know the reason why he should do it. His mind will be opened; he will be led step by step to study the cognate sciences and arts, and may, in due time, become a *savant*, or an artist, or both. This ease of production has led hundreds of thousands of amateurs, all over the world, to take up photography, much to their own happiness and the delight of their friends. It has provided readers and supporters for numerous photographic journals; it has sent visitors to the photographic exhibitions, and supplied them with their welcome shillings, and it has created a new and a vast industry, affording employment to hosts of artisans and assistants in the various trades which supply the requirements of the art. So much for the "curse." Another great curse of photography is the ease with which it can be employed by photographic thieves for the purpose of piracy, to the immeasurable detriment of Fine Art and its producers.

PALETTE.

(*To be concluded.*)

THE NAISSANCE OF ART IN PHOTOGRAPHY.*

WERE we to get together a gallery of the best photographic pictures, it would be found that almost every exhibitor had "studied art" to some extent, and, of the illustrations chosen for this article, nearly every one is by a worker who has been as painter, architect, or in some way or other more or less intimately connected with art. This gives further proof that, when photography fails to be pictorial, the fault lies with the manipulator rather than with his craft.

It may be well to inquire in general terms into the most salient faults, not only in ordinary photographs as we see them, but in the art itself. In the first place, we are confronted with a glaring defect depending on scientific facts. We may call this false tonality, but this rather explains our objection than defines what we mean by tonality. The constituent parts of light which chiefly act on the eye are not those which chiefly act upon a photographic plate. The brightest visual rays of the solar spectrum are those in the yellow and yellow-green regions, but ordinary photographic plates are comparatively insensitive to these, while they are relatively much more affected by violet and blue. This, of course, under common conditions, often leads to false renderings of Nature; parts of a subject which ought to be represented as high lights appearing as dark, and the subdued tones of Nature telling as the highest lights. This grave defect is fully admitted by photographers, and to a considerable extent is being overcome by the use of what are called "orthochromatic" plates, wherein the sensitiveness to yellow and neighbouring spectrum rays, is relatively increased to a marked extent. This relative increase of sensitiveness is, in our science, enhanced by the use of yellow media in the camera, or in some part of the light way; we can, so to speak, eke out the discriminating action of the orthochromatic plates; for the yellow medium acts as a filter, and arrests a certain proportion of the violet and blue which otherwise would exercise undue influence on the sensitive salts in the plate. It is necessary to refer to this common defect by way of noting the advance made lately in the art. There is no reason to doubt that this defect of false tonality will be eliminated in process of time. It is true that no graphic art is able to represent the whole gamut of Nature's tone, and photography not only falls short of painting in the extent of its colour scale, but it is very apt, as we have seen, to render Nature with flat contradiction of her true light and shade.

The next important fault which confronts us in general photography, is redundancy of detail. In a photograph of a landscape of the usual type, we may admire the precision of the optical instrument used, we may admit the scientific accuracy of the rendering, but we revolt against the "finicking" minutiæ of the details, and miss sadly the effect of breadth of treatment and the satisfying result of massing. A print of this kind is either exasperating from its spottiness or contemptible for its weakness. One cannot call such a production "beautiful," nor even "rich," it is simply extravagant. If there is one defect which destroys all nobility in a picture, it is "spottiness," and, as this is one of the faults into which photographers are most prone to fall, we venture to state, without dogmatism but with confidence, that the awaking of photographers to the evil of over-detail has chiefly given us the right to use the word Naissance in the heading of this article.

It may be said, "Vixere fortes ante Agamemnona." But the word "multi" cannot with justice be added in the present case. From almost the earliest days of photography some were, indeed, found who used the science as an art, but they were very few. None of these is better known to fame than one who passed away some years ago, Rejlander. He may be said to have been the first to produce photographs, crude though their execution may sometimes have been, that, nevertheless, had distinct claims to be considered pictures. In access of ambition, he produced pictures which were made from many negatives, a task of extreme technical difficulty, and still more difficult from an art standpoint. The most noted of his productions in this class is the *Two Ways of Life*, which might be compared in some respects to a conception of Hogarth. It was composed of a great number of figures brought together in printing by a process which came to be called Composite Photography. Rejlander was followed by Henry P. Robinson, who has given us a number of composites. Although there have been some much applauded, there are not a few of his pictures by ordinary methods which we must prefer. On the whole, his most successful composite picture was *Carolling*. Mr. Robinson, who at one time intended to follow painting as a profession, did great service to photography by drawing attention to some of the leading precepts of artistic composition in a small book, *Pictorial Effect in Photography*. Mr. Adam Diston, of Leven in Scotland, is also among the number of our old and good artists. Contemporary with Rejlander was Mrs. Julia Cameron, who produced portraits and figure studies of large size, and full of character, which are looked upon as models worthy of imitation to this day. Some very fine figure subjects have been lately produced by Mrs. Myers, who has evidently and happily followed in the steps of Mrs. Cameron. Mr. F. M. Sutcliffe, of Whitby, though a comparatively young man, has been for a long time known to the

* *Concluded from page* 702.

photographic world as one who is essentially an artist. Mr. Sutcliffe, the son of an artist, and carefully trained in art, seems to have developed highly the talent of snatching the "happy moment" for the best aspect of his subjects. Few would attempt, and still fewer would succeed, with such a subject as that which forms our "tailpiece." Mr. J. Gale must also be included among the number of those who have long and successfully followed photography as an art.

We do not mean to say that here we have named the only men who used photography as an art before our "Agamemnon," but we have named the best known, and we have omitted but few. Towards the end of the "eighties" some works by Dr. P. H. Emerson attracted much notice, partly on account of the novelty of treatment, partly because of the boldness of departure from the beaten track. These photographs, chiefly of subjects from the Fens and Broads, were severely criticised by many, utterly condemned as pictures by some, but all thinking men owned that here was something new and something good. For the first time we saw detail ignored, and place given to impression and massing. Dr. Emerson followed up practice with precept in his book, *Naturalistic Photography*, which at once aroused no little excitement. In no measured terms he pointed out what he considered the faults of photographers, and gave to the world his own ideas of true art. Many objected to the tone of the book, which was considered offensive, but there was much of value in its pages. The most important argument was against "spotty-lighted, sharply focussed, brightly developed negatives," which were stigmatised as "noisy, and garish, and inartistic." In this book Dr. Emerson offended some, and by later actions he displeased others; but he by no means always gets the credit he deserves for his services to photography, for we firmly believe that his pictures and his writings first drew serious attention to the most flagrant sins of photography as an art; and it is certain that very soon a school of photographers sprang up whose leading principle was to avoid sharpness of focus and to obtain increase in breadth of treatment. This school, the outcome of Dr. Emerson's teaching, has been variously dubbed the "Naturalistic," the "Impressionist," and the "Fuzzy." It is not to be supposed that all our artistic photographers deliberately put their lens out of focus to obtain the advantage of breadth; but misty effects, which previously would have been avoided, came to be much in request; simpler subjects are chosen, and we have thrown off many trammels which took the form of rules for composition and lighting, and were a bar to originality and expression.

This crusade against superfluous detail led to many follies and extravagances. For a time we had quite a run on very rough papers for prints, even of the smallest sizes. These prints were simply smudges in most cases; true texture was lost. We ran riot in fuzziness. Pictures were, and are, made so much out of focus, that the outlines are doubled, and spotty "areas of confusion" are seen with an effect almost sickening. One set of evils is eliminated at the expense of the introduction of another set no less objectionable; but it is to be hoped that in time we may return to moderation. Many have accepted the example of Dr. Emerson without rushing into extremes—none more successfully than Mr. Davison, Mr. Horsley Hinton, Mr. Wellington, and Mr. Wilkinson. In the hands of artists such as these, we believe that photography must, and will, take its deserved place sooner or later in the world of Fine Art.

The prevailing style of professional portraiture has always been a sore point to those who wish photography well. We allude particularly to the practice known as "retouching." A painter who should represent in a portrait a lady disfigured by freckles would not be wise, and would certainly not be successful, in his profession; and the same may be said of a photographer. But, when the removal of accidental and evanescent blemishes was carried to the extent of complete "modelling" of the features, and when the result of this modelling was to produce faces with the appearance of putty or dough, and to obliterate every trace of character from the features, then, indeed, great damage was done to photography. We have a perfect right to portray a face at its best, to remove fortuitous blemishes; but the line must not be drawn at falsification, and the human face must not be represented as similar in surface texture to a butcher's ball of suet. Portrait photography has also been degraded by the use of commercial backgrounds and impossible "properties." The best of these backgrounds and properties are not in themselves objectionable, but from their frequent repetition. Among professional portraitists who have discarded both "stock backgrounds" and "properties," may be mentioned Mr. Crooke, of Edinburgh, whose studio is fitted up in the style of an ordinary room, or rather of several ordinary rooms, with special arrangements for lighting the sitter. Mr. Crooke, a few years ago, woke us up by a set of portraits, in the Kitcat style, of Scots Judges in their robes, printed in platinotype on tinted paper with a plate mark; in each portrait the character was admirably preserved. Mr. A. Burchett has also done good service in figure studies, some of them being on the borderland of pure portraiture. This gentleman selects good models and paints his own backgrounds. His *Girl with a Violin* is one of his simplest and, to us, most pleasing achievements.

The use of hand cameras is at once a danger and a boon to photography—danger in the abominable facility it offers for a vast amount of careless work, and the consequent dulling of the artistic discrimination; a boon to those who use the instrument aright. By it a faculty of quick observation is cultivated, and we are put in possession of many natural effects which are lost to the tripod camera. We do not allude to the *very* rapid exposures on quickly moving objects, but to exposures having some proportion to the physiological "persistence of vision." As an example, we have the work of Mr. A. R. Dresser, who, in the course of a year, makes an almost incredible number of exposures with a hand camera. Many of these, when enlarged to about 12×10, or 15×12 inches, are held in high esteem by those qualified to judge. The hand camera has given birth to a school of workers in small sizes, some of the productions being gems in their own way. Among works of this kind may be noticed those of Mr. Ramsay and Mr. Cembrano; but, on account of the minuteness of the detail, it is almost impossible to obtain suitable reproductions of the originals by any mechanical process, such as required for illustrating a book or journal.

When Mr. Willis introduced the platinotype process of printing, a great stride was made in photographic art. The brown tones and glazed surface of albumen paper are now replaced in our exhibitions, to a great extent by images in the paper, rivalling the finest engravings, and, in some respects, superior to them. Those who prefer glossy surface and warm media, which undoubtedly have their advantages for some styles, can now obtain gelatino-chloride papers, which bid fair to supplant the albumen.

Photography is seen at its worst in a photographic exhibition, and our critics ought, in justice, to remember this. The monotony of colour is depressing to those accustomed to the variety of an exhibition of paintings, just as we, accustomed to photographic collections, are confused and almost blinded on entering an exhibition in colour. But we believe that the unprejudiced will find, in every exhibition of photographs worthy of the name, works which will prove the capability of photography to stand, and entitle it to the credit of standing, as a fine art, juvenile though at present it may be.

ANDREW PRINGLE.

LANTERN-SLIDE MAKING.

[Liverpool Amateur Photographic Association.]

A PRACTICAL demonstration on lantern-slide making was given on Thursday evening, the 2nd inst., by Mr. G. A. Carruthers and Mr. Harry Holt.

Reduction by Daylight.—Mr. Holt pointed out that the first thing to do was to settle down to one make of plate and thoroughly master the manipulation of that; each brand had some special feature which required a little practice to understand. The reducing camera which gave the best results in his opinion was the Pearson & Denham's, both for simplicity of working and compactness. When once the focus was ascertained for the different sizes of negative, these should be accurately marked on the baseboard of the camera. Nearly all of his slides were from whole-plate negatives, and he found the exposure was to judge by the light at the time, and the question if it was necessary to use a small stop was an open one. He was inclined to say that it did not improve and make the slide sharper, it was only a question of seconds; that it was best to err on the safe side, using a sheet of ground glass in front of negative; this is only necessary when the camera is not pointed direct to the sky, but is absolutely necessary if trees or buildings are in the way of direct light. North light, if possible, as a standard for the time of the year, using a Mawson plate (really a very quick brand) reduction from whole-plate, *f*-22, one minute's exposure was found to be the correct exposure, using a fair negative, full of detail, but not over-dense. Hydroquinone he considered the standard developer for transparency work, and the same solution could be used for several plates. After answering several questions, Mr. Holt concluded by explaining the method of putting in clouds as follows:—Clear the sky off the slide with ferridcyanide of potash, a few drops of saturated solution in two ounces of hypo, and use a very fine camel's-hair brush, then expose another plate for the cloud only from opposite corners; after the cloud is developed, place the slide and the clouds film to film, say about half an inch apart, and trace the outline of the picture of the glass side of the cloud slide, then clear with the brush, wash well, and use cloud as cover glass.

Mr. Carruthers followed, generally agreeing with what Mr. Holt had said, but pointed out the great difficulty experienced by the average amateur in finding time to make slides by daylight; where it could be done, he strongly recommended it, but with the present speed of lantern plates it required very little practice to get good results by artificial light, his plan of working being very simple, using a Pearson & Denham's reducing camera; it is a very easy matter to focus, a candle close up to the negative is quite sufficient. A sheet of ground glass between the negative and the light is necessary, close up to the negative is the best. About nine to twelve inches of magnesium ribbon held about a foot from the negative, taking care to keep the light moving about right and left, up and down, so that you get an equal illumination all over the negative. For weak negatives England's rapid chloride plates will require about the exposure.

The lecturer rather emphasised the use of fresh hypo, also the spotting of negative and slide, and the introduction of suitable clouds; this appeared to be a simple matter in experienced hands, and success can only be obtained after a little practice. Mr. Carruthers also gave a lot of useful hints about chloride slides by contact, explaining that full exposure will develop warm tones; these can be toned any time after fixing, a good bath being the P. O. P. toning bath. A lot of excellent slides were passed through the lantern, showing the most suitable tone.

COBALT PRINTING.

Before the Leeds Photographic Society, on November 2, Mr. B. A. Burrell, F.I.C., read a paper on Messrs. Lumière's process of cobalt printing. This process is of very recent origin, the first notice appearing in the *Comptes Rendus*, June, 1893. The method is based upon the unstable nature of the cobalt salts, and their conversion into cobaltous salts by the action of light. The formation of cobaltous and cobaltic hydroxides were shown, the latter being formed by the action of sodium peroxide (NaO_2) on a solution of cobaltous sulphate ($CoSO_4 7H_2O$). The sodium peroxide requires to be dissolved in water with care, otherwise great heat is evolved, and decomposition ensues into sodic hydrate and free oxygen. After precipitating, the cobaltic hydroxide requires careful washing to free it from the sodic sulphate formed during the reaction; it is then dissolved by means of saturated solution of oxalic acid (one part in 10·5 parts water). The method of calculating the amount of cobaltic hydroxide ($Co_2 H_6 O_6$) formed from a given quantity of cobaltous sulphate was described, as it is important not to add an excess of oxalic acid. The oxalic acid solution is allowed to react upon the moist cobaltic hydroxide for about three hours in the dark, the mixture being kept well cooled. The resulting cobaltic oxalate is of a dark green colour, and is used at once to sensitise the gelatine paper. This is done in the usual way, and, after drying, the paper is used for printing under a negative. When exposed to light under these conditions, the parts acted upon lose their green colour, being converted into a pale rose colour, owing to the formation of cobaltous oxalate, a substance but slightly soluble in water. The print now requires developing, this being done by means of a five per cent. solution of potassium ferricyanide, leaving untouched the cobaltic oxalate still remaining in the print.

The resulting prints, which are of a deeper rose colour, require thorough washing (about half an hour in running water) in order to wash out all traces of unaltered cobaltic oxalate. When this is effected, the prints are put into a dilute solution of ammonic sulphide, and allowed to remain for varying time, depending on the desired tone—a short time for sepia tone, and a lengthened period for black tones, any desired tone being obtainable, depending on the time of immersion. The prints should be washed for a few minutes and dried. The image consists of sulphide of cobalt, and is almost as permanent as one composed of platinum.

The process possesses the following advantages:—First, its extreme cheapness; second, the short time required for washing; third, the absence of toning and short time for printing; fourth, the great permanency of the prints, whilst its disadvantages are:—First, having to prepare one's own paper (at present none is in the market suitable), and to sensitise it, and using it almost as soon as it is dry, as it rapidly deteriorates. Specimens of the sensitised paper and prints in the various stages of development were shown, and several prints were developed.

SOUTH LONDON PHOTOGRAPHIC SOCIETY'S EXHIBITION.

Not merely in the quality of the work shown, but also in the classification and arrangements of the exhibits, do we congratulate that useful and practical body, the South London, on a marked advance in this year's Exhibition over its immediate predecessor. The Exhibition, which opened on Tuesday night, contains a great deal of really good work by members, while in the open classes there are some conspicuously meritorious examples by men of wider renown. About a hundred exhibitors contribute between 300 and 400 photographs. There are four lantern-slide classes well patronised, and the exhibits not for competition include a choice collection of animal and architectural studies by such men as Thomas Fall and F. W. Edwards (the President). The Judges were Messrs. F. P. Cembrano, W. E. Debenham, and Leon Warnerke, and their awards, we should imagine, must have given great satisfaction, as they appear to have been carefully and evenly distributed.

In class A (Members: Portraiture and figure study, including animals), the most noticeable frames were a large direct portrait of a girl by Mr. C. F. Dickinson, some charming pastoral studies, *Feeding Time*, *Haymaking*, and a *Group of Sheep*, (bronze medal) by Mr. W. E. Harman, and a clever study of an old couple seated by the fireside, *Peaceful Old Age*, by Howard Esler, for which a bronze medal was awarded. This is printed on a very rough paper and in lighting, composition, and sentiment does Mr. Esler credit. Class B (Architecture) is a remarkably good one, containing as it does many fine examples of architectural work, in which members of the South London have collectively no superiors. Messrs. Harman, W. J. Symes, C. H. Oakden, H. E. Farmer, E. R. Bull, and W. Howell shine in the class, the last three gentlemen securing silver and bronze medals for *Across the Octagon, Ely*, *Tomb of Edward the Black Prince*, and *The Choir, Rochester* respectively, examples of sound photography. In class C (landscape and seascape), Mr. G. H. Cricks takes a silver medal for a realistic picture of an *Essex Swamp*, and has other equally good examples of his powers. Mr. H. E. Farmer's *On the Essex Hills*, a study of trees on the hillside is a free and pleasing transcript of a simple but effective subject. Class D (landscape and seascape half-plate or under) is a large one, and, perhaps, the weakest of all, the dead level of mediocrity obviating criticism. The most interesting exhibit to our thinking was a small picture by Mr. W. Howell, *A Smith's Shop*, that seemed to breathe the life and bustle of the smithy. The awards went to Miss Smyth (silver) and Mr. W. F. Slater (bronze). In Class E. (enlargements) the Judges make no awards, which somewhat surprises us, as Mr. C. F. Dickinson's enlargements from small originals of the *American Bison*, *Indian Adjutant*, and the *Martial Hawk Eagle*, and Mr. Symes's enlarged *Portrait of a Lady* struck us as extremely good. Mr. Dickinson obtained the silver medal in Class F (members' lantern slides).

There were four open classes. In G (Pictures which had previously received awards) many "old stagers" were entered, Mr. Wellington taking the silver medal for *Eventide* and Mr. Oakden the bronze for his *North Aisle, Ely Cathedral*. The latter gentleman by the way also received the "general excellence" medal, and richly deserved it. Mr. A. G. Tagliaferro in this class shows a homely study of an old lady dressing the *Cut Finger* of a small boy; and other exhibitors are Messrs. Terras, Byrne, C. S. Roe and E. M. Stone. Class H (for pictures not previously medalled) is undoubtedly the strongest. Mr. E. M. Stone's cattle study, *An Evening Bath*, is full of great charm. The rugged head of the old fisherman *Mending his Nets*, by Mr. D. J. Scott, is one of the finest portrait studies in the Exhibition—natural and above all lifelike. To Mr. Byrne was awarded the silver medal for a large direct portrait study and a bronze medal for another portrait in red carbon, both in Mr. Byrne's best style. A bronze medal goes to Mr. Tagliaferro for a devotional subject, a girl making *A Humble Offering* of flowers to the statue of a wayside Virgin, presumably in some southern country. This is an unaffected piece of composition, the treatment being refined and the subject being unhackneyed. English photographers must envy Mr. Tagliaferro the command of unconventional subjects which his periodical flights to southern climes gives him. Mr. T. G. Hemery shows good portrait work; Mr. Terras, among other exhibits, a "study" of a girl's head, a well executed piece of work; Messrs. Charles Sweet, and West & Son, yacht studies; Mr. E. A. and Miss Golledge, some striking views on the River Roding. Lack of space compels us only to mention the fact that Messrs. C. S. Roe, Dresser, W. M. Warneuke, T. E. H. Bullen, H. Avery (with an unconvincing "nocturne"), D. Pym, and other good workers contributed more or less well-known pictures to this class. In the class for lantern slides, which had previously received awards, Messrs. G. E. Thompson and W. Taverner were successful with silver and bronze medals respectively, and in the class for slides, which had not been previously medalled, Mr. G. Hankins obtained the silver and Mr. J. H. Gear the bronze medal.

On the whole, a capital exhibition, supplemented by an interesting loan collection, examples of carbon printing by Messrs Elliott & Son, and stalls of apparatus by Mr. W. F. Slater (who has many choice things in picture frames), Messrs. Howell, The Prosser Roberts Drug Co., Mr. T. H. Powell, &c.

Our Editorial Table.

Specimens of well-designed and well-printed Christmas and New Year's cards have been received from Messrs. Percy Lund & Co., Bradford. They are, of course, intended to receive photographic portraits.

Amateur Photographic Requisites.

The London Stereoscopic and Photographic Company, Limited (Regent-street and Cheapside), have issued a very beautifully printed catalogue of 207 pages of requisites for amateurs. It comprises several complete sets, hand cameras, including their latest novelty, the new "Race-glass" detective; Kodaks; lenses of their own make as well as those of other leading makers; dry plates and films; lanterns, chemicals, albums, shutters, stands, and, in fine, everything that an amateur can possibly require. This fine catalogue, which has numerous illustrations, has, we learn, been printed in the Company's own works. Price 6*d*.

A New Film Hand Camera.

Messrs. Perken, Son, & Rayment have perfected, and are to have on sale in January, a hand camera to carry forty-eight films on celluloid, the important feature of which is that the films will be used as supplied by all manufacturers—*i.e.*, without any notching or interference with the films. The outside of the instrument measures $9\frac{1}{2} \times 5\frac{1}{4} \times 5\frac{3}{4}$ inches. We have had submitted a sample for examination, and we find that by moving a lever it acts automatically without a hitch. It takes plates as well as films—a fewer number of the former, of course. The movement of the one lever releases the exposed film, and sets the next one ready for exposure. The mechanism is exceedingly simple and not likely to get out of order. We predict great popularity for the new camera.

Intensity Coils: How Made and How Used.

By 'Dyer.'

This little shilling manual, published by Perken, Son, & Rayment, has now attained its eighteenth edition. It is not written for the advanced electrician, but for the *paterfamilias* or the boys at home who desire to spend the winter evenings in a rational and improving manner. Various batteries are described, and instructions given in the making and using of intensity coils. The electric light, electric bells, the telegraph and the telephone all find a place in its pages.

The Magic Lantern: Its Construction and Use.

From the same firm we have received a new edition of this useful little book. It supplies a capital introductory guide to the beginner in optical lantern work, the chapters on lantern experiments and the lantern microscope being extremely clear. The book is illustrated, and at this season should be popular.

News and Notes.

West London Photographic Society.—November 14, *Figure in Landscape*, by Mr. J. C. Dollman.

The Exhibition of the Photographic Society of Great Britain will close on Wednesday, November 15.

Lewisham Camera Club.—November 10, *Common Defects in Negatives, their Cause and Cure*, by Professor Carlton J. Lambert, M.A.

In the report of the Photographic Section of the Croydon Microscopical Society, published last week, "Messrs. Adams & Co." should read "Messrs. Hannam & Co."

Central Photographic Club.—November 10, *Printing-out Processes*, by Mr. S. Herbert Fry. 15, Smoking Concert. 24, *Norway* Lantern Lecture, by Mr. Paul Lange (of Liverpool). 31, *Films v. Glass*, by Mr. H. M. Smith. 27, Mr. Thomas Fall will give a one-man show.

The Polytechnic Photographic School.—The following are the arrangements for the photographic classes during the winter session:—Mondays, at eight p.m., Lectures: *Art in connexion with Photography*, by Mr. Valentine Blanchard; *Technique and Elementary, Practical*, by Mr. Alfred W. Dollond. Practical Classes: *Studio Posing, Lighting, &c.* (at three p.m.), by Mr. Valentine Blanchard; *Studio Work (Elementary)*, by Mr. Samuel J. Beckett; *Wet Collodion*, by Mr. C. R. Whiting; *Negatives and Printing*, by Mr. A. W. Dollond; *Gelatino-chloride Printing, &c.*, by Mr. Ernest Beeson; *Retouching*, by Mr. Wolfgang Arndt; *Finishing Enlargements in Black, White, and Monochrome*, by Mr. Ernest Wesson. Tuesdays, at eight p.m., Lectures: *Technique and Practice of Studio and General Photography*, by Mr. Howard Farmer. Practical Classes: *Air Brush-work*, by Mr. W. H. Harrison; *Lantern Slides and Lantern Work*, by Mr. J. H. Gear. Wednesdays, at eight p.m., Lectures: *How to obtain Pictorial Excellence in Photographs*, by Mr A. Horsley Hinton; *Elementary Practical Chemistry for Photographers*, by Mr. Robert Avey Ward, F.C.S. Practical Classes: *Photogravure*, by Mr. Howard Farmer; *Negative-making, Practice and Technology*, by Mr. C. W. Gamble. Thursdays, at eight p.m., Lectures: *Photographic Optics and Photographic Chemistry*, by Mr. A. W. Dollond. Practical Classes: *Collotype*, by Mr. G. Holtzhausen. Fridays, at eight p.m., Practical Classes: *Enlarging*, by Mr. J. H. Gear; *Process Blocks*, by Mr. H. Colomele; *Carbon and Platinotype Printing*, by Mr. E. Beeson; *Retouching*, by Mr. Wolfgang Arndt.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 20,474.—"Improvements in the Manufacture and Treatment of Photographic Papers." R. Krügener.—*Dated October* 30, 1863.

No. 20,609.—"Improvements in the Production of Photographic Prints." Communicated by E. Meregalli. H. C. Buckingham.—*Dated October* 31, 1893.

No. 20,644.—"Antomatic Camera and Apparatus for Exposing and Developing Photographic Plates." M. Shearer and A. Hill.—*Dated November* 1, 1893.

No. 20,836.—"Improvements in Well Developing-trays for Photographic Use." W. Tylar.—*Dated November* 3, 1893.

No, 20,877.—"Improvements in Photographic Cameras." Complete Specification. Communicated by F. A. Brownell. A. J. Boult.—*Dated November* 3, 1893.

No. 20,950.—"Improvements in or relating to Photographic Hand Cameras." L. A. Franks.—*Dated November* 4, 1893.

PATENTS COMPLETED.

An Improvement in Photoorapiic Cameras and Dark Slides for same.

No. 21,946. Lars Severin Zachariasen, 57, Charing Cross, London, S.W. *October* 7, 1893.

This invention relates to an improved form of double dark slide and the means of working it in a camera. The dark slides are, by preference, made to hold two sensitive films or plates, and each slide is to consist of two folding parts hinged together or to a back common to both, the joints between the two parts and the back being made light-tight by means of beads and grooves, or other convenient manner.

Each of the two folding parts is to consist of a suitable framework, and of a back plate, made of wood, cardboard, metal, or other suitable material; grooves are cut in the framework near the back plate, in which grooves the sensitive film or plate is inserted and held in place against the back plate, the sensitive surface being on the side away from the back, so that, when the slide is closed, the two sensitive surfaces will be facing each other. When folded, the slide is locked by means of suitable fastenings acting automatically.

The camera to be used in connexion with this form of dark slide I prefer to make with a parallel body, the lens being fixed on the front in any convenient manner. The back of the camera may be made so as to hold any number of the dark slides, and is to be fitted so as to hold one of them in position for exposure, and with a door to cover in the slide or slides, which will thus be entirely enclosed in a light-tight chamber, and therefore securely protected against stray light. When pushed home in the camera, the automatic fastenings of the slides will engage with suitable projections, and are thereby released, leaving the front part of the slide free to be swung on its hinges by means of a lever or levers operating from the outside of the camera. When the front part is thus swung out of the way, the sensitive film or plate contained in the back part faces the lens, and may be exposed to the action of the light through the lens. During the exposure, the sensitive film or plate contained in the front part of the slide is protected by a screen or curtain, made of some opaque material and of a suitable form, hinged to the front of the camera behind the lens, and caused to move into position so as to screen the sensitive film or plate from light. The screen or curtain may be moved by independent mechanism, but is by preference actuated by the same as that which is used for the double slide.

Improvements in and in connexion with Photographic Dark Slides or Changing Backs.

No. 8122. Joseph George Reid, Woodley Cottage, Bloomfield, Belfast, Ireland.—*October* 14, 1893.

A box used as a dark slide, made of wood or other substance, to hold any number of plates, in carriers made of sheet zinc or other substance. The box is fitted in front with sliding, light-tight, double-back shutter, to which is affixed a spring pin, which acts on an indicator inserted in framework of box. The indicator is for showing the number of the plate in position for exposure, and consists of a barrel axle, round which are affixed or engraved numbers on cog-wheel. The pin affixed to the shutter causes the wheel to revolve on the shutter being closed. The wheel has cogs or teeth, according to the number of plates the box is made to hold. The back is detachable for the purpose of filling the box with plates, and is light-tight, being fitted into grooves and held in position by clasps. Affixed to the back, on the inside, are springs, which press on the backs of the carriers, so that, when the shutter is withdrawn for exposure of plate, a plate, by the action of the springs, comes into the position which the shutter occupied. At one side of the box is affixed an opaque bag, made of cloth or other substance, and in the side of the box to which the bag is affixed there are two slits, one being to allow the plate which has been exposed to pass into the bag. This is done by the closing of the shutter, a plate having, by the action of the springs, been forced into its place. On being closed, the shutter drives the plate forward, through the slit, into the bag. The second slit is for the purpose of passing the exposed plate from the bag back again into the box, and is so arranged that the plate comes in at the back of the box in a position between the springs and the last plate, thus ensuring the full pressure of the springs and the safety of the plates. The bag is collapsible, and can be folded over the box.

Improvements in Cameras.

No. 19,929. Thomas Charles Naylor, 13 Greek-street, Soho-square, London.—*October* 14, 1893.

This invention relates to improvements in cameras, and is designed for the purpose of enabling the respective parts of the camera, when closed, to instantaneously come into position ready for use, by merely pressing upon a spring catch, or the like, with which the camera is provided. The act of pressing upon said spring catch, or the like, causes the baseboard and the front to immediately fall into position ready for exposure, this movement being effected by springs connected to the stretchers and the baseboard, and by others connected to the front of the baseboard. The lens and shutter being also ready, the trouble and delay due to screwing, &c., are avoided.

The camera has a double extension, closes into a small compass, and is provided at each side of the back frame with a slot in which works a pin or stud connected by a stretcher or link to the base, thus enabling it to be used as a "swing back." By means of a stop, situated near bottom of said slot, the back frame can be kept upright or perpendicular to the baseboard when the camera is opened.

Improvements in Clamps or Rests for Photographic Cameras and other Instruments similarly supported.

No. 23,010. Thomas Binnie Ralston, 234 Buchanan-street, Glasgow.—*October* 14, 1893.

This invention has for its object to afford steady support for cameras and like instruments upon walls, bars of railing or fencing, and similar situations, where it is impracticable to employ an ordinary tripod stand or otherwise to obtain a steady support for the instrument. The apparatus constituting the invention consists of a horizontal bar, the underside of which has a series of ratchet teeth made upon it. This bar may, in circumstances where a tripod stand is provided in conjunction with the instrument, be a section of one of the ordinary legs. At one end the bar has a pin or stop, against which a vertical leg strung on to it abuts. This vertical leg, at its upper end has jointed to it a stand or angled piece capable of movement through an arc, and to which the camera or other instrument is screwed in the ordinary manner, the stand being fixed in the required position by a thumb nut or equivalent device upon its centre of movement, or the stand may have a ball-and-socket joint to enable it to be moved in every direction.

On the horizontal bar there is also strung a clamping leg which has a tooth engaging with the teeth on the lower surface of the bar, the said leg being capable of movement backwards or forwards to suit the thickness of the wall, railing, or other situation to which the rest for the camera or other instrument is to be secured, and the apparatus is fastened in position by a screw passed through the said clamping leg, and having a head or flange at its inner end which grips upon the source of support. The screw is carried in a slot in the clamping leg, and is capable of adjustment vertically.

When the apparatus is to be attached to the top bar of a railing or other comparative thin horizontal or vertical body, the clamping leg and the horizontal ratchet bar may be dispensed with, the leg which supports the camera or other instrument being provided with a jaw and pinching screw to fix it in situation, and in some cases the said leg may have a stand or feet, and be merely rested upon any horizontal surface.

Liverpool Amateur Photographic Association.—November 15, Lantern Lecture in City Hall, Eberle-street, *Life in Tripoli*, by Mr. G. E. Thompson. 16, Lecture, *Hand-camera Work, with Special Reference to the Frena System*, by F. O. Bynoe (Messrs. R. & J. Beck, London).

Photographic Society of Great Britain.—Ordinary Meeting, Tuesday, November 14, at the Gallery, 5A, Pall Mall East. *Photography in Coal Mines*, by Herbert W. Hughes, F.G.S., A.R.S.M. *On the Range of Light impinging on a Plate during Exposure in the Camera*, by Professor W. K. Burton, C.E.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 13 ...	Camera Club	Charing Cross-road, W.C.
,, 13 ...	Darlington	Trevelyan Hotel, Darlington.
,, 13 ...	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 13 ...	Lantern Society (Annual)	20, Hanover-square.
,, 13 ...	Norfolk and Norwich	Bell Hotel, Norwich.
,, 13 ..	North Middlesex	Jubilee House, Hornsey-road, N.
,, 13 ...	Putney	Boys' Gymnasium, Charlwood-road.
,, 13 ...	Richmond	Greyhound Hotel, Richmond.
,, 14 ...	Birmingham Photo. Society ..	Club Room, Colonnade Hotel.
,, 14 ...	Derby	Smith's Restaurant, Victoria-st.
,, 14 ...	Great Britain	5[illegible] Great Russell-st. Bloomsbury.
,, 14 ...	Hackney	[illegible]66, Mare-street, Hackney.
,, 14 ...	Manchester Amateur	Lecture Hall, Athenæum.
,, 14 ...	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 14 ...	Paisley	9, Gauze-street, Paisley.
,, 14 ...	Stockton	Mason's Court, High-street.
,, 15 ..	Brechin	14, St. Mary-street, Brechin.
,, 15 ...	Bury	Club Rooms, 13, Agar-street, Bury.
,, 15 ...	Leytonstone	The Assembly Rooms, High-road.
,, 15 ...	Manchester Camera Club	Victoria Hotel, Manchester.
,, 15 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 15 ...	Southport	The Studio, 15, Cambridge-arcade.
,, 15 ...	Southsea	3, King's-road, Southsea.
,, 16 ...	Birmingham Photo. Society ...	Club Room, Colonnade Hotel.
,, 16 ...	Camera Club	Charing Cross-road, W.C.
,, 16 ...	Glossop Dale	
,, 16 ...	Greenock	Museum, Kelly-street, Greenock.
,, 16 ...	Hull	71, Prospect-street, Hull.
,, 16 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 16 ...	Oldham	The Lyceum, Union-street, Oldham.
,, 16 ...	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 17 ...	Cardiff	
,, 17 ...	Central Photographic Club	Coleman's Hotel, Henrietta-st., W.C.
,, 17 ...	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 17 ...	Holborn	
,, 17 ...	Leamington	Trinity Church Room, Morton-st.
,, 17 ...	Maidstone	"The Palace," Maidstone.
,, 18 ...	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

November 2,—Mr. Alexander Mackie in the chair.

Developed Gelatino-chloride Papers.

Mr. S. Herbert Fry prefaced a demonstration of development of partly printed proofs on Paget printing-out paper by saying that the plan should be useful to the professional in dull weather, and to the amateur who endeavoured to get the best representation from his negative that could be got. The paper had been put on the market as adapted for development, a very thin coating of gelatine being the leading feature of its manufacture. A large quantity of gelatine on the paper interfered with the chemical reactions. The paper would tone more easily on account of the less amount of gelatine, while the tones would also be more regular. He (Mr. Fry) had before now emphasised the great objection to double tones in gelatine papers. He did not suggest that this was the fault of the papers, but the fact remains that a large number of photographs had those double tones. Coming to the depth to which printing should be carried, he said it was immaterial whether it was too much or too little within certain limits. When developing by a yellow light, a slight degree of printing out would do; if the prints were nearly printed out, it was easier to over-develop them. The time recommended by the Company was two minutes, or about a tenth of the time required for printing out. When taken from the frame, the prints are passed into a ten per cent. bromide solution. The older the paper the stronger the bromising bath should be. He would recommend that the prints be left in it for about five minutes. It was better to wash out the bromide well, but it did not appear a vital matter. The toning had been called an intensification process, but it depended on how it had been done; if the developer were not well washed out, the toning would be by intensification, so much so, that the print would go far beyond the depth intended. If the developer were well washed out, the depth could be judged better. Solution 3, containing ammonium carbonate [see p. 672 *ante*], could be used instead of the bromising solution, as a preliminary bath, for the purpose of obtaining more contrast. He recommended that the proportions of the solution be kept constant; he got better results with caustic alkali than with the other alkalies, a better image for toning being obtained. As to light action on the paper, he said he got better results by being very careful of the light; a paraffin lamp or gas was a good light to work by. He used the developer given diluted with an equal quantity of water.

Mr. Fry's remarks were followed by the development and toning of several prints. He gave as the difference between printed-out and developed prints, that with the latter there was less loss of detail.

Mr. W. E. Debenham remarked that he considered the separate sulphor cyanide-toning bath better than the combined bath as regards permanency. He suggested that makers should supply two or three kinds of paper to suit different kinds of negatives.

Mr. H. M. Smith said that with the combined bath warm tones could be obtained, and, so far as the permanence of such pictures was concerned, he would emphatically say that, if the combined bath were used in the proper manner, the prints so toned were as permanent as anything made by separate toning and fixing baths. Mr. Debenham's suggestion as to two or three kinds of paper showed that he did not understand the commercial aspect of the matter.

Mr. Debenham said that, if the sulphocyanide bath took more gold to produce a good tone than the combined bath, it practically promised the most permanence.

Mr. FRY pointed out that Mr. Dobenham suggested that the sulphocyanide bath required more gold than the combined bath, but that the whole of the gold went into the print had not been shown.

After further observations and discussion a vote of thanks was passed to Mr. Fry.

Croydon Camera Club.—November 1.—Messrs. Walter Burr and J. Irving Dickson were elected members A paper on *Harmonising Harsh Negatives*, by Mr. Macintosh, was read by the President, Mr. White's paper being postponed for lack of time. Questions and answers elicited (1) that Welford's rapid toning bath had not yielded satisfactory results to those who had tried it; (2) immersion of gelatino-chloride prints in methylated spirits was the surest safeguard against blisters; (3) no exposure tables or meters at present in use will entirely supersede judgment and experience; (4) 150 gelatino-chloride prints may be safely and evenly toned together in a bath whose superficial area does not exceed four times that of each print. This Mr. White offered to demonstrate.

Croydon Microscopical and Natural History Club (Photographic Section).—November 3, *Paget Printing-out Lantern Plates*, by Mr. S. H. Fry. Mr. J. Weir Brown in the chair.—Mr. FRY confined his remarks and demonstrations to the lantern plates, stating, however, that the treatment of the opals and the P.O.P. was practically the same. The image on these plates partook more of the nature of a stain, and density was easily obtainable without blocking up the shadows. There was no difficulty in printing them in an ordinary printing frame, being sufficiently printed when, on looking through from the back, they had a reddish appearance all over. If found over-printed, they could be reduced in a weak—two-grain—cyanide bath. Mr. Fry then proceeded to develop two partly printed plates. Stress was laid on the thorough "bromising" and washing before being placed in the developer. He preferred the "hydroquinone" developer, as given for the paper, diluted, however, with an equal quantity of water, as it was more easy to wash the developer out before toning, and unless this was done, the gold, in the presence of hydroquinone, acted as an intensifier, and produced an enormous density, whilst toning was very slow After development the plates were toned and fixed in a combined bath. The appearance of the resulting slides was greatly admired by the members, as also were a number of finished slides which were shown.

Ealing Photographic Society.—November 2, Meeting in Princes' Hall, Public Buildings.—Messrs. Roland Whiting and T. Stephenson were elected members. A set of lantern slides, illustrative of Yorkshire scenery, contributed by the Leeds Photographic Society to the Affiliation of Photographic Societies, and lent by the consent of the latter body, was shown. The remains of the once splendid abbeys, in which Yorkshire is so rich, were well represented, the slides including views of Bolton, Kirkstall, Rievaulx, Whitby, and Fountain's Abbeys. Amongst them *A Peep Through the Transept Arch at Bolton Abbey*, by Mr. J. A. Walker, and a view of the *Crypt at Fountain's Abbey*, were much admired for their excellent lighting and stereoscopic effect. Beauties of wood and moorland, of lane and stream, were plentifully depicted, and there were several views of the picturesque town of Knaresborough. The curious rocks at Brinham, near Harrowgate, were thrice depicted, and there were numerous specimens of the coast scenery at and near Whitby. Amongst the seascapes *Flamborough Head* and *Sunset o'er the Sea* were most pleasing, though the former suffered from the absence of clouds. After the Yorkshire slides, a number of home manufacture were shown. These comprised views in Surrey, on the Thames near Marlow, flower studies, &c., by Mr. T. Crisp, and views at Strand-on-the-Green, Brentford, in Scotland, &c., by Mr. Vallance. The pictorial qualities and excellence of technique of these slides elicited much applause. At the termination of the lantern display, an adjournment was made to the dark room to inspect the enlarging apparatus, which is in process of construction, from designs by, and under the superintendence of, Mr. Charles Whiting.

Hackney Photographic Society.—October 31, Mr. W. L. Barker in the chair.—Members' work was shown by Mr. Henzler, viz., views taken upon the "Rocket" and Cadet lightning plates. Owing to the wide range in subjects treated, a decided opinion was unobtained as to which plates yielded the best results with an equal exposure. The Hon. Secretary showed the Thornton-Pickard automatic camera stand, which has many advantages, viz., automatic locking joints, lightness and compactness consistent with rigidity. Mr. FRY, of the Paget Prize Plate Company, then gave a demonstration upon the new rapid Paget printing-out paper by partial development. Amongst its advantages may be claimed that prints only require partially printing, the rest being developed up to the necessary strength and detail. They are then toned and fixed in the usual manner. To briefly describe the process, it consists of taking the partially printed print and immersing, without washing, in a solution of potassium bromide 1 ounce and water 10 ounces, leaving two minutes or more. It is then washed in water for about five minutes, and then developed with hydroquinone, according to formula given by the Company. It should then be washed for five minutes and toned with the following combined bath:—Make a stock solution of 80 ounces of water, 1 pound of hypo, 1 ounce of acetate of lead, and about 1 ounce of chalk. Then take 5 ounces of this solution, after well shaking, and add 1 to 1½ grains of gold, which will be sufficient to tone the sheet of paper. The prints tone rapidly, and give a large variety of tones, according to the taste of the operator. The prints are then washed for a couple of hours in running water. The demonstrator recommended not to carry the prints too far in development, as they gained in density in toning. The paper, although very sensitive to daylight, may be manipulated with a very fair amount of gaslight without having any effect upon the finished print.

Leytonstone Camera Club.—November 1, Mr. Albert E. Bailey in the chair.—Mr. J. CARPENTER gave a most interesting evening on *Flower Studies, and how to make them.* In opening he observed that, although he had made flower studies a speciality, he found it much easier to produce a passable picture than to impart to others the necessary knowledge of how to proceed to make them. All flowers were not suitable, and, although he had gone to great trouble to secure some of the most beautiful exotics, he found the well-known flowers, such as the primrose, lily of the valley, &c., were more appreciated by the general public. Light colours gave the best results; arrangement and grouping were a most important factor to success. No hard-and-fast line could be laid down, but much must depend on the individual taste. A number of prints were passed round, showing good and bad grouping. Lighting and backgrounds were next dealt with, which required varying to suit the subject. For plates he preferred isochromatic, and was quite satisfied that they were quite indispensable for this class of work. Pyro-ammonia was his favourite developer. Some negatives were passed round showing the density required, and a few hints as to exposure concluded a very interesting lecture. About fifty of his well-known and beautiful lantern slides were next put through the lantern, and, pausing over each, questions were asked and answers freely given in an explicit manner, showing Mr. Carpenter was a perfect master in his speciality. All exhibits for the Exhibition must reach the Clubs' headquarters, the Assembly Room, High-road, Leytonstone, on or before the 14th inst., addressed to the Hon. Secretary.

Woodford Photographic Society.—November 5, Ordinary Meeting, the President (Mr. H. Wilmes) in the chair.—Paper by Mr. H. CROUCH on *Lenses.* The lecturer said that his object was not to give information that could be found in any elementary text-book, but rather to give reasons for lenses taking certain forms, and show the advantages that different types had for special work. Specimens of Jena glass, grinding tools, and lenses in different stages of manufacture were shown; among others, the two elements of a single lens not cemented together, so that the surfaces that would be cemented when finished could be seen, the curves and the reasons for the form of the two elements being explained with blackboard diagrams. It was stated that the exterior surface of the lens controls its whole character, and that the flare spot, which is rarely seen in modern lenses, could always be cured by altering the position of the stop. Next meeting (informal), November 16. Subject for discussion, *What Form should the Work of a Photographic Society take in order to be of the greatest Assistance to its Younger Members?*

Aston Natural History and Photographic Society.—In the course of the practical demonstration on the manipulation of the dry-collodion lantern plate, Dr. HILL NORRIS said that exposures were, to his mind, more satisfactory when made to a paraffin lamp, as the variation in the pressure of gas often defied true judgment. The guide given for reduction in the camera was, mid-day, sun shining, facing north light, stop *f*-16, from thirty to sixty seconds. Contact printing was next dealt with, and the recommendation was ten to twenty seconds at a distance of two feet from a No. 6 batswing. The brilliancy of the negative is, however, always proportionate to the whiteness of the light. The developing should be conducted in a temperature of 60° to 65° Fahr., and should be continued until sufficient density is obtained, which may be judged by observing three rules, viz., (1) till all veil has disappeared; (2) that the image should be black; (3) that it appear dense and black by the transmitted light of the ruby lamp. In cases of over or under-exposure the results will be thin and flat. Over-exposures may be remedied by cutting short the development, fixing, washing, and then redeveloping with the silver and pyro. The plate must on no account be touched or brushed when wet, but the films are very tough when dry. Dr. Norris then passed round the following formulæ:—No. 1. Hydroquinone, 160 grains; sodium sulphite, 2 ounces; citric acid, 60 grains; potassic bromide, 40 grains; water, 20 ounces. No. 2. Sodium hydrate, 100 grains; water, 20 ounces. Take equal parts of each to develop. *Fixing:* Potassic cyanide, ¼ ounce; water, 10 ounces. Rinse well under tap. Or, hyposulphite soda, 4 ounces; water, 20 ounces. After immersion of plate, bring out of room into white light, and wash at once as soon as all unaltered silver bromide has gone from film. If No. 2 is used, more washing is required. *Redeveloper:* No. 1. Pyrogallic acid, 10 grains; citric acid, 25 grains; water, 2 ounces. No. 2. Silver nitrate, 20 grains; distilled water, 2 ounces. To ½ ounce of No. 1 add 30 drops of No. 2. The Secretary then exhibited a new film slide by Tylar, and a magazine camera by Archer & Sons.

Birmingham Photographic Society.—October 31, Mr. J. J. Button in the chair.—Mr. MIDDLETON gave a lecture entitled, *The By-ways of Warwickshire.* He described, in a very interesting way, a great many of the less-known places of the county, giving many valuable hints. Mr. Middleton strongly urged those present to adopt a definite object in their work. Thus would they add greatly to their own interest, and also be the means of obtaining valuable records. This is well demonstrated by the work of the Warwickshire Survey, of which Mr. Middleton is an active member.

Brighton and Sussex Natural History and Philosophical Society (Photographic Section).—At the ordinary monthly meeting, held in the Librarian's room, Public Library, Church-street, on Friday, November 3, competition slides were exhibited, also a selection of members' slides.

Munster Camera Club.—Annual Meeting. The President (Major Lysaght) occupied the chair.—The report of the Committee showed the Club to be in a flourishing condition. Mr. W. R. Atkins submitted a statement of accounts, showing that the total revenue of the Club was 27*l.* 3*s.* 6*d.*, and the ordinary expenditure 19*l.* 13*s.* 1*d.* The exhibition account showed a loss of 8*l.* 19*s.* 11*d.* The out-going Committee were re-elected, substituting Mr. L. Egan for Mr. D. Franklin, resigned.

FORTHCOMING EXHIBITIONS.

1893.	
November 10, 11.....	*Photographic Salon, Dudley Gallery, Piccadilly, W. Hon. Secretary of Organizing Committee, A. Maskell, 215, Shaftesbury-avenue, W.C.
,, 10, 11.....	*South London Photographic Society. Hon. Secretary, C. H. Oakden, 51, Melbourne-grove, Dulwich, S.E.

„	10–15.....	*Photographic Society of Great Britain, 5A, Pall Mall East, S.W. Assistant Secretary, R. Child-Bayley, 50, Great Russell-street, W.C.
„	17–25.....	*Stanley Show (Photographic Section), Agricultural Hall. Manager, Walter D. Welford, 57 and 58, Chancery-lane, W.C.
„	20–25.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December.....		*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
„	18–Jan. 22, 1894	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

GELATINO-CHLORIDE PAPER YELLOW STAINS.

To the Editor.

Sir,—While I fully endorse all that Mr. Bothamley has stated in his report on the cause of yellowing of gelatino-chloride prints, I do not think he has quite exhausted the subject.

Undoubtedly hypo is the cause of yellowing *between* toning and fixing where separate baths are used, and the knowledge of the fact led me astray for some time. Mr. Bothamley has probably not been asked to seek the cause of yellowing *after* toning and fixing, whether by separate baths or the combined one, and this, I think, is the ghost which so many are desirous of laying.

Hypo has got such a bad name for staining that anything in the shape of a discolouration is sure to be attributed to its agency, and thus, I believe, it has been credited with a much larger share of spoilt prints than it deserves. Given a yellow stain, and hypo is hunted for high and low, as a matter of course, and I must plead guilty to having joined in the chase.

The practice at my studio is to wash and tone in one room, and fix in another, using separate dishes for every operation. One sink is used exclusively for fixing and washing prints, which are toned and fixed separately. (Albumen ones have a bath to themselves.)

Despite all these precautions occasionally a crop of yellow prints would appear, sometimes only one or two, at others a dozen or more, and then all would, perhaps, go well for a week or two. This went on till I had arrived at my wit's end to think of fresh fields for investigation, when a waste bromide enlargement gave me the clue. This had been put to wash with others early in the day, but, being a waster and intended only to work by, instead of being pinned up to dry in the evening, it was left in the running water and forgotten till the morning, when I found the once-clear white paper stained to a dirty yellow brown. My conscience wouldn't allow me to accuse friend Hypo of this, so I began to suspect the washing water (direct from the main).

As a preliminary test I tied a bag of clean cotton-wool over the tap and allowed the water to filter through it for several hours. Result—a filtrate resembling slimy mud in character and strong coffee in colour. That, in my mind, settled the *colouring* matter of the stains, it only remained a account for their streaky character 1

Some prints were carefully prepared and put to wash in the usual manner. Not a trace of stain was visible after two hours' washing. Two prints were pinned together diagonally, and two more were crumpled and allowed to jam at the point of overflow, the whole being left till the next evening, some twenty-two hours in all. (I at that time practised the old-fashioned plan of washing prints, chloride and albumen, all night.)

An examination of prints proved them all to be yellowed, the free ones being slightly tinted all over; of those pinned together the under one remained fairly white in the part protected by the print in contact with it, the upper one having a deep yellow patch where the pin was inserted. The crumpled prints exhibited streaks of yellow corresponding to the ridges facing the overflowing water, and in depth of colour according to the angle each ridge presented to that overflow, proving that *pressure* has some influence.

Here, then, was the cause. Remedy:—shortest possible washing to ensure elimination of hypo. Two hours I found ample, and no hypo could be detected after even one hour, provided prints were frequently taken from one dish to another and well rinsed. Result—have not seen a yellow stain since, now over twelve months.

I could not detect any difference in *colour* of stain by too prolonged washing, and that purposely produced by weak hypo before fixing; but in the former the shape takes a more definite outline, mostly well defined and following a crease or fold. Moreover, my experience of hypo stains (fortunately very limited) is, that age accentuates them rather than not while stains from washing certainly decrease in a strong light, and I'm sorry I did not save some to see whether they would eventually disappear altogether. I have found the same stains on albumen prints from the same cause, and have no doubt others have done the same, and given, as I did, hypo the credit.

It is well known that water varies enormously in different districts, and this will account for the immunity of some fortunate workers from such pests as the yellow plague.

If these remarks should help any one to convalescence, my time will not have been wasted.—I am, yours, &c., J. Thos. Pentney,

6 *South-parade, Huddersfield.*

IRIDESCENT STAINS.

To the Editor.

Sir,—Referring to a complaint by M. Wilson in last week's Journal with respect to a "Marginal Irideacent Stain," a repetition of a complaint printed a few weeks ago, it may interest him and others of your readers to know that these stains, if not very deeply seated, may be removed by placing the negative, direct from the fixing bath, in a dish of water tinted straw colour, with perchloride of iron solution. This effects a slight reduction in density, which should be allowed for in developing.—I am, yours, &c., T. Stokoe,

Clare, Suffolk, November 1, 1893.

FILMS *VERSUS* PLATES.

To the Editor.

Sir,—Mr. Conybeare seems to have a very vague idea of what constitutes a test in respect to the comparison of films with plates, and when he says that his experience is so completely at variance with mine, that he gives it to prove that I am wrong, I am tempted to show him that his experience is a very trivial one, and not at all in variance with mine. He has not tried exposures of the thousandth of a second, and therefore can say nothing of the difference between plates and films at minimum exposures; he has used slow films which had not deteriorated after eighteen months, and I have just been using some of ——'s films which have been lying in my cupboard more than that time, being the most rapid which the maker of them sends out, and find them, if slower, still clear and as free from defects as when I got them, so that unless he has used the same films that I alluded to in my letter, which are much more rapid than those I allude to above, he proves nothing opposed to my statement. I say that Mr. X's films fogged two months after I got them from the agent. As he does not know who Mr. X is, he does not disprove me. He has evidently used Messrs. A, B, & Co.'s films instead—he tries exposures of more than the double of mine, and with amidol he finds it difficult to get fairly exposed negatives on anything—who advised him to use amidol? He has not found rapid films to deteriorate in two months; what test has he applied? Does he not see, without straining his mental vision, that he has not made an experiment with the precision which is necessary to give it any scientific value? It is a fact, I suppose, generally admitted, that very rapid gelatine emulsions lose their rapidity somewhat in proportion to their sensitiveness, while the slow ones deteriorate as slowly. To prove an exception to this rule, it would be necessary to compare such emulsions with some plate of known constant qualities of fresh manufacture, and to expose them with a mathematical precision, by a mechanical contrivance in a constant light, and to develop them with the same developer, and besides this, it is necessary to give a minimum exposure, because when a margin is allowed, it becomes impossible to calculate the extent to which that margin has been drawn on. Exposures made by guess and on different days, developed according to the exposure, and with developers which may differ materially from each other, have no value as indication whatever.

A correspondent of the Journal wrote, not long ago, to say that he had found plates that had been kept for some years to be more sensitive than when they were new, and the Editor asked the very sensible and, it seems, unanswerable question, how he knew it? It is quite impossible to compare an exposure on one day with one made on the succeeding day, sometimes one made on one hour of the day with one made on another hour of the same day. What is the use, then, of comparing what we got in July with what we got in October, or what was done in this year with what was done last? Any such tests are utterly unscientific, and, except as indications for general practice in a loose way, utterly worthless. If I want to test two films or plates, I choose a day without a cloud, and between the hours of ten and twelve. I expose them as quickly as possible, lay them side by side in the tray, and pour on the developer, and in the exposure I employ some shutter which operates mechanically, like the Bausch and Lomb, or the Thornton-Pickard, where the smallest fraction of a second is required, and where there is not even the uncertainty of an elastic band to lead to a doubt. Unless experiments are made in

this manner, they are absolutely worthless for exact comparisons, whether they be of developers or of plates and films. I am not so arrogant as to say that my experiments and methods are better than those of any other student, but my conclusions, drawn from a great many trials with different brands of plates and films, are that no films have yet been so coated as to give a sensitiveness equal to that which can be got with glass, and that the more sensitive the emulsions, the more rapid will be the deterioration, both in sensitiveness and in their tendency to fog. But a photographer who depends on amidol for rapid work can have only limited knowledge of what can be done.—I am, yours, &c.,

W. J. Stillman.

To the Editor.

Sir,—I have long had a lurking fancy that there is something in a celluloid film which tends to impair the sensitiveness of an emulsion spread upon it. Some years ago I was using Fry's ordinary plates for landscape work, and when on a tour I took a packet of films of that brand with me as well as the plates. The films proved to be hopelessly underexposed, while the plates were all right. More recently, a packet of Edwards' medium isochromatic films proved to be less than half the speed of the same brand of plates tested at the same time. In testing for speed a number of different brands of celluloid films, I have generally found them slower than I should have expected in comparison with similar plates.

All this, of course, is inconclusive, because the speed of different batches of emulsion varies from time to time, and I might have come across unusually slow batches on the celluloid.

Within the last few weeks, however, I obtained from the makers a box of Edwards' special rapid plates, batch No. 5306, and a packet of the same brand of films bearing the same batch number. On exposing plate and film side by side in the camera and developing together, the plates developed much more rapidly, and had the appearance of greater rapidity than the films, the latter giving a negative more brilliant in character, just as if some strong restrainer, such as citrate of soda, had been added to the developer.

On further tests I estimated the films to be only two-thirds the speed of the plates. Mr. V. C. Driffield also kindly tested the relative speeds of these same plates and films by the Hurter & Driffield method, and also found the plates to be faster than the films in the proportion of 1·88 to 1·00.

Of course, it is quite possible that some celluloid films do not exercise this influence over the emulsion, and I am not aware that celluloid films generally are inferior in quality to plates; it is merely a question of speed. Early films were not always even in coating, but I think this failing is now overcome.—I am, yours, &c.,

Alfred Watkins.

Hereford, November 3, 1893.

BRISTOL EXHIBITION.

To the Editor.

Sir,—Mr. H. P. Robinson's letter, published in the photographic press of last week, would have elicited no reply whatever from me, had it not contained such evident misrepresentations, such animus, and desire to damage this Exhibition, and such a display of discourtesy in publishing his letter without any intimation to me that he was about to do so. This action has rendered plain speaking imperative.

Firstly, Mr. Robinson says, "I cannot find a class to which I or those who think with me could contribute." If that be so, I am sorry; but it is evident very few "think with him," as is proved by the large number of entries already received from leading workers. If Mr. Robinson cared to send his exhibits, they would have been properly hung and fairly judged; he prefers not to do so; well, he must please himself; we shall simply have one exhibitor the less.

His next reference, that to the Photographic Society of Great Britain, is quite incomprehensible to me. The Photographic Society of Great Britain no more concerns my Council than would the Bristol and West of England Association influence the Exhibition rules of the former Society or any other society "of Great Britain."

I may here remark that our rules, which Mr. Robinson refers to as an "almost immediate reply" to the deliberations of the Photographic Society of Great Britain, are the same as were formulated thirteen years since for our first Exhibition, and which gave then, and have since given, universal satisfaction to all, save Mr. Robinson himself.

With regard to that gentleman's reference to the Photographic Society of Great Britain, it would interest us to know whether he is authorised by them to write so, as in that case we should be pleased to reply to his expressions at an early opportunity.

And let me say I write with no ill-feeling whatever towards the Society in question, but as Mr. Robinson throws it in our teeth, I am compelled to answer his reference thereto. As that gentleman kindly allows that we have a right to make our rules as we please, we ought, I am sure, to feel very grateful to him; but when he tries to play "Sir Oracle" in the last paragraph of his letter, and endeavours to coerce others, with such an evident and petty desire to injure this Exhibition, let me say he may spare himself the trouble, as *already, with a month to spare, we have such a large number of first-class entries that the complete success of the Exhibition is assured.*

Mr. Robinson appears to have overlooked the paragraphs in our schedule which have placed in the hands of the judges the power of withholding medals, and the awarding of extra medals at their discretion. We are the more surprised at this, as he has exhibited in Bristol previously, and has taken awards, and herein, apparently, lies the sore point. Let me explain. Mr. Robinson has probably not forgotten some unpleasant correspondence which originated with himself relative to one of his awards, and which, if published, might interest your readers, as throwing light on, and giving the reason for, his published letter of last week. Will Mr. Robinson oblige?

Finally we shall, in due course, publish the list of the Jury, who will in every respect command universal confidence, and who will—as have our Juries in the past—make their awards according to *merit*, and quite *irrespective of tradition*. We have every reliance on the great bulk of exhibitors fully approving our rules and supporting the Exhibition.

I regret, Sir, that Mr. Robinson's most unusual procedure should have caused me to occupy so much of your valuable space, for which many thanks.—I am, yours, &c.,

Frederick Bligh Bond,
Hon. Secretary Bristol International Photographic Exhibition.

THE BENEVOLENT.

To the Editor.

Sir,—Will you kindly, as in former years, direct the attention of your readers to the Benefit Night of the Photographers' Benevolent Association, which will be given at the Exhibition of the Photographic Society of Great Britain, 5*a*, Pall Mall East, on Friday, November 10? At the same time may I have a few lines of space for a very special appeal? We are just completing the twenty-first year of the Benevolent Association. The calls are more numerous and more urgent this year than they have ever been in the past. We have already granted relief to the extent of 134*l.*, and our income for the year to date has been 59*l.* It is an unfortunate feature of the Benevolent that it is supported by such a small number of subscribers. The income almost entirely comes from amateurs and the photo-material trade, and very little from those who really benefit by the Association. The committee is most anxious to increase the number of subscribers. The minimum subscription is only 2*s.* 6*d.* There are few photographers or assistants who cannot afford this, and we earnestly appeal to those who are not subscribers to become so. We are specially anxious to celebrate the twenty-first birthday by instituting run of greater usefulness than ever before.—I am, yours, &c.,

H. Snowden Ward, *Hon. Sec.*

Memorial Hall, Ludgate-circus, E.C., November 6, 1893.

OPERATOR'S SPECIMENS.

To the Editor.

Sir,—Allow me to protest against what I have found to be a common practice amongst professional photographers, viz., advertising for an operator, &c., without disclosing their identity, and failing to answer letters, or return specimens, which have been sent in the ordinary business good faith, which is usually warranted outside photography.

As this practice not only causes disappointment and loss to a great number of helpless assistants, but also tends to bring into disrepute the unsuspecting medium of these unbusinesslike and dishonourable men, I believe my protest is justifiable.

I know also that you, Sir, will not willingly allow a custom to exist for one moment longer than is necessary, when you find that it casts a shadow upon the respectability of the office of your highly valued paper.

I am glad to be able to admit that I have written to some (though sadly exceptional) photographers, who have not only replied, but that in a most courteous and kindly manner.—I am, yours, &c.,

A Turning Worm.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange a good imitation stone seat for rock-work seat or set of stones for studio.—Address, W. Hobbs, Gold-street Studio, Saffron Waldon.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

PHOTOGRAPHS REGISTERED:

James Leach, Carnarvon.—*Three portraits of Rev. John Hughes, D.D.*

John McLaren, Larbert, Stirlingshire.—*Portrait of Rev. John McLaren.*

Ralph Starr, Cambridge.—*Two groups of the Executive of the High Court of Foresters, 1893-4.*

THOMAS MOLLERSHEAD.—We will bear your suggestion in mind.

P. C.—1. Apply to the Platinotype Company, Southampton-row, W.C. 2. Citric acid and alum.

W. H. W.—You would be safe in taking the relative values as 1 : 1½; but it depends entirely on circumstances.

SUUM CUIQUE.—Sorry we cannot reopen the subject. It has already been referred to in our correspondence columns.

R. R. LIVINGSTON.—Thanks; we are much interested in the moonlight picture. What you term lightniug in it, however, is not such.

G. CLAVIGO.—1. You would have to employ a method of spectroscopic examination. 2. Mr. Ives referred to rapid printing in colours.

ENGLISHMAN.—It is probable that the indiarubber of the squeegee has perished—that is, lost its elasticity, in which case the remedy is renewal of the rubber.

HADLEY.—The most convenient solvent for amber, to make a photographic varnish, is chloroform. It is somewhat expensive, but the methylated kind answers as well as the other.

W. A. BROWN.—1. and 2. Probably the Welsbach light would suit. Apply to the Company, Palmer-street, Westminster. 3. Bromide enlarging is dealt with fully in our back volumes.

VERAX.—It is difficult to say the cause of the markings without knowing more about the manipulations. It rather appears, however, that they proceed from the prints leaving the glass at the edges before the other parts are dry.

SIZE.—We must confess we are not well versed in the practical details of making *papier-maché* goods. No doubt you will find them fully described in *Spon's Workshop Receipts*, or, at least, sufficiently for you to get a general insight of the work.

C. H. REED.—We are not aware where the graduated measures in enamelled ware referred to a short time back are to be had, but funnels, and cups, and the little ladles may be obtained, we imagine, at any of the shops that supply this kind of ware.

W. C. NORSE.—The studio, according to the sketch, is good. It might, however, be improved a little by making the ridge a foot or eighteen inches higher, continuing the glass to the top; but much will depend upon the aspect, which is not mentioned.

INQUIRER.—Several formulæ have from time to time been given both in the JOURNAL and in the ALMANAC. Those who supply the medium for sale do not publish how it is compounded; but, as a shilling bottle is sufficient for some hundreds of negatives, you will probably find it cheaper to purchase it than to make it yourself.

CONSTANT WORKER.—The difference in cost of building a temporary studio to resist a windy and rainy season and a permanent one will not be great. We should advise you to consult a horticultural builder in the neighbourhood. He would possibly construct you a suitable building, and take it off your hands at the end of the season, for a moderate price.

C. W. A.—White lac, when dissolved in spirit, *is* turbid; but, by standing for a time in a warm place, the undissolved portion subsides, when the clear solution can be decanted. We have, however, seen a white lac that dissolves perfectly, and gives a clear solution at once, but have failed to obtain any in this country. We are told this kind of lac is expensive.

NEWCASTLE.—Unless the copyright is registered, it will be of no use to institute proceedings. On comparing the engraving with the photograph, there can be little question as to the piracy of the picture. The figures being your own family would be convincing evidence if there were otherwise a doubt on the subject. But, as we have said before, the copyright not being registered, you cannot proceed.

T. LLOYD.—It is not necessary that the word "copyright" appears on the mount of the photograph. There is no means of knowing if the picture is copyright or not, except by searching the register at Stationers' Hall. As the firm who ask you to reproduce the picture is a substantial one, we advise you to get a guarantee from it to hold you harmless, in case the picture is copyright and proceedings are instituted.

E. GEORGE says: "In preparing the etching ground for the Klic process with bitumen, I find, after dusting the plate and heating it, that I do not get an even granular coating, but a uniform layer without grain, or with very little indeed, through which the perchloride of iron will not act. What is the reason?"—Apparently too much powder is on the plate, or that it is overheated. Or, possibly, the two things combined.

R. E.—The cause of the paper printing so unevenly and so faintly is that it is not properly sensitised, the bath was much too weak. On exposing the piece enclosed to the light, we had proof of that by the way it behaved. Although the solution was made forty-five grains to the ounce, it has become, as is usual, weaker by use. Judging by the paper, we should say the solution is not more than half its original strength, if so strong.

T. GROSSMEN.—I. Yes: a lens of *f*-16 can be used for instantaneous pictures at the seaside, but not at this time of the year, unless, indeed, the light is exceptionally good and very quick plates are employed. We are, of course, assuming that fully exposed negatives are a desideratum. 2. You will not improve upon the formula supplied by the makers, that is, according to our experience. 3. Don't trust to "saturated solutions," particularly at this season, but make up solutions of a definite strength.

H. INWOOD.—The north light is the one more generally selected for enlarging by when that aspect is available. The reason why it is preferred is that with it the sun gives no trouble, and the light from that quarter is more constant the day through than from any other. When, however, the solar camera is employed, a southern aspect is to be chosen. We cannot recommend you to adopt this instrument, for this reason, that, with it, sunshine is imperative, and that is a scarce commodity in the large towns of this country.

R. E. X. asks how he can copy a painting the whole-plate size; the largest lens he has is a half-plate rectilinear. He says he is told that, if he uses one of the lenses as a single lens (fifteen inches focus), the copy will be distorted, and wishes to know if that is correct.—Yes, it is quite correct; but, with a lens of that focus on a whole-plate, the distortion at the margin will be so slight that it may be totally disregarded in a subject like a painting. It would certainly not be detected when the print is trimmed.

F. WYLLIE.—The quarter-plate portrait lens cannot be made to cover eight inches. Much better buy another of not less than nine or ten inches focus. It is quite immaterial that your other lenses are for dry plates, for they will equally answer for wet-collodion plates. By removing the back cell with its lenses, and using the front lens only, with a small stop placed about the middle of the tube, it will cover a larger field than it can do in its combined form. But it will somewhat distort architectural subjects, although it will serve for ordinary landscapes.

A NEW SUBSCRIBER.—I. A copious outline of the different photo-mechanical processes is given in the ALMANAC for the current year. 2. Nelson's are the most uniform gelatines in the market that are suitable for the purpose. The "No. 1 sheet" will answer well. 3. Use a five per cent. solution of bichromate of potash, and keep this as a stock solution. Foreign writers are very fond of giving "saturated solutions," in their formulæ, and they often lead to trouble with a change of temperature. 4. We have no competitions, periodical or otherwise.

S. E. W. writes as follows: "What do artists apply to photographs to cause them to take the colour easily? I get on very well with albumenised paper and gelatine prints, but my trouble is with carbon. Directly the surface is touched with water colour it is repelled as if it had been greased. I am told this is only the case with prints that are done by double transfer. Can you tell me of anything to apply?"—The repellent nature is due to the waxy material applied to the temporary support upon which the prints are developed. It is easily cleaned off by treating the print with a little benzole.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1750. Vol. XL.—NOVEMBER 17, 1893.

CONSECUTIVE AUTOMATIC EXPOSURES.

To Mr. Ead. Muybridge, so far as we can ascertain, must be accorded the position of having been the originator of the valuable system of producing, by photography, pictures in a series of extremely rapid successive exposures, by which it has been rendered possible to analyse such motions as those of the limbs and feet of horses and other animals in rapid movement.

Previous to the advent of Muybridge, the true actions of these were very imperfectly understood, if understood at all, owing to the impossibility of the eye being able to note the various positions consecutively assumed. The first of these attempts resulted in mere silhouettes, being all that were capable of being produced at the time, owing to the incapability of the wet-collodion process to record the detail of objects taken with the inconceivably brief exposure required for the purpose in hand. This was subsequently remedied on the introduction of the more sensitive gelatine plates.

The original camera, with its battery of lenses, was rather a formidable and costly affair, and was manipulated by electricity, and, unless we greatly mistake, it is protected by patents, the infringement of which we should be very sorry to encourage.

A few years ago, when in the establishment of M. Vanneck, of Antwerp, we saw a portion of a rapid shutter in an unfinished state, which gave us an idea for the construction of a camera to carry twelve or any desired number of lenses. The principle of the action is such, that when the button of the first lens has been pressed, and an exposure made, the mere act of the completing of the exposure causes the uncapping of lens No. 2, which in its turn, on its completing its exposure, acts in like manner as the first one the part of a starter for the one next to it, and so on till the last of the series has been exposed. The time required for the exposure of the twelve lenses need not, if the mechanism be well constructed, exceed one second, but the duration of the consecutive exposures can be extended to two, three, or more seconds, this depending on the nature of the subject.

The camera must be sufficiently wide to be capable of receiving the number of quarter-plates for which there are lenses, and it must be partitioned so as to separate one lens and plate from its fellows, in a manner similar to what is adopted in a stereoscopic camera. In brief, if one can imagine, *more Hibernico*, a binocular camera fitted with six, nine, or twelve lenses, he has got an accurate idea of what we mean.

A suitable class of lens for the purpose is that known as a Sixth Size Portrait Combination, which is the size immediately below that of a quarter-plate. It is one of the Petzval form, and works with a degree of rapidity considerably exceeding that of the average rapid rectilinear class. The hoods should be unscrewed and laid away, and the front ends of the lenses inserted in, or, at any rate, placed close up against, circular apertures cut in a board which extends the whole width of the camera. Each aperture must be covered by a vertical sliding drop shutter, and, by explaining the construction and action of the first and second ones, we do so of all, for all are alike.

The second of the series is kept in position by a paul or lever, the upper end of which falls into a notch, or other similar resist at the side. The lower end of this lever, that at the other side of the fulcrum, has its tail projecting, so as to be touched and acted upon by a projection on the side of the first drop shutter. Here is how it acts.

Premising that each of the series of shutters has a strong downward tendency, owing to the tension of a rubber band, the camera is directed to a point a little in advance of that in which the trotting horse, the flying bird, or other object in motion will presently be found, and, at a fitting moment, the first shutter is released by any of the mechanical devices now so well known. No sooner has the aperture in it passed the lens opening than, in its fall, it liberates the second shutter, which does the same for the third, and so on in automatic succession till the last has been exposed. The duration of the total exposure may be regulated by increasing or diminishing the tension of the rubber bands, several very weak ones answering much better than one of greater strength.

In the first camera of this kind we had constructed the shutters were kept in position by a steel rod passing horizontally through a metallic loop placed in each shutter. As this was being steadily withdrawn, one exposure followed the other with a rapidity determined by that of the withdrawal of the rod. This forms the easiest way to effect successive exposures but it cannot be said to be automatic in its action.

Of course, this successive principle is applicable to cameras with less than a dozen lenses; nay, for certain purposes, it may be applied to an ordinary twin lens or binocular camera.

PAPER IN PHOTOGRAPHY.

Some of the earliest photographic results were produced on paper, and at the present day nothing else is used for the vast majority of photographs; yet there is, perhaps, scarcely one material in the whole range of photographic technics which has received less attention than the subject of our article. Possibly the reason may be that it is the one substance least under the worker's control; as regards its essential qualities, selection must be exercised in choosing it, but there the matter ends. It cannot be said of paper that it must be "ended or mended." We cannot do without it, and we must

take it as we find it. It is a little unfortunate that such should be the case, for the result is, practically, that for the paper employed in the production of chemical prints we are compelled to go to one district on the Continent—almost to one single maker. If it were that such singleness of purpose in paper-buying were owing to general excellence and superiority of quality, there would be no cause to complain. If a man make an article so excellent in quality that all the world are his customers, he deserves the trade; but the probability is that the superiority of the paper for the purposes in question is owing to its possession of certain mechanical properties which no other paper manufactured has, so far, been able to rival—this combined with general good quality also. The amount of paper now required for various kinds of photography is a hundred-fold the requirements of a score of years ago; it seems most singular that a reliable quality at a reasonable price should not be produced in this country. Cannot our paper-makers be roused? We hope that something we write may be the means of inducing them to experiment to a greater extent than they yet have done, and see if a process essentially British in its modern developments cannot be carried on with British materials. Paper of almost every quality is made in this country. Granted a paper of the right substance and freedom from metallic impurities, surely a series of experiments with sizings of various kinds might be made, the results put into competent hands to report upon, and eventually a paper equal, if not superior, to what we purchase out of the country be manufactured at home.

Paper is essentially fibrous cellulose obtained from various sources, purified, made into a species of felt, and ultimately hardened by impregnating with various glutinous materials, technically called sizes. The easiest mode of seeing the manufacture is, perhaps, to go through a small paper factory, where hand-made paper is produced. We have comparatively recently been in such a mill where none but hand-made paper is produced. We saw the rags cleaned and introduced in the usual apparatus for disintegrating them into a fibrous cream. This, transferred to a tank and kept constantly stirred, is made into paper by the simple introduction, slightly below the surface, of a sort of woven wire framework, which is withdrawn, holding on its surface the wet pulp; the water drains away, a sheet of wet paper is left, it is placed to dry, and there we have a piece of pure white paper. Not a particle of bleaching material was used, consequently no "antichlor," as hypo is called in that trade, was needed to get rid of the chlorine, with its destructive action. The paper thus produced, however, was practically neither more nor less than "blotting-paper." If it were made wet, it could scarcely be lifted up without tearing; it was useless for any other purpose. It is after this stage where the essential property which gives the superiority to paper from Rives comes in—the material used, and the manner of using is as "size."

For photographic purposes it is essential that paper should really be pure—as nearly as possible pure cellulose and size. One of the causes of the difficulty in rivalling the paper we speak of consists in the fact that, in the race for cheapness, so many materials are added, either to give weight or fictitious appearance of quality, that a pure paper is rather an exceptional article. Much of the highly glazed printing paper we see owes its gloss to the introduction of earthy materials—kaolin, for example, and many other bodies being employed.

To obtain pure and white paper, either linen rags of first-rate quality must be used, or inferior coloured rags bleached with chloride of lime; as this latter involves, as we have just said, the use of thio sulphate of soda to get rid of the free chlorine or chlorous acids, we are at once face to face with another scarcely less insidious evil. It would be highly instructive if one of our Societies were to take this matter in hand, examine samples of paper used for various purposes in photography, and report as to how many were contaminated with sulphur salts in such manner as to render their use for such purposes injurious. Of course, we know that hypo exposed to the air gradually becomes converted to sulphate; but, even for this, some amount of moisture and some access of air is needed to facilitate the action. If the material be imprisoned in the texture of a mount, packed away in large heaps, little air will gain entry, and the actual result of the decomposition there is doubtful, and certainly not likely to be free from danger to photographs pasted upon them.

These, however, are not the only evils to be guarded against. Another potent factor in the degradation of the purity of a photographic print may be the use of wood-pulp in the paper. Many samples of paper so made will turn brown, through, probably, the decomposition of the resinous accompaniment of the fibre not sufficiently removed in the preliminary treatment. It will be useful to collect a few methods for readily examining a paper to be used for photographic purposes; but, as to do so would unduly extend the length of our remarks, we propose to do this in a subsequent article.

THE RELATIVE PERMANENCY OF PRINTS.

It is customary to regard the carbon process and similar methods of printing as giving absolutely permanent results, while the various systems based upon the employment of silver salts, but particularly in conjunction with albumen, are as commonly set down as more or less liable to fade or change. But a brief examination of a collection of old prints will often discover anomalies in connexion with the usually accepted ideas as to permanency, and raise questions as to whether some processes are so far above suspicion and others so little to be trusted as is usually supposed.

In turning over such a collection a short time back, our attention was arrested by the remark, "How evenly these prints have faded." The prints in question had the appearance of having been made upon highly surfaced or double albumenised paper and were mostly of a warm brown tone, but the whites and half-tones exhibited a palpable and uniform yellowness which told an evident tale of sulphuration. Our friend was not a little astonished, and somewhat incredulous, when we assured him that the pictures were in reality photo-mechanical prints, being, in fact, specimens of collotype printing of a high quality, produced some twelve or fourteen years ago in America, and sent to us at that time in illustration of what could be accomplished in that style of printing.

Since they came into our possession they have been constantly kept in the portfolio in which they now lie, and may therefore be fairly said to have been well protected from the usual vicissitudes to which photographs are subjected. The change which has taken place, so far as we are able to judge at the present time, is solely confined to the yellowing of the lights, the image itself being apparently perfect, and, it is scarcely needful to say, can scarcely be attributed to similar causes to those that produce a like effect in albumen prints. In fact, but for one circumstance, we should have had no

hesitation in setting it down to simple discolouration of the paper.

That this is not the cause, however, may, we think, be assumed from the fact, that amongst the prints are some possessing a matt surface, or at least are free from the high glaze presented by the majority, which is, of course, produced by means of a varnish applied subsequent to printing. In every case the matt prints are quite free from the discolouration shown by the others, and there can be little doubt therefore that it is to the varnish or glaze that the fault is really attributable.

The discovery of these altered collotypes caused us to make a careful examination of the rest of the contents of the portfolio, some of which are at least thirty years old, and the results were of a decidedly interesting character. For instance, amongst the pictures were a number of carbon prints by various artists and of different periods, some dating back almost as far as the publication of Swan's specification in 1864. One such print, produced as far as we can tell about 1865, presents very much the same appearance as the collotype already referred to, though the discolouration is more marked; but, in addition to that, the image itself has acquired a disagreeable greenish tone, more especially noticeable in the half-tints, and undoubtedly due to the presence of chromium compounds left in the print.

Other carbon prints of a much later date—from twelve to fifteen years old—while still remaining perfect in gradation, as well as pure in the lights, present an unpleasantly cold black tone that was certainly not their original colour; whilst others, of at least the same age, still possess the warmth and freshness of tone that we can imagine to have been theirs originally. This is particularly noticeable in a couple of small prints received from abroad a dozen years back, the rich, warm brown tones being apparently as fresh as if produced yesterday.

Platinotypes are usually regarded as representing the acme of permanence, and such, no doubt, so far as the image itself is concerned, is the truth. But amongst our collection are several prints representing some of the very earliest productions in that process, and dating probably as far back as 1878. The images present, no doubt, exactly the same appearance as when the prints were newly made, but in all cases, or nearly all, the whites are very seriously degraded; but whether from the effects of chemicals left in the prints, from natural discolouration of the paper, or from simple dirt, it is impossible to decide at a glance. The last is more than a probable cause, as from the character of the surface of the prints they are more likely to suffer from the combined effects of dust and friction than would be the case with either albumen, carbon, or other surfaced prints.

Several very early speciments of developed gelatino-bromide prints exhibit, without exception, decided signs of yellowness—in some cases of a very pronounced character—while others of a later date are entirely free from any discolouration. The change in the earlier prints can readily be traced to the want of sufficient care in the removal of the last traces of the ferrous-oxalate developer, then invariably used; while the absence of colouration in the later ones may be due partly to greater care and the use of clearing solutions, and partly, no doubt, to the employment of other developers not so liable to cause the yellow stain. In no instance is there any sign of deterioration of the image itself, or of loss of the finer details by fading or sulphuration.

The same remark applies to the earliest samples we possess of gelatino-chloride prints, although necessarily these do not date as far back as the others mentioned. Many of these are upwards of seven or eight years old, and, except for the wear and tear of handling, show no signs of deterioration. The oldest print by this process is one which the endorsement on the back tells us was sent to us in an untoned condition, as an example of what could be done with gelatino-chloride emulsion. This was, we believe, in 1883 or 1884, long before gelatino-chloride paper was an established article of commerce, and the print was toned by ourselves and put away as a curiosity.

Amongst the other curiosities is one worthy of mention, in the shape of a collodio-chloride, or highly enamelled gelatino-chloride, print—we are not sure which—that was sent to us by Dr. Liesegang, some eight or nine years ago, to illustrate the fixing power of common salt. The print, after toning in the usual way, was fixed in a saturated solution of common salt, and at the present day is as fresh and bright as when received. In this case, if any change had occurred, we should naturally not expect it to take the form of sulphuration, but rather of general discolouration from the presence of silver salts remaining from imperfect fixation; but there is not the slightest symptom of any such change.

Lastly, strange as it may appear, some of the best preserved of the old pictures in this collection are upon the much-maligned albumenised paper. A print of Mr. Francis Bedford's well-known *Brook at Kenilworth*, that must be nearly, if not quite, thirty years old, is only slightly yellowed, and that is more from dirt and age than from actual fading. Another print, of almost the same age, by Mudd, of Manchester, is absolutely as fresh and bright as if printed yesterday, and many others are nearly as well preserved. It is worthy of note, in connexion with albumen prints, that those upon rough or Saxe paper appear to have kept the best, probably from some difference in the sizing.

A plain paper print, of the details of the production of which we have no particulars, though it is over thirty years old, is apparently as good as when newly made, proving again that silver prints are not necessarily evanescent.

In conclusion, we may remark that, in estimating the probable permanency of any process, it seems that at least as much attention should be paid to the care devoted to the manipulations and to other usually neglected details as to the actual constitution of the image itself.

Judgment versus Exposure Tables.—Amongst the replies given to a series of questions at one of the provincial societies was this: "No exposure tables or meters at present in use will entirely supersede judgment and experience." With this every practical photographer will agree. Exposure tables may be of some service to a novice in his first attempts, but the sooner he learns to discard them the better it will be for his future convenience, and often his work. It sometimes happens, as in early spring, for example, when fleeting clouds are rapidly passing, that, by the time the calculations are completed as to the exposure to be given, the character of the light has completely changed, and a picture becomes lost, though a negative may be obtained. "Rule of thumb" is no more to be relied upon in exposures than it is in any other photographic operation. Therefore the beginner should, from the commencement, learn to judge of the exposure required from the appearance of the image on the focussing screen, and the character of the light at the time.

Bursting of a Gas Cylinder.—A lamentable and fatal accident, which may tend to shake the confidence of the nervous, happened one evening last week at Bradford by the bursting of a gas

cylinder. It appears that a boy, in the employ of a local firm of chemists, was carrying a couple of cylinders of compressed gas to be used for lantern purposes in the neighbourhood, when, according to report, he dropped one, and it burst. The greater part of the lad's chest, head, and arms were blown away. Fortunately, although a considerable number of people were near at the time, no one else was injured. In some experiments a year or more back, to test the safety of charged cylinders, one was thrown from a considerable height on to a hard surface without suffering any injury. But here is the case of a fall which could not exceed a foot or two producing disastrons results. Only a short time ago we were at a provincial railway station when some twenty or more cylinders of extra size, accompanying the paraphernalia of a theatrical company, were being transferred from one train to another, and the concussion each received as it was thrown by the "careful" railway porter on to the pile must have been much greater than by the cylinder when it was dropped by the lad who was killed.

Artificial Light for Contact Printing.—In several demonstrations of lantern-slide making by artificial light, the question has been raised as to the best light to employ for contact printing. Some advocate magnesium ribbon, some a gas flame, and others, and not a few, a paraffin lamp. So far as result is concerned, it matters not which is used, it is simply a matter of convenience. The principal thing is to have the light always, as nearly as possible, under uniform conditions. This is not always obtainable with magnesium, even when it is carefully weighed or measured, as the metal is liable to oxidation, which diminishes the light; also, it is not easy to burn it always at exactly the same distance from the negative. Gas has been objected to on the ground of the constantly varying pressure on the mains at different times of the day and evening. This may, however, be obviated by the use of a governor burner. Then, with the cock full on, the flame will remain the same, however the pressure of gas may vary. The form we have used for some time past is what is known as the "Christiana burner," and it answers perfectly. Paraffin is excellent, provided the oil used is always the same and the flame adjusted to the same height. This is not easy to accomplish with the ordinary flat wicks, but with the circular ones a uniform height and light is more easily obtained, as the length of the flame is readily measured. We recently saw an excellent paraffin lamp for the purpose. It had a flat wick and a circular burner, the wick being pressed into the cylindrical form in its passage through the tube. The burner was stamped as being made in Vienna, but similar ones are, doubtless, made here.

Another Fatal Accident from Ether.—A brief telegram from Berlin announces that a terrible accident has occurred in the Russian province of Grodno. Owing to carelessness, it is stated, of an *employé* at a chemist's, an explosion of ether took place, and the entire building was blown in the air, while the houses in the vicinity were seriously damaged, twenty persons were killed, and many others were seriously injured. The above, even if the account may be somewhat overdrawn (and it is to be hoped it is) should serve to emphasise the warnings we have so frequently given, when previous fatalities have happened in this country, to those unfamiliar with the properties of this material. Ether is frequently dealt with by artificial light, and it is then that it becomes dangerous. Its vapour is inflammable like coal gas, and when it is mixed with a certain proportion of atmospheric air it becomes as explosive as does gas under similar conditions. Not long ago we saw an ether saturator being refilled by the light of a paraffin lamp under most dangerous conditions, inasmuch as the lamp was placed below the level at which the vessel was filled, and this was done for imaginary safety. Because ether is one of the lightest of liquids, it was assumed that its vapour was proportionally so, whereas it is very much heavier than the atmosphere. The vapour of ether can be poured from one vessel to another in the same manner as the liquid itself. Therefore, in decanting ether in the vicinity of an open flame, it should always be done at a lower level than that of the light, and the precaution should be taken that there is no draught that would waft the vapour towards it.

Offensive Smelling Oil Lanterns and Heating Stoves.—*Apropos* of the coming season we have received three or four queries relating to the above subject. One correspondent, in addition to the smell, complains of the excessive heat given off from the lantern while in use. All the writers, curiously enough, ask if nothing can be added to the oil to prevent the obnoxious fumes. As the subject is just now of interest to more than the querists, we reply here instead of in the "Answers" column. In the first, we may say that various substances have from time to time been suggested as an addition to mineral oils to prevent their smelling when burnt; but, so far as our experience goes, they have very little, if any, effect in practice, whether used in connexion with the lantern lamp or the heating stove. We use both, and are not troubled with smells because we always keep them scrupulously clean, and the wicks in good order. When a well-constructed lamp or stove gives off offensive smells, it may be safely assumed that the smell is caused by vapourisation of oil on the outside of the burner and fittings, or, perhaps, from an ill adjustment of the wicks. Many lanterns and stoves have been standing out of use since last season with oil in them, which, by capillary attraction, has become distributed all over the fittings, and no amount of wiping will completely remove it. Consequently, when it becomes heated, it is volatilised, and hence unpleasant experiences. In nine cases out of ten, when a paraffin lamp or stove proves offensive, it is not from the oil consumed, but from that which is allowed to exist on the outside of the lamp and the burner. With regard to the excessive heat evolved by the lantern, much of that can often be avoided by proper attention to the burners. The wicks are frequently turned unnecessarily high, and, as a result, although no more effective light is obtained, the heat is materially increased. Lamps and stoves are frequently condemned when the fault really rests with those who work them.

THE ILLUSTRATED PAPERS AND COPYRIGHT PHOTOGRAPHS.

The following circular has been sent to a few London and country photographers, and we have reproduced it for the benefit of the profession at large, who, we hope, will not be slow in profiting by the example set. In a matter of this kind, affecting the interests of so many photographers, we should have thought the guiding spirits of the movement would not have hesitated to give the whole of their brethren an opportunity of participating in it:—

"A Meeting of Photographers held at the Hotel Victoria, Northumberland Avenue.

"*November* 1, 1893.

"At a meeting held at the Hotel Victoria, on July 19, 1893, it was resolved that a fee should be charged for all *copyright* photographs reproduced in any illustrated paper or periodical, and that the minimum charge should be one guinea; also that the name and address of the photographer should be legibly printed under each impression. The above has been given a three months' trial, and a second meeting was held on October 19, 1893, when it was unanimously agreed to continue the original resolution. And it was then further resolved that this brief statement should be sent to our leading provincial brethren, asking for expression of opinion on this or any other subject of interest to the profession.—I am, yours faithfully,

"C. M. Schomberg, *Hon. Secretary.*

"55, *Baker-street, London, W.*

"N.B.—A copyright photograph is one taken at the artist's expense, without any charge being made or fee received for the sitting, whether registered or not.

"The following is a list of the firms agreeing to the foregoing resolution:—Mr. Bassano; Mr. Frank Bishop, of Marion & Co.; Mr. Byrne, of Byrne & Co.; Mr. Cameron, of Cameron & Smith; Mr. Wm. Downey and Mr. Wm. Downey, jun., of Messrs. W. & D. Downey; Mr. Elliott, of Elliott & Fry; Mr. Alfred Ellis; Mr. Fox, of Maull & Fox; Mr. Grove, of Window & Grove; Miss Alice Hughes; M. Lafayette, of Dublin; Mr. Bedford Lemère; Mr. Mendelssohn; Mr. Taylor, of Barraud, Limited; Mr. Thompson, of Grosvenor-street; M. Walery, of Walery & Co., Limited; M. Van der Weyde; and Mr. Young, of Fradelle & Young."

JOTTINGS.

A MONTH ago I voiced a rumour concerning a projected new photographic paper. The only hints that I gave as to the quarter of the sky from which it would burst upon us were (1) that it would take art photography under its wing, and that (2) its promoters had been cultivating the gentle art of advertisement. The editor of your amateur contemporary thereupon delivers himself of sundry remarks about "another weekly photographic paper," "English energy," and "recently imported American gold," to neither of which did I make direct or indirect reference; and then, having told an awestricken world that he is "somewhat more behind the scenes than others," says that the report is "merely a canard," and that "the American eagle will not flutter either weakly or weekly." Well and good. But what a pity it is that some people are so ready to trumpet forth their highly privileged presence "behind the scenes" at the expense of their reputation for common sense. I never said anything about a weekly paper, and never for a moment supposed (or said) that English energy and American gold would be the moving spirits of the rumoured venture. The reckless precipitation with which the proverbial bull is said to attack a five-barred gate is nothing to the lightning speed with which some people jump at conclusions of an erroneous nature.

Mr. James William Fawcett, of St. Kilda, near Melbourne, Colony of Victoria, the specification of whose patent for "improved means for regulating the rays of light passing through photographic lenses" is published in the JOURNAL of October 13, is evidently a simple-minded gentleman who started photography about the first of April, 1892. He not only "patents" the inverted V-shaped stop for giving more exposure to the foreground than to the sky, but "partly to impart a stereoscopic effect to the photograph." He says the latter effect is obtained by sliding a shutter with a V-shaped aperture horizontally across the lens, when "a stereoscopic effect is given to the finished photograph by reason of the light being allowed to enter first at one bottom corner, then gradually being allowed to pass through the whole of the lens aperture, and finally through a small opening at the opposite bottom corner, thus, as it were, to a certain extent photographing the object from two different points of view, and so producing the desired effect." Holy Moses! what next? "To a certain extent, photographing the object from two different points of view" with a fixed lens is very funny, but it is a crying shame that the Patent Office should batten and fatten year after year on such ignorance as this.

The London and Provincial Photographic Association has had the question of the admission of ladies as members before it, and has, it seems from your report, decided not to admit them as ordinary members. What a pity it is that your reporter restricted himself to a mere outline of this part of the proceedings. I feel sure that a great deal must have been said *pro* and *con*, and, looking at the nature of the subject, no doubt some wise, foolish, and amusing things were uttered before the vote was taken. I do not envy Mr. Thomas Bedding, who moved the amendment excluding ladies from the "L. and P.," the disagreeable reputation that must attach to him for the part he took in the business, though, in the absence of his arguments, it is impossible to condemn him and his majority so freely as one would like. In these days of enlightenment and progress the opposition to the admission of ladies to learned and similar societies smacks of mediæval tyranny and narrow-mindedness. The sex that gave us Mary Somerville, George Eliot, Harriett Martineau, Angelica Kauffman, Florence Nightingale, Caroline Fry, and Phillippa Fawcett has surely won its right to share in all the intellectual advantages of men; and I hope it will not be long before the London and Provincial succeeds in obliterating the stigmata of boorishness which the selfish action of the gentleman named and his friends has cast upon it.

In passing, I noted among the Society intelligence during the last month the remark of a lecturer as to the "objectionable yellowness of many old gelatine negatives rendering them unfit for printing." Such negatives must have been very yellow indeed. Every photographer knows that harshness and shortness of scale of contrast are reduced by the presence of a certain amount of discolouration in some negatives, and therefore what is in essence a defect becomes in practice an advantage. Of late years there has been a dead set made against the presence of any developer stain in the negative, not always, I fancy, to the advantage of the latter. To systematically clear all negatives is, I believe, a mistake, for in some instances one may be taking away just the property which gives the *cliché* its proper wished-for printing value. Moral for my amateur readers: Don't "clear" your negatives until you have taken a trial print from them.

Yet, again, the old complaint about the detention of specimens. "A Turning Worm" in your last issue protests against photographers advertising for assistants not disclosing their identity, failing to answer letters, and not returning specimens. The last item is the only head under which complaint can be legitimately made. Why will not "A Turning Worm" and those of his kind adopt the plan of writing their names and addresses across their specimens, so often recommended in these pages? If this did not ensure the return of the specimens, it would prevent their misuse by unscrupulous advertisers, which would be something gained, at any rate.

Dearly beloved brethren, for many years past you and I have been using the alkaline sulphides for toning (or intensifying) silver images; but we may do so no longer, for Mr. R. G. Williams, of Greenfield House, Heywood, Manchester, has made the astonishing discovery that "the expensive salts of gold, platinum, and like metals" may be replaced in toning by "potassium, sodium, or ammonium sulphide," the use of which he has patented for toning gelatino-chloride prints! (see *ante*, page 675). The makers of gelatino-chloride papers will be glad to know that "prints toned by my improved process are very permanent." Mr. Williams, I wish you joy in your "invention," and would like to know your price for the patent rights?

"Log-rolling" is one of the most prominent and disagreeable features of modern literature. Lest my readers should not know what it means, I will explain. In brief, it is the habit known as "You scratch my back and I'll scratch yours." Journalists and authors, who may be reviewers and critics, praise, puff, and paragraph their friends' productions, and, in turn, secure for their own work like recognition. I regret to find that this kind of thing is creeping into photography, particularly in connexion with the public exhibition of pictures. Most of the principal exhibitors also happen to be Judges and pressmen. In the latter respect, the amount of log-rolling that has recently gone on is simply sickening. In some instances critics have not hesitated to praise their own work. The game of mutual admiration, as played by a small coterie of "art photographers," ought to be exposed. Some pretty little revelations in the way of exchange puffs for pecuniary ends would, I believe, come out.

COSMOS.

THE POSITION OF PROFESSIONAL PHOTOGRAPHY.

[President's Address to the National Association of Professional Photographers.]

Now that the time has come for me to address you on the subject of professional photography and the aims of our Association, I feel a degree of diffidence for several reasons. First, there is an amount of assumption, which, in my position and capacity, I ought not to take upon myself; but, feeling that something requires to be done, I volunteer to make the attempt, and if I accomplish the object we all have in view—objects far-reaching in their nature, and affecting the best interests of us all—I shall feel satisfied I have not spoken in vain. It is patent to every one that photography, as a profession, is not what it once was; but it is not alone in this, so many causes are contributory to the prevailing universal depression. New studios, in localities already congested, are being opened, the supply far exceeding the demand. In addition to this, there are many influences at work

tending to reduce our chances of success; some of them may be removed or lessened, and others we have it in our power to modify.

How Business Suffers.

Now, we all know, in large establishments especially, that enlargements with a photographic base, also oil paintings, crayon and pastel portraits, and other styles painted direct, are the backbone of a photographer's business, and I ask, that being so, why have we allowed these, especially the former, to pass into the hands of others? Some few of us, I admit, have from early days made our own carbon and bromide enlargements, and, if photographers had been united in purpose, we might have retained this industry, and still be obtaining remunerative prices. Unfortunately, the trade generally rushed off to the factory, and helped to build up colossal concerns, and held them together till the advent of the amateur; and now where are we? I will tell you. I some time ago photographed a child since deceased. I carefully named and numbered the negative and stored it (the negative, not the child) in a room specially arranged for the purpose, hoping it might be required for future orders. The parent, in good circumstances, applied to me for prices of enlargements; and, knowing that he was associated with an amateur who obtained all he required from the factory, I quoted low terms for a 24 × 18 bromide and three duplicates, with the result that he ordered a plain, unmounted copy of the picture for copying purposes, and a well-known firm agreed to give him a finished portrait, 24 × 18, for 19*s.* 6*d.*, and duplicates for 10*s.* 6*d.* each, a price a trifle beyond the charge to the trade, and less than I could have produced them for. I know for a fact that the person was prepared to pay considerably more had he been asked.

I give another case to show the facilities the public have for getting their work done at trade prices. The amateur goes to headquarters himself, and puts his non-photographic friends in the way of doing the same. He carries about with him the dealers' trade list, which he must have had given to him, and the poor professional is checkmated at every turn. Here is an experience of my own. I made for a client several 24 × 18 carbon pictures from landscape negatives, charging not a great excess over factory prices. The account was sent in, and my customer promptly produced his trade list, pointing out the variation in prices, with the usual result—he paid his account, and I saw him no more.

Amateur Capitalists.

There is one phase in connexion with our profession I think is dying out. You will have observed what a many outsiders possess themselves of the idea that to open a studio in a good district is like striking a gold mine—a perfect Eldorado—and capitalists have shown themselves eager to ally themselves with an operating photographer, and to back the idea by investing their capital in a swell concern. They begin with a flourish; then, having exhausted their sitters, who are generally their immediate friends, the struggle begins. Reducing prices, touting (which may be legitimate in a sense, but I consider very demoralising), and finally a dissolution of partnership, with the usual *finale*—I hold all this has a tendency to degrade.

These amateur capitalists, before they get the experience of business, simply calculate the cost of the plate and the piece of paper, ignoring rates, taxes, wages, &c., and seldom place any value on the hard-earned experience of the photographer.

An incident occurs to me of a lady whose collie dog I had recently photographed, and supplied five proofs. (I believe I have the reputation of knowing something of dogs). She called to give her order, and I heard an altercation with my attendant as to the excessive charge of 31*s.* 6*d.* for six cabinets; and, putting in an appearance I politely asked her if she knew what she was paying for:—"I suppose for six cabinets." 'Oh, no!—if that was so, you would be justified —you are paying for nearly forty years' experience; or, as Whistler puts it, 'the experience of a lifetime.'" And thus the photographer goes on, each day bringing its cares and annoyances, constantly assuming different forms.

One more experience. A lady brings in her carriage a well-executed and framed carbon enlargement, and requests to have a companion picture from the negative of a child I had recently taken, and she quoted the price she had paid—viz., four guineas. I reply at once it cannot be done for the money, and politely tell her it would be better to go to the same man again. Sad to say, and thanks to her and others similar, she replies, "The man is DEAD." And having killed him—perhaps not her first victim—she tries her wiles on myself. Fortunately I was equal to the occasion, and I got my price without losing my self-respect.

More Unity Wanted.

These experiences, I am happy to say, are rare with me, but I give them, because I am afraid the photographer too often forgets himself by charging profit only on the bare material he uses, and placing insufficient value on himself; and how often does he do even worse than this, in the form of giving a bribe and emulating the shopkeeper who gives his customer a teapot with a pound of tea! I admit rates, taxes, and wages must be paid, and in depressing times it is a fearful temptation to resort to practices which become played out and are ruinous in their consequences. But, better far improve the quality of your work; but if we became united in membership, and the more experienced in artistic excellence would give help to those around them by showing examples and methods in the club-room, and by one man exhibiting, &c., I hold that, if the artistic element and a higher standard of work in the profession was raised, photographers would be more valued and able to more than hold their own against the trading amateur (some of them do trade by a side wind, notwithstanding all that has been written). I feel assured the status of photography would be higher, we should become more respected as a body and be better paid for our work. The amateur question has long been a vexed one. Are there not amateurs and amateurs? I have fortunately and generally met with the genuine ones, and turned them to good account, and found them genial and generous.

As to competitive exhibitions, I have had little experience, but on one occasion I was asked by the respected President of the Parent Society to exhibit my dog pictures—and, mark you, they were not the result of snap-shots and hap-hazard exposures. I had visited the dog shows, and consulted the Judges, scrutinising their judgment, so as to secure the best points in my pictures. I thought I had succeeded, and, as far as the opinion of dog-fanciers and the owners went, I was satisfied; but not so the Judges, they passed them over in their class for some sharply, small-focussed snap-shot cabinet pictures of circus animals—elephants standing on their heads, spotted hares on their hind legs, and you know the rest—a frame of photographs, to my mind no doubt mechanically good, but unworthy of such an exhibition as the Parent Society. However, the series were awarded a medal. We have seen pictures medalled over and over again so worked on that it was impossible to tell where the photography ended and the stippling began. I consider exhibitions are a powerful incentive and a great help to the photographer; he sees there something to emulate and possibly much to avoid. The "Proud Turk" may not rouse his ambition, but there are always specimens which he can study and learn from.

I have given you some of the obstacles we have to contend against, to prove that, if we as a profession would unite and at regular intervals record our experience, and for the benefit of our brethren in remote places have a trade journal confined purely to professional photographers (there is an existing journal which we could utilise, and arrangements could be made to have a supplement to ourselves), and by reducing the subscription to the National Association of Professional Photographers to 5*s.* per year, so as to secure the united help of every photographer in the country, infinite good would ensue. Let it be observed that merely subscribing is not all the assistance required, the Association needs what it has not hitherto had, viz., the sympathy and advice of the many who are well able to give it. I put the question, Why cannot photographers do for themselves what every other trade and profession have done, viz., protect their own interests from injustices which are constantly cropping up? The desultory mode of fighting which some have adopted by firing off in the journals—though the motive may be good, is not dignified; better far contribute to our Association and, by your presence at our Councils, make the Association what it should be, then some practical good would result.

The Copyright Question.

There is much to be done, the copyright question ought to be taken up in earnest; Mr. Snowden Ward, ever ready with his fertile brain, and with a characteristic disinterestedness, has a scheme which, with modifications, ought to work well; he proposes that every photographer should have a trade mark (registered) which would protect our photographs from being made the plunder of every journal (whether respectable or otherwise) in the country, and also secure to us a better chance of keeping enlarging orders in our hands.

A select number of photographers recently met and arranged amongst themselves a method of protecting their copyright portraits by making a minimum charge of a guinea to all journals using them. I protested to several of their number that I thought they ought to include all photographers, and at their second meeting they agreed to make a further edition to their numbers by making a selection of some of our leading firms. I think it would have been better to have started the movement on a broader basis, and let all photographers share in the benefit; at any rate, though limited, it is a step in the right direction, and one which our Association are taking up for the benefit of those left out in the cold.

I will now speak on a question which has long been on my mind—Why have photographers let chemists, stationers (and I have heard of shoemakers), being agents for photographic stores? I know a man in a suburb of London who has increased his sales for our materials that he makes more profit by their sale than from his own legitimate business.

Photographers should become Dealers.

I strongly advise the photographer everwhere taking up an agency where amateurs abound; he not only will get the full percentage of material he uses, but, as the amateur is in our midst, and is inevitable, it is well to fraternise with him, and make the best of him.

Again, in the great fight for patronage, and the tendency to lower our price lists in order to do any business at all (and here I must admit some of the cutting businesses have been successful) we have been creating a false position, as we all know low prices and good work cannot run side by side, and must end in failure; but, meanwhile, our assistants in many cases have had to suffer. I have always held that an industrious, clever, well-paid assistant is by far away the cheapest. I don't mean the man who, on a busy summer's day, watches the clock strike the hour, forgetting the long winter fogs when no man can work. The rent and wages go on as usual. Young assistants must bear in mind that the success or non-success of a business can be contributed largely to by their activityand forethought. Then I argue that the young in our profession ought to make the question of unity their own, and rally round any effort set on foot to establish and well found an association that has for its object the elevating and maintaining of our profession on a higher level. Thus, by mutual work, both master and assistants will profit, though it will not be by paying the *5s.* subscription only, but by taking some of the responsibilities in hand.

The Training of Young Photographers.

Writing to the journals complaining of inertness is inexcusable, because here is an association which can be moulded, as you, with most of those on its Council, are men who ought to be set aside from active responsibility, and only engage in the social part of the work, dropping a word of sage advice now and again. The training of the young in our profession has been left mainly to outsiders. I admit apprentices have been taken by some, and this has not always been successful.

The Polytechnic Institution has been doing good work, though only about eight certificates of efficiency have been given yet, I may say large number of assistants are availing themselves of the excellent advantages offered. I have had interviews with the Secretary and Mr. Howard Farmer, who I am glad to see here to-night, and they would welcome any assistance we can give them.

I should be glad if to-night we could secure a large accession of town members so as to have a central working Council (so far it has been our difficulty having the Council scattered over the country, making it a serious matter to get together). The social element has been a great source of attraction and inducement. Our genial country friends it has always been a real joy to meet, and some good has been effected, but we have only touched the fringe of the work yet to do; but unless more interest and sympathy is forthcoming the whole, I am afraid, must collapse.

The Photographers' Benevolent Society next claims a few moments of your time. It is a Society which has existed many years, having gone through many vicissitudes. I have the more right to press it on your notice, as I took an active part in its inception. It has done much good in the past, and I may say at the present time it is more active than at any time of its existence. It has considerably extended its operations. It not only grants immediate relief in pressing cases to all assistants connected with the profession, but it grants loans in cases where an assistant would be benefited by help in going to a situation which the Society, through its labour bureau, may have secured for him. In some instances it has provided clothing for those needing it. Of course, strict inquiry is made to avoid imposition. Hitherto its funds have been augmented by subscriptions from the amateur and the trader. The professional, as a rule, is not wanting in generosity. I have known many instances where he has been called upon for help, and not in vain, so that I am sure he will not forget in the future the claims of this Society.

It has been the practice lately at all exhibitions and social meetings in London to make, say, a sixpenny lead, and may I suggest this to-night. The nimble sixpence is not much in itself, but, when added to, it may make a goodly sum. I may say the Secretary is present, and any young assistant willing to join may do so by giving his name and paying but his *2s. 6d.* yearly subscription either now or when convenient.

I thank you for listening so patiently to my disjointed address. I have expressed my individual opinions, and the responsibility in giving them rests with myself. Thomas Fall.

AMERICAN NOTES AND NEWS.

Tuition in Pressing the Button.—We read in the *Pacific Coast Photographer* that the services of Mr. Archibald Treat have been secured to write a series of articles on photography which "will gradually advance up into the higher branches." This is all right and as it ought to be, but is it quite wise in Mr. Treat to write, as he does, in the first of these articles: "I will confess to you at the outset that my own knowledge of chemistry is confined to the fact that chloride of sodium means common salt?" But Mr. Treat, who, says the editor of our Western contemporary, "is well able to handle a series of letters on photography," continues: "As with chemistry so with the mechanics of the art; technical knowledge is convenient, though not necessary to successful photography." If chemistry and other technical teachings are not to be considered necessary in a course of lectures or letters on photography, are these to be confined to the art of pressing the button, and getting some one else to do the rest? Is it not written, Who drives fat oxen should himself be fat?

Death of Mr. C. Gentile.—We are sorry to learn of the death of Mr. Gentile, editor, and we think, proprietor of the *Photographic Eye* of Chicago. The *Eye*, somewhere about twelve or fourteen years ago, began to devote a large portion of its space to photographic matter, and eventually, under Mr. Gentile's management, went in exclusively for photography. As a considerable period has elapsed since we saw the paper, it is possible that it has succumbed to the growth of rival publications. Mr. Gentile was a man of gentlemanly instincts, and was well up in all that concerned photography.

Protection against Piratic Publishers.—In view of a good deal of photographic piracy that appears to prevail in America, much as it does in this country, Mr. D. Bachrach suggests (in *Wilson's Photographic Magazine*) that a provisional protection be given for five years to every picture by stamping on the face or back with the words "provisional copyright," with the month and year of making the negative. In that time, if any should prove valuable enough for the regular copyright, this right should still be open by payment of the proper fees. In addition, infringement should be made liable to either criminal or civil prosecution at the option of the plaintiff. This would, in Mr. Bachrach's opinion, enable the producer of a valuable piece of work to get the kernel instead of only the shell. Now, he continues, for a pittance, the photographer has to use all his skill and effort to get a pleasing portrait, cabinet size, which is to be used by some mere copyist for enlargement and profit, without any permission from the photographer. Under such a law as that suggested he might have a chance to obtain something proportionate to his skill, unless a price was paid for the work in anticipation of such use of it. In this country the fees for registration are fortunately so low—one shilling, with a penny extra for a form, in contrast with those which prevail in the United States of America—that the same objections to making every photograph copyright do not hold. But the question to be settled first of all is the fundamental one, To whom does the copyright of a commissioned portrait belong? Legislation in both America and Great Britain is badly needed to settle this and other matters connected with photographic copyright.

Drying Gelatine Negatives.—In the magazine previously named, there is a translation from the *Photo. Nachrichten*, which we had no difficulty in recognising as an editorial article that appeared some months ago in The British Journal of Photography, on a quick method of drying gelatine negatives and which need not occupy more than five minutes. On this our American brother exclaims, "What a job for a busy photographer! In the United States we dry

our negatives at a hot stove in five minutes, after applying Helmold's fireproof hardener, long since for sale by all stock dealers." On looking up the directions for using this tanning fluid, we find that the plates have to be immersed in it for a period of from ten to fifteen minutes, which, with the subsequent drying of five minutes, say, nearly twenty minutes altogether, as against our five minutes, represents the percentage of loss of time sustained by the busy (!) American photographer. By the way, we are glad to learn that some photographers are busy, as American papers and magazines have led us to believe quite the contrary.

The "Photo-American."—We have to thank the publisher of the *Photo-American*, Mr. Charles H. Loeber, New York, for a bound volume of his beautifully illustrated magazine, which we always peruse with pleasure. But we have searched in vain among the illustrations for the portrait of the esteemed lady who edits that department entitled "Our Women Friends." Our album of photographic brethren (and sisters) has still some vacancies. Perhaps Miss Skeel will oblige.

HOW LENSES ACT.

[Photographic Society of Ireland.]

The first thing necessary to the proper understanding of how a lens acts is to get a proper idea of how light acts. Suppose we have any small body, that body sends out rays of light in all directions. Whether the light is from its own illumination, or is reflected light, matters not, the rays depart just the same. A bundle of these rays entering our eyes enables us to see the body, and, according to the character of the rays thus received, we form our opinions as to what the body consists of, and what is its shape and position. The thing to be remembered is, that every body capable of being seen, and every individual point on it, is sending out rays of light in every direction.

Now, suppose we have such a body, and we place a piece of tinfoil, pierced with a small hole, in front of it, we will find that some particular ray from the top of the body will pass through the hole and continue its journey. Now, if we intercept it by a screen, the ray of light will fall upon it, and form a little spot of light. If this ray be strong, weak, or coloured, the little spot will be strong, weak, or coloured in proportion. Now, the bottom of the object also sends one of its rays through the hole, which will also form a little spot of light upon the screen, which will be strong, weak, or coloured also. Every other part of the object also forms its spot of light on the screen, so that we have an endless number of little spots adjoining each other, and varying in intensity and colour according to the rays sent from the object, and this aggregation of little spots forms the image. This is, as far as I am aware of, the simplest possible means of forming an image.

There are two things to be noticed here: First, that the image is *inverted*—that is, turned upside down; and, second, that the screen may be at any distance from the pinhole. The effect of the distance being greater or less is to make the image larger or smaller. If the distance be twice as great, the image will be of twice the diameter, and consequently four times the area. To illustrate this, suppose the screen be six inches from the pinhole and the image of an object to fill a quarter-plate. If the screen be removed to twelve inches, the image of the same object will now fill a whole-plate—that is, four times the area for twice the distance.

It might be thought that the smaller the pinhole the smaller the little spots of light on the screen would be, and consequently the sharper the image; but this is not so.

If you watch waves in a heavy sea passing the end of a pier, you will see them approach straight, and most of them pass on straight, but those near the pier get bent inwards, and are deflected from their original course. Now, rays of light, which also travel by waves, act in a similar way, and, if the pinhole be too small, too large a proportion of the waves will be bent out of their course, and will sadly interfere with the sharpness of the spots formed by those rays which go straight.

The most suitable size of pinhole varies with the size of the picture, and the best results are said to be obtained with holes varying between $\frac{1}{30}$ of an inch and $\frac{1}{20}$ of an inch diameter. I recently saw a good way for estimating the exposure to be given with a pinhole without having to work out the angular aperture every time it was desired to make an exposure. The pinholes in this case were made of different sizes, say, $\frac{1}{30}$ of an inch, and $\frac{1}{20}$ of an inch, and therefore the same size that the stops *f*-32 and *f*-20 of a lens, of an inch focal length would be.

If using the $\frac{1}{20}$ of an inch pinhole, and one inch from the screen, we would be working at *f*-20, and consequently should give the same exposure as we should give with an ordinary lens working at *f*-20, neglecting the very small difference due to there being no glass to stop part of the light. If using the same stop, $\frac{1}{30}$ of an inch, at two inches from the screen, we should be working at *f*-40, and consequently would have to give four times the exposure required with a lens working at *f*-20. If using the same stop, $\frac{1}{20}$ of an inch, at three inches from screen, we should be working at *f*-60, and should therefore require to make the exposure nine times as long as for a lens at *f*-20. These are all tabulated here, and you will notice that there is a sort of family resemblance between them, and that the multiple is the square of the distance between pinhole and screen. Hence, to find the exposure with pinhole $\frac{1}{30}$ of an inch at any distance from the screen, you first estimate a the exposure required for a lens at *f*-32, and multiply it by the square of the distance betwen hole and screen.

Pinhole image are by no means so uncommon as is generally imagined. You will all have observed when walking through a wood on a sunny day a number of bright spots on the ground, and, strange, to say, these spots are all circular. They are simply pinhole images of the sun formed by interstices between the leaves. In very hot and bright climates, where dark blinds are used to keep out the glare, similar images of the road outside are occasionally to be seen on the ceilings, and indeed I have once seen a similar image in Dublin, but it was not good.

But a pinhole is not a good means of forming an image, it does not give good definition, it is very slow, you cannot see what you are taking, &c.; so we use something else, and that something else, is a lens.

Now, when light passes from a medium of a certain density into another of different density, it is bent, or refracted, as it is termed. Suppose we are looking at an oar which is partially immersed in water, the ray of light going from the end of the oar to the eye does not go straight, but takes a bent course, as shown. The eye cannot recognise that the light is thus bent, and we apparently see the oar in a higher position than it really occupies; every part of the oar which is under water similarly appears to be higher, hence the oar appears to be bent sharply at the surface of the water.

Light passing through glass at an angle does not go straight, and this has some effect upon lenses, especially thick ones; but how much it effects them I cannot tell you.

If a ray of light be sent through a triangular piece of glass, called a prism, it is bent on entering it, and again, on leaving it. Placing another prism underneath, and drawing the corresponding rays through it, we find that the outer rays meet in one place, and the inner rays at another, thus *partially* forming images at both places. If the angle of the lower part of the prisms be decreased, the refraction will be lessened, and the point where the inner rays meet will move outwards to the other point. There are other rays besides those, and, by altering the angle for them also, they can be made to meet at the outer point.

But, as the number of rays are innumerable, so also must the changes of angle be innumerable; or, in other words, the surfaces of the prisms must become curves, and such an arrangement is called a *lens*, and is such that all the rays from the object meet at a point, and consequently form an image there. If we take another object, the rays from which reach the lens parallel, these rays will come to a focus nearer to the lens at a point called the *principal focus*, while the first object and its image are at *conjugate foci*.

Now, a lens which will cause *all* direct rays to meet in a focus must be ground to a certain curve, which, I believe, is a parabola, and for important visual work I believe they are so ground. A photographic lens has also to bring the oblique rays to a focus, and this requires a modification of the curves. Again, lenses are ground in lathes, and it is comparatively simple to grind spherical curves, much easier than any any other curve, hence all ordinary photographic lenses are ground to spherical curves.

Now, I have just mentioned that a parabolic curve is necessary to bring all rays to a correct focus, and, as photographic lenses are not parabolic, but spherical, it follows they will not bring all rays to a correct focus; and this undesirable quality in a lens is called spherical aberration, and it may be greater or less, according to the skill of the maker, in selecting the glass and the curves, or it may be left there purposely, in order to gain some other advantages, which the maker thinks more requisite. All the good qualities cannot be put into one lens, so the maker has to make either the best average or the best lens for a spherical purpose.

Spherical aberration is useful for the advanced school of photographers and for portraiture. If a screen be placed about the focus, some of the rays will form a sharp image thereon, but the other rays do not, and the result is a certain blurring or softness, with no obtrusive sharpness anywhere to contrast with the blurring of other parts of the image, which may not be in focus.

Spherical aberration also gives a sort of false depth of focus, to which I shall refer later on.

Single lenses of long focus and large aperture have a large amount of this spherical aberration, and hence are considered by some to be excellent for portraiture. Mrs. Cameron, whose pictures were thought a very great deal of, used, I believe, a lens of this description. Dallmeyer makes a lens with an arrangement for diffusion of focus, which is merely an arrangement for introducing more or less spherical aberration at will.

When we come to make negatives for lantern slides, or for scientific work, or to preserve records, all the sharpness procurable is desired, and spherical aberration becomes a fault in the lens. Luckily, however, we have a remedy for it in the shape of a diaphragm, or stop, as it is wrongly called. If a stop which will exclude the extreme rays be placed before a

lens, it will be seen that the remaining rays meet more nearly in a point. If the stop be made smaller, so as to exclude still more outer rays, those remaining meet still more nearly in a point; so that, by making the stop small enough, an image can be had free from aberration, and consequently sharp. But a small stop cuts off a large amount of light, and, to make up for it, the exposure must be longer.

Now, the amount of light which can pass through a stop depends upon the size of the opening; and if we consider two stops, say 1" and 1½" diameter, the second, although of half the diameter, has only a quarter the area of the first. Hence, if the first requires one second exposure, the second will require four seconds; in other words, the amount of light admitted, and consequently the exposure, vary as the square of the diameter of the stop.

Now, from what I have said, if we have a single lens with a certain size stop in front, a certain amount of light will get through, and consequently it might be thought that the exposure would be proportional to the actual size of the stop, as the lens behind the stop cannot affect the amount of light which has passed through. This, however, is not the case; the amount of light passing through the stop is constant, but the amount of work it has to do varies with the focal length of the lens. If one focal length be double the other, the one image will also be double the other lineally, that is, it is twice as long and twice as broad, and therefore four times the area. The amount of light being the same, but the image with the bigger lens four times the area of the other, the illumination of the larger image can only be one-quarter that of the smaller, and therefore four times the exposure must be given in order to enable it to complete its work upon the sensitive film.

To equalise the illumination, and consequently the exposure, four times the amount of light must be admitted, and to do this requires a stop twice the diameter. This means that a half-inch stop in a six-inch lens will give the same illumination and exposure as a one-inch stop in a twelve-inch lens.

It will be noticed that each of these stops is one-twelfth of the focal length of the lens to which it refers; hence, stops which bear the same proportion to the focal length, or, have the same angular aperture, give equal intensity of light and equal exposure. The usual way of expressing this proportion is *f*-8, *f*-16, *f*-32, &c., and *f*-8 in one lens will give equal exposure to *f*-8 in another lens, no matter what form or focal length that other lens may have.

J. H. HARORAVE.

(*To be continued.*)

TER'S VIEW OF THE PHOTOGRAPHIC SALON.*

II.

Forewords commences thus: "Among the monochrome arts, photography seems to hold a place nearer to the copper-plate processes than to any others. Like them, it is a negative process, a plate being produced, from which positive impressions are afterwards made. As in etching, the original plate is made by chemical means; as in mezzotint and aquatint, the drawing is in tones, not lines; but, unlike any other process, this drawing is accomplished by the action of light without the interposition of the hand." To say that, "in etching, the original plate is made by chemical means" is a perversion of well-known facts. An etching is made on a solid plate of copper (*opaque*, of course, whereas a photographic negative is made on a *transparent film*), which is prepared with a highly polished surface, it is then covered all over with the etching ground, chiefly composed of wax, which is evenly distributed by the dabber. It is next blackened all over by the flame of a candle or other means. The artist, having previously made a careful drawing of his subject in black and white, makes a tracing of it, which he reverses, and with red transfer paper he makes a red outline of the leading parts of his picture; then he takes his etching needles of various thicknesses, and on the black ground he draws his picture, which is reversed throughout. He can judge of his progress by the coloured lines of the copper, which are seen through the black ground wherever his needle has removed it in making the lines. If it is to be what is called a "dry-point" etching, the lines are drawn more firmly and deeply, on the pure copper, without any ground, then it is ready for printing a proof. This is most suitable for small, light, and delicate work. If it is to be an ordinary etching, the lines need not be drawn so deeply; it is sufficient if, in the lighter parts, the copper is only scratched. The great advantage in this is that the drawing can be made with almost as much feeling and artistic freedom of touch as with pen and ink. The artist next places his copper plate in a flat dish containing about equal parts of nitric acid and water, and allows it to remain about five or ten minutes, according to temperature. The action is that the acid attacks the copper where it has been exposed by the etching needles, and deepens the lines in proportion to their strength. The black parts of the plate which are untouched by the needle are preserved from the acid. The object of biting in with the acid is to avoid the necessity of drawing the lines more deeply by hand, with less freedom. The etcher then takes the plate out, cleans off the black ground, polishes, and takes a proof in the printing press. The light parts are generally deep enough, and are covered over again with the etching ground or a stopping-out varnish, which protects the copper from the further action of the acid. The plate is again immersed in the dish for the purpose of deepening the lines which require to be darker; it is again proved, and the process is repeated again and again until the desired effect is obtained. The parts which are too dark are hammered up from the back and scraped down even on the surface with flat scrapers; the dry point is also used for finishing up the finer shades in the light parts. The value of an etching depends very much upon the artistic skill and feeling of the printer, and the manner in which he may leave the delicate *nuance* or soft tone of a shade of ink on the plate in addition to the lines. So important is the printing that some of the best etchers print their own proofs and keep their own printer. Etching is distinctly a branch of fine art; it is the direct product of the human mind and hand. A fine and important etching sometimes requires months and even years to produce. The above is merely a crude, general outline of the process, but it is sufficient to show the palpable absurdity of attempting to establish an analogy between the production of such fine-art work as this and the making of a photographic negative and print.

Mezzotint engraving is another fine-art process, and is produced by drawing and scraping on a copper plate; it is frequently combined both with etching and stippling. No mention is made of the beautiful arts of lithography and wood engraving. These also, in their highest development, are branches of fine art, and they bear a closer resemblance in their results to photography than etching does, although the processes are entirely different; they also are the direct product of the hand and mind of man.

In the second paragraph of *Forewords* we arrive at what is perhaps intended to be the great joke of the "Sahlong." Here it is:—"Although not entirely limited by what is presented before it, the camera is not much used to show its power of invention, being employed, generally speaking, to reproduce, more or less accurately, what actually exists before it at one time." We know the pretty poetical fiction about Galatea, where the sculptor fell in love with the beautiful young female form he had created in the marble, and the gods forthwith endowed her with life, and flowing blood, and soul, and brains; but I cannot credit the suggestion, thus gravely put forward, that they have ever bestowed any such gifts on a photographic camera, be it "Kodak," "Acme," "Snap-shot," or any other sort, to enable it "to show its power of invention," and I don't believe they ever will—not in our time, at least. But as we are here distinctly given to understand that the camera *does* possess the *power of invention*, and can show it when required, the authors must know of some new and miraculous "power of invention," in which the intervention of human brains is dispensed with altogether. Perhaps Edison has given them the wrinkle, or perhaps—as is more likely—this is only one of their little jokes; they seem to be of a very jocular turn of mind, do some of these gentlemen. In the course of my walk round the room I suddenly encountered a mysterious *something* in a little frame—No. 196, jestingly denominated *The White Robe of Winter*. When I looked I nearly lost my senses, and began to wonder where I was. I seemed to see a lot of small photographs cut into strips, all jumping over the top of each other in having a game at photographic leap-frog. My head seemed to swim; needles and pins seemed flashing through my eyes as they got dimmer and dimmer. Before it was too late I had still sense enough left to stagger to the nearest chair, into which I sank exhausted, stuck my hat over my optical department, and gasped for breath. When I "came to" I saw other people hurriedly rushing from "the accursed spot" with expressions of utter amazement and consternation. This, then, after all, may have been "the greatest curse of photography," this abominable freak. I gave it a wide berth; I never looked at it a second time. I would not enter that Sahlong alone at midnight—no, not for untold wealth (at least, not for less than half a sovereign down). I should expect to see "the thing" phosphorescent, the leap-frog business still going on, and goodness knows what else besides. Seriously speaking, the presence of "the thing" constitutes a daring assault on the public. I did not go to Piccadilly to have my organs of vision assailed in that manner.

I suppose it has been placed here by the Fuzzyites as an intimation or note of warning to this effect:—"This is what we are coming to! away with your old-fashioned prejudices—look out!" Terrible fellows these Fuzzyites—not content with blurring their own beautiful photographs out of all reasonable resemblance to anything in Nature or in art, they have actually set about blurring and obfusticating the very eyes of the visitors who come to look at them. This new photo-wooly-graphic school *may* (?) have a right to extinguish the finest characteristic qualities of their own art in the unworthy attempt to make a *mechanical imitation* of the mere technique, the outward husk, of quite a different kind of art, which is not homogeneous to theirs, which they cannot assimilate, yet may burlesque; but they should leave the eyes of the public alone. No. 171 is another of these absurdities. It is a little bit of very coarse paper, on which an ink bottle seems to have been upset, making an inky streak in the middle and blotting over the lower part. It is a poor joke—a mere affectation of eccentricity. The best work in the gallery is, of course, produced by operators who endeavour to secure the reflections of Nature in the finished style in which it is the natural function of photography to present them, aided by their own taste in the selection of subjects and the artistic manner in which they treat them. On the other hand, the least satisfactory works are those of clever operators, also with good artistic taste and feeling, who have got tired of the perfect work of

* *Concluded from page* 720.

Nature as rendered by photography, and prefer to waste their talent in the imitation of the work of other men — scene-painters and the painters of unfinished pictures, called impressionists—in which spurious imitation the mechanical labour involved in this branch of photographic manufacture necessarily destroys the finest and most valuable qualities of pure photography, some of which cannot be rivalled by any branch of art. There are pictures here printed on canvas, and even on raw cloth, which are far inferior to work which could be printed from the same negatives on suitable paper. *Cui bono?* More than a quarter of a century ago I used to see photographs on canvas by various methods, much superior to anything exhibited here. Then a large proportion of the photographs are sadly depreciated by the use of very rough drawing paper, which is quite out of proportion for small work; the delicate tones, sky, atmosphere, distance, water, and all the light parts in landscape are destroyed by the obtrusive, coarse texture; and in portraits the subjects are made to look coarse, and deeply marked with small-pox. That texture which is excellent for the reception of colour in the free, bold handling of large work is fatal to photography. *Photogravure* gives the very boldest rendering of the texture of pictures on paper which is perfectly smooth. It would be ridiculous for a scene-painter to imitate the delicacy and detail of a photograph; it is equally ridiculous for a photographer to imitate the breadth and boldness of scene-painting. *Suum cuique tribuito.* These photographic aberrations are the result of a desire to appear artistic—they are art pretentiousness. The late C. R. Leslie, R.A., a most refined and accomplished painter, in his *Hand-book of Painting* enunciated half a dozen words which should never be forgotten: "Pretence is the essence of vulgarity." PALETTE.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

On Friday, November 10, a meeting of the National Association of Professional Photographers was held at Coleman's Hotel, Henrietta-street, Covent Garden. The proceedings began with a Council Meeting in the afternoon, and this was succeeded by a high tea, kindly given by the President (Mr. Thomas Fall), and to which between thirty and forty sat down. At the conclusion of the repast the Chevalier Lafosse (Vice-President) proposed a vote of thanks to the President for his hospitality. This was seconded by Mr. W. Gill (Colchester) and supported by Mr. T. Birtles (Warrington). The President, in acknowledging the vote, hoped that no one would try to put down the Association by saying that it was not succeeding. It had already gone through a lot of difficulties, and he was certain that if they persevered, the future of the Association would be all right.

In the evening the President again took the chair at a general meeting of the Association, the attendance being extremely good. Among those present were Messrs. H. J. Whitlock (Birmingham), James Martin (New Southgate), Warwick Brookes (Manchester), Warwick Brookes, jun., F. Turner (Barnsbury), E. Howard Farmer, S. J. Beckett, J. J. Elliott, Frost (Loughborough), Spink (Brighton), Harold Baker (Birmingham), W. Gill (Colchester), Crosby (Sheffield), G. V. Yates (Sheffield), Hollis, W. P. Marsh (Bognor), W. T. Coombes (Plymouth), J. Martyn (Southwold), W. Davey, G. Pendry (Nottingham), Chevalier Lafosse (Ilfracombe), C. Lafosse, jun., Hogg (Ryde), R. Keene, jun. (Plymouth), D. J. O'Neill (Secretary), Mr. and Mrs. Snowden Ward, Mr. Thomas Bedding, and many others.

The President delivered an address to the Members [see page 733], after which an informal discussion on the aims and objects of the Association took place.

Mr. W. Gill said the Association had started too ambitiously, and he confessed himself rather disappointed with it. They were, however, he thought, coming to a healthier state. They need not be too anxious to do anything; if they only kept together, something would come to them to be done. As to the subscription (10*s.* 6*d.* per annum), he considered it should be doubled. He would rather let people apply for membership, which should be an honour, than endeavour to get new members.

Mr. Jas. Martin said photographers had a grievance against themselves and the public. The public wanted them to render their services at too low a rate, and did not accord them a due amount of consideration. They looked upon them as mechanics, and ignored the more or less number of years of experience which were necessary to enable them to turn out the work which the public required from them at so low a rate. He thought the causes of the grievance could be removed by imitating the Pharmaceutical Society in the case of chemists and druggists, and granting diplomas to photographers.

Mr. T. Birtles said the last matter had already been under discussion. It had been said that the public under-valued photographers' work. Well, he thought the public took them at their own prices, and if photographers sold work at low prices they had only themselves to blame for it. What was wanted was more unity amongst photographers. Where were the London photographers that night? That room would have been filled three or four times over if the London men had only come forward as they should have done. Some of the country photographers there had travelled hundreds of miles to be present to work for the benefit of the whole of the profession.

Mr. Snowden Ward advised photographers to undertake process work as a means of improving their positions.

Mr. R. Keene asked where the demand for process work existed in small provincial towns?

Mr. Ward quoted the case of Colne (Lancashire), which in his experience was sending to London to have lantern slides made.

Mr. Crosby alluded to a professional photographer in a small provincial town who had recently returned from London with considerable orders for lantern slides, &c. He was sorry the Association had not fulfilled the anticipations that had been formed of it.

Mr. E. Howard Farmer said that he was practically "born in a dark room," both his father and mother having been photographers, while he himself started in the profession on Ramsgate sands. His object in speaking that night was to try and remove the prejudice which existed as to the photographic teaching given by the Polytechnic. The object of that institution was to educate young photographers, and it included a large number of classes. If there were not enough young professionals to start the classes, amateurs were admitted at slightly increased fees. Photography had been rendered almost too easy by the introduction of dry plates. He strongly advocated professionals undertaking processes giving results which the amateur could not approach, and seconded Mr. Ward's suggestion that photographers should take up process work. There was an idea that collotype and other processes were very difficult, but that was not the case. As to the demand for that kind of work in the country, were not local papers frequently producing half-tone blocks? Then, why should not the local photographer supply them? There was nothing to prevent him. He thought also that photographers should supply a sitter with his finished photographs the same day as the sitting, and not keep him waiting two months. There was nothing to prevent the prints being delivered the same day. This would improve the business of the professional. In reply to a general chorus of inquiry as to how this was to be done, Mr. Farmer said it was actually being done.

Mr. Whitlock pointed out that a cabinet head took two hours to retouch and not a quarter of an hour, as Mr. Farmer said, so that he failed entirely to see how the prints could be so quickly delivered. No doubt Mr. Farmer was speaking of some quick process, of which they would be glad to have information.

Mr. Farmer said that the prints could be made by the developed-out, collotype or bromide processes.

The meeting closed appropriately enough by a demonstration of the new Paget Print-out and Development Paper by Mr. S. H. Fry.

ON THE PHOTOGRAPHY OF THE LUMINOUS RAYS OF THE SHORTEST WAVE-LENGTHS.*

The Source of Light.

THE purpose of the photograph demands a source of light rich in energetic rays of the shortest wave-lengths.

Only the light of electric discharges fulfils this condition. Hence I had merely the choice between the arc light and the light of sparks. As the latter promised the better result, all my photographs have been produced with spark light. For its production there was used a Ruhmkorff inductorium arranged for a maximum spark length of twenty-five cm. The primary current was furnished by six Grove elements. A Leyden jar, of 500 square cm. of external coating, was inserted in the track of the secondary current. In some cases an additional jar was introduced, and even occasionally two more.

For the region of wave-lengths 198·8 $\mu\mu$ to 185·2 $\mu\mu$, only aluminium electrodes are available, according to the observations of Stokes (*Phil. Trans.*, clii. p. 606, fig. 1, 1862) and Cornu (*Archiv. des Sci. Phys. et Naturelles*, III. Période, t. ii. p. 125, 1879), and merely for the wave-lengths 230·0 $\mu\mu$ to 198·0 $\mu\mu$, which I could not leave unnoticed, I used electrodes of zinc and cadmium. Zinc and cadmium deserve to be preferred to other metals, on account of the uniform distribution and relatively powerful action of their most refrangible rays.

The Photographic Procedure.

I use dry gelatine plates of my own preparation. Commercial plates are less suitable for the photography of spectra. When it is important to support as far as possible the optical power of the photographic spectral apparatus, where the sharpness of the image is a main condition, and also where a strong contrast in the intensity of the images of the lines is needed (photometry), the commercial plate is inadequate. It does not work intensely enough to assist spectroscopy to the extent of the modern dry plate.

The gelatine plate of my own preparation gives an intense and finely granular image on a ground clear as glass. The emulsion is relatively rich in silver iodide, containing, to 100 parts by weight of silver bromide, four to five parts of silver iodide. Its preparation is effected exclusively on

* *Continued from page* 707.

Eder's method, with silver-oxide ammonia (J. M. Eder, *Ausf. Hand. d. Photographie*, Part III., pp. 208–211, 4th ed., Halle, 1890), which I have used for more than ten years.

For developing the plates I use the soda-pyrogallic developer, and for fixation sodium thiosulphate.

The Photographic Proof.

Before proceeding to treat of photographic proofs, it may be remarked that I have long occupied myself in a complete manner with the photography of the ultra-violet region. My chief object was then the development of the graphic portion of the proofs, the most refrangible rays being overlooked. Only now and then, in a transitory manner, I have attempted to photograph the most refrangible lines of aluminium, but without success.

More favourable, then, with aluminium were the conditions of the most refractive lines of zinc, which precede the above-named aluminium lines in the series of the most striking rays of the ultra-violet. But, though I did not here operate unsuccessfully, the image which I obtained was always pale and indecisive.

The most refrangible lines of cadmium, which are still less deflected than most refrangible zinc lines, appeared regularly after a short exposure to light. But in intensity they were decidedly inferior to the neighbouring lines of smaller wave-length of the same spectrum.

In general the wave-length of the cadmium line No. 24 (226·55) formed the limit of my earlier photographs of the ultra-violet.

The above-mentioned most refrangible lines of cadmium, zinc, and aluminium have been marked by Mascart and Soret with numbers, and generally in spectroscopy, where the wave-lengths are not necessary, this system has come into use. I shall use it in what follows. Here follows a list of these lines with the Mascart-Soret characterisation, the wave-lengths as determined by Cornu (*Archives des. Sci. Phys. et Nat.*, III. Période, t. ii. pp. 121–126, 1879), and a design (fig. 1) taken from my own photographs.

Cd, No. 23, 231·35; No. 24, 226·55; No. 25, 219·45; No. 26, 214·41. Zn, No. 27, 209·88; No. 58, 206·10; No. 29, 202·43. Al, No. 30, 198·81; No. 31, 193·35; No. 32, 185·22. No. 28, No. 31, and No. 32 are double lines.

The photography of the cadmium spectrum formed the beginning of my investigation.

VICTOR SCHUMANN.

(To be continued.)

Our Editorial Table.

DR. ANDRESEN'S FIXING SALT IN BARS AND CARTRIDGES.

Arthur Schwarz & Co., Dashwood House, E.C.

WE have before now spoken of the convenience of the fixing cartridges issued by Messrs. Schwarz & Co. The latest adaptation of the idea is to compress the salts into small bars, which are handy in more senses than one, being less bulky than the uncompressed salts. The bars dissolve readily, the four ounce in thirty-six ounces of water, and so on, and thus an acid fixing bath is easily formed which answers perfectly. These fixing bars and cartridges should be popular.

TYRER'S PATENT POSTAL TUBE.

The Government Postal Tube Company, 70, Long-lane, S.E.

DOUBTLESS this tube would be found useful for the transmission of photographs, &c. It consists of an ordinary cardboard, towards one extremity of which is a hole which so allows of the disposition of the fingers that the contents of the tube can be withdrawn without damage to them.

"PHOTOGRAPHY AT NIGHT."

By P. C. DUCHOCHOIS, New York.

WELL knowing Mr. Duchochois' thorough knowledge of all that appertains to photography, we invariably read his writings with more than common interest. In *Photography at Night* he compresses into its 108 pages everything that can be said on the subject, giving, as might be expected, a primary place to magnesium, and full directions as to its employment in portraiture, including the arranging of the sitter, the lamps, and the developers to be employed. Printing by contact on bromide paper, enlarging, making lantern slides, and, indeed, everything that can be done by artificial light fall under the category of topics treated. The work can be obtained from the Scovill & Adams Company, 423, Broome-street, New York.

News and Notes.

PHOTOGRAPHIC CLUB.—November 22, Smoking Concert.

LEWISHAM CAMERA CLUB.—November 17, Exhibition of Members' Work.

WEST LONDON PHOTOGRAPHIC SOCIETY.—November 28, *Tele-photography*, by Mr. T. R. Dallmeyer.

BRIXTON AND CLAPHAM CAMERA CLUB.—Next meeting, November 21, *Skies*, by Mr. W. Thomas.

WIDNES PHOTOGRAPHIC SOCIETY.—Next meeting, November 22, at Bedford Chambers. Members' Lantern Slides.

LEEDS CAMERA CLUB.—November 23, Demonstration, *Lantern-slide Making by Reduction*, by Mr. C. Grayson.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—November 23 Demonstration, *Carbon Printing*, by Mr. Birt Acres.

THE Manchester Amateur Photographic Society's Annual Exhibition of Members' Work takes place on December 12, 13, 14, 15, and 16, 1893. Particulars of the exhibition manager, Mr. E. Ashman, 5 Bine Boar-court, Market-place, City.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—November 23, *Paget Company's Printing-out Paper, Toning and Finishing;* also special remarks and practical demonstration on *Part Print-out and Part Development of Image*, by Mr. S. Herbert Fry.

DEATH OF MR. THOMAS MAYNE.—We learn with great regret of the death of Mr. Thomas S. Mayne, which occurred at his residence, St. Hilary Brow, Wallasey, on Thursday, November 9. He was an enthusiastic and very successful amateur photographer, and was prominently connected with the recent Liverpool Photographic Exhibition.

SOCIETY OF ARTS.—The new Session of the Society of Arts commenced on Wednesday, 15th inst., when the opening address was delivered by Sir Richard E. Webster, Q.C., M.P., Chairman of Council. Amongst the subjects before Christmas likely to interest photographers, are, November 22, *Conformation of the Horse from the Artistic Point of View*, by Capt. M. H. Hayes; and, December 6, *An Artist's View of Chicago and the World's Fair*, by Mr. Frederick Villiers. Mr. Henry Blackburn will deliver a course of Cantor lectures on *The Art of Book and Newspaper Illustration* on Monday evenings, November 27, December 4, and 11.

HALIFAX CAMERA CLUB'S CONVERSAZIONE AND MUSICAL EVENING.—A thoroughly enjoyable entertainment was provided in the Mechanics' Hall, on Thursday night, November 9, by the Halifax Camera Club. The Club's headquarters are in Crossley-street, where meetings are held and experiments conducted. As Mr. J. Ingham Learoyd, the active President, explained to the large company which assembled, the object of the gathering was twofold: to interest visitors in photography and so draw new members; and also to add to the funds of the Club. The members had contributed a most interesting collection of apparatus and work produced by themselves. Mr. Thomas Illingworth, of Crown-street, furnished a large number of well-furnished photographs, many of large size; and Messrs. Thomas Illingworth & Co., of London, had also sent some charming exhibits. These exhibits, together with examples of electro blocks, photogravure, &c., the most improved cameras, and hundreds of pictures done by members, were exhibited on tables placed along the sides and across the room; while the tables were lit with lamps and decorated with plants, giving altogether a very pleasant effect. Members were present to answer questions and give any information desired respecting any of the objects or the curious processes of photography; and, more than this, a dark room had been fitted in which the work of developing, fixing, &c., was practically demonstrated. During the evening two exhibitions of magic-lantern views, also done by the members, were given. The proceedings were varied with selections of instrumental music by Mr. E. J. Walker and a party of friends, and songs by Mr. J. C. Marchant and Mr. A. Munday. Mr. C. Thomas ably officiated as accompanist. Mr. H. Walsh, of Thornleigh, Halifax, is the Hon. Secretary.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 21,071.—"Improvements in Photographic Shutters." Communicated by E. Hanau. H. H. LAKE.—*Dated November* 6, 1893.

No. 21,127.—"A Combined Spring Catch and Lock for Photographic Dark Slides." A. J. DEWEY.—*Dated November* 7, 1893.

No. 21,249.—"A New or Improved Method of Treating Canvas, Shirting, Silk, Paper, and like Substances for the Purpose of Rendering the same Sensitive to Light." Complete specification. G. J. JUNK.—*Dated November* 8, 1893.

No. 21,258.—"Improvements in Reflectors for Photographic Purposes. F. R. BOARDMAN.—*Dated November* 8, 1893.

No. 21,276.—"Improvements in Iris Diaphragms for Photographic Objectives, and in Mechanisms for using same as Objective Shutters." Complete specification. Commnnicated by the Firm of C. Zeiss. J. Y. Johnson.—*Dated November* 8, 1893.

No. 21,282.—"Improvements in Dark Slides for Photographic Cameras." J. E. Thornton and E. Pickard.—*Dated November* 9, 1893.

No. 21,371.—"An Improved Mount for Photographic Prints." H. F. Studds.—*Dated November* 10, 1893.

No. 21,379.—"Improvements in the Application of Electric Light for Photographic Purposes, and Apparatus therefor." A. G. Adamson.—*Dated November* 10, 1893.

No. 21,476.—"Improvements iu and connected with the Developing of Photographs." A. G. Adamson.—*Dated November* 11, 1893.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 20 ...	Camera Club	Charing Cross-road, W.C.
,, 20 ...	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 20 ...	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 20 ...	Hastings and St. Leonards	
,, 20 ...	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 20 ...	Richmond	Greyhound Hotel.
,, 20 ...	South London	Hanover Hall, Hanover-park, S.E.
,, 21 ...	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 21 ...	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 21 ...	Exeter	City Chambers, Gandy-st., Exeter.
,, 21 ...	Hackney	206, Mare-street, Hackney.
,, 21 ...	Keighley and District	Mechanics' Institute, North-street.
,, 21 ...	North London	Canonbury Tower, Islington, N.
,, 21 ...	Paisley	9, Ganze-street, Paisley.
,, 21 ...	Rochester	Mathematical School, Rochester.
,, 22 ...	Leytonstone	The Assembly Rooms, High-road.
,, 22 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 22 ...	Southport	The Studio, 15, Cambridge-arcade.
,, 22 ...	Stockport	Mechanics' Institute, Stockport.
,, 23 ...	Camera Club	Charing Cross-road, W.C.
,, 23 ...	Glossop Dale	
,, 23 ...	Hull	71, Prospect-street, Hull.
,, 23 ...	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 23 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 23 ...	Oldham	The Lyceum, Union-st., Oldham.
,, 24 ...	Cardiff	
,, 24 ...	Central Photographic Club	Coleman's Hotel, Henrietta-st., W.C
,, 24 ...	Croydon Microscopical	Public Hall, George-street, Croydon
,, 24 ...	Holborn	
,, 24 ...	Maidstone	"The Palace," Maidstone.
,, 24 ...	Swansea	Tenby Hotel, Swansea.
,, 24 ...	West London	Chiswick School of Art. Chiswick.
,, 25 ...	Hull	71 Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

November 14, Ordinary Meeting, Mr. J. Spiller (Vice-President) in the chair.

The following were unanimously elected members of the Society:—Messrs. G. Ardaseer, Thomas Bedding, Mrs. C. W. Ward, Messrs. J. C. Burrow, E. R. Cox, jun., A. W. Dollond, C. Hipp; Staff-Surgeon Preston, and Mr. G. Stevens.

Photography in Coal Mines.

Mr. Herbert W. Hughes, F.G.S., A.R.S.M., gave an address on this subject, saying that he was anxious to obtain some ideas which would help him in tackling this difficult branch of photography. The first series of mining photographs ever taken were by Mr. Arthur Sopwith, of Walsall, where the seam was from six to seven feet thick. The methods that were perfectly successful with Mr. Sopwith were useless with him (Mr. Hughes), where the seam was thirty feet thick. The only other coal-mining photographs taken, that he knew of, were by a Pennsylvania photographer; the remainder were metal-mining views. He did not wish to disparage metal-mining photographs, but nearly twice as much light was required to get the same result in a coal mine as in a metal mine. The soft, sooty variety of coal so often met with absorbed the light instead of reflecting it, whereas in metal mines it was reflected with comparative brilliancy. Alluding to the views in Cornish mines, taken by Mr. Burrow, and shown at the Exhibition, he said his remarks applied equally to them, the only difference being in the lighting respectively employed by him and Mr. Burrow. The latter gentleman used a triple magnesium flash lamp; he (Mr. Hughes) a Platinotype Company's lamp, supplemented by an Optimus 1000 candle power lamp. As to lenses, Mr. Burrow and himself tried lenses of the rapid symmetrical and portrait type. Mr. Sopwith's pictures had been taken with a portrait lens, but they lacked distinctness in objects comparatively distaut from the lens, which should not be. Both he and Mr. Burrow finally used a lens of Zeiss, Series III., while for certain purposes, the Zeiss lens being of rather long focus, he had obtained most excellent results with the Concentric lens of Ross. By using this lens at *f*-22, he found that it did not require double the illumination that the Zeiss did at *f*-18, as, with a short-focus lens, one could get so much nearer the object, and the conditions of lighting were so totally different that the light is reflected back, so that one obtained more of it. In fact, with a short-focus lens and a small aperture, he would burn the same amount of magnesium as with a long-focus lens of larger aperture. In this kind of work the difficulties to be overcome were not many, but they were hard. Smoke from blasting, a moisture-laden atmosphere, water from the roof, supplemented in coal mines by the presence of coal dust, which thickened the atmosphere and deposited particles on the plate, were among the few he enumerated. Condensation of moisture on the lens was difficult to get rid of. He obviated it somewhat by always carrying his lenses in his pocket. The opening of a door in the mine was sometimes sufficient to send in a stream of cold air, which would condense moisture. It was impossible to properly compose the picture on the ground glass. He generally arranged a series of lights round the principal objects, and moved the camera about until he obtained the principal points on the ground glass. Focussing had to be guessed at. Sometimes one could burn a length of magnesium wire for that purpose, but in the majority of cases, where it was burnt, it was impossible to take a photograph that day. The air should pass from the object toward the lens. He had found the light given by the Platinotype Company's lamp more actinic than that of ordinary flash lamps. One scene he took had 270 grains of magnesium burnt on it, and the same picture, taken from the other side, had ninety grains; the latter negative was, if anything, the better exposed. The only instantaneous photograph he had got underground was obtained by accident, the lamp stopping, as it were, in its flash. The negative turned out one of the best he had taken. For developer, he succeeded best with pyro and ammonia. He never over-exposed, and usually took from two to three hours to develop, subsequent intensification being always necessary. To show the difficulties of the kind of work, seventy per cent. of the plates he exposed were failures, and of the remaining thirty per cent. one-half only were good. Mr. Burrow said that, of his exposures, seventeen per cent. were good. In his (Mr. Hughes's) case, nine hours' work underground only produced three negatives, which, on development were valueless.

A large number of slides, by Mr. Hughes, Mr. Burrow, and Mr. Sopwith, were shown, illustrative of the difficulties of coal and metal-mining photography, as well as of points in Mr. Hughes's paper. He pointed out that, in pictures where very dark shadows occurred, secondary lighting of them was necessary, but care was to be taken in preventing direct light from the magnesium entering the lens.

Mr. Brough, as a mining engineer, bore testimony to the value of the photographs, which, he said, was hardly to be over-estimated. In teaching mining engineering to ordinary students, diagrams conveyed but a very imperfect idea of the state of things that such students would meet with. Such pictures would also make teachers and lecturers' work more interesting. To the geologist the question was also a vital one. One of the most difficult problems was, that which related to the formation of ore deposits; here the mining engineer and the geologist had to work haud in hand.

Mr. Graves (also an expert) said the mining photographs had given people a wonderfully good idea of what underground workings were like.

The Chairman asked for an explanation of the fact that one of the photographs had been taken by magnesium light while one of the men had a Davy lamp in use.

Mr. Hughes said an artist's licence had been taken. Mr. Sopwith (who took the photograph) had satisfied himself that there was no gas present.

Mr. Debenham, in 1865, had taken photographs in a Cornish tin mine, using wet collodion. As to an oxy-magnesium lamp being more advantageous than other flash lamps, magnesium burnt in oxygen was known to give more light than the same quantity of magnesium burnt in air.

Mr. Wilmer suggested that possibly condensation of moisture in the lenses might be obviated by employing an oil or water jacket.

After other remarks, Mr. Hughes briefly replied; and a vote of thanks was passed to him.

The Hon. Secretary gave a brief *resumé* of a paper by Mr. W. K. Burton, *On the Range of Light Impinging on a Plate during Exposure in the Camera;* and the proceedings terminated.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

November 9,—Mr. J. S. Teape in the chair.

Attention was called to a statement in the *Standard* of a gas bottle having burst.

Mr. Hodd said he could not accouut for it; if it had been a drawn steel cylinder, it would not have burst.

Mr. R. R. Beard showed a new saturator called the "Gridiron." He had tried it in various ways, but could not get any back snap. The saturator was packed with asbestos. He thought a weak point in it was that there was no means of stopping the evaporation of the ether when not in use.

Being a Lantern Night, slides were shown by Messrs. Bayston, Steiumetz, Hodd, Austin, Joy, aud the Hon. Secretary.

Brixton and Clapham Camera Club.—November 7, the chair being occupied successively by Mr. R. G. F. Kidson (Treasurer), Dr. J. Reynolds (President), and Mr. F. Goldby (Vice-Presideut).—The Club settled details with respect to the forthcoming Club Exhibition, which will be held at the Clarence Rooms, Coldharbour Lane, Brixton, from Thursday, January 25, to Wednesday, January 31, 1894, both days inclusive. There will be no open class, and prints will not be divided into classes, as on former occasions. It was decided to invite Messrs. Pringle, Cembrano, Colonel Gale, and Mr. Warnerke to act as Judges, giving them full power to award or withhold medals as may seem best in their judgment, the only restriction in the matter being that not more thau two medals shall be awarded to any one exhibitor. Full particulars and tickets may be obtained from any member of the Club or of the Hon. Secretary, Mr. B. E. Pinder, 7, McDowall-road, Camberwell, S.E. Subsequently a paper was read and a demonstration on *Enlarging* given by Mr. Butler, one of the members. An enlargement 12×10 was successfully made from a half-plate negative, the enlargement (on Morgan & Kidd's bromide paper) being developed with the following formula:—Amidol, 2 grains; sulphite soda, 24 grains; bromide of potassium, 1 grain; water 1 ounce.

Hackney Photographic Society.—November 7, Mr. T. H. Smith in the chair.—The following work was shown by members: Mr. Gosling some hand-camera shots; negative and print by Mr. Farmer, and photographs of pen-and-ink sketches by Mr. Beckett on argentotype paper developed with amidol, showing what an intense black this developer will give with a freedom from stains. Mr. Hudson showed a frame for enlarging portion of a quarter-plate negative with four-inch condenser of optical lantern, which had springs for holding the negative perfectly vertical during exposure. Samples of Elliott & Sons', "Barnet" lantern plate were distributed amongst the members, reports to be lodged at a subsequent meeting. A discussion upon Exhibition matters brought the evening to a close.

Lantern Society.—November 13, Annual Meeting.—The report and balance-sheet having been adopted, and the officers for the ensuing year elected, the set of 100 slides received from America were shown. These slides, which are of excellent quality and interesting subjects, are available for the use of members until May next, application to be made to the Curator, who will book dates in advance.

North Middlesex Photographic Society.—November 13.—In the regretted absence through illness of Mr. Horsley Hinton, who was to have addressed this Society, a general discussion on various topics took place. Mr. AVERY raised the question whether it was allowable, or true in art, to put a cloud into a landscape which was photographed upon a day when there were no clouds but a clear blue sky, or whether such a sky should be simply toned down to represent a blue sky. Mr. MARCHANT thought it would be justifiable to put in any cloud that was suitable, but it *must be* suitable. He did not think a painter would stand at putting in a suitable cloud if it helped the picture, and why should not a photographer? Mr. MATTOCKS had seen many paintings with a cloudless blue sky, and if a photographer could convey the idea of blue sky he did not know why he should not do it. But it was admittedly difficult, and the next best thing was to put in a suitable cloud. Mr. GOLDING thought that a sky slightly toned down would, at any rate, in some cases, represent blue sky, and instanced Mr. Calland's picture in the Salon *Orchard in June*. Mr. COX thought a man must carry in his mind the ultimate effect desired, and might do anything which would help him to gain that effect. Mr. BEADLE thought that anything which would tend to make a photograph more picturesque was justifiable. Mr. MUMMERY said it did not matter two straws whether clouds were present when the landscape was photographed or not. Would any particular cloud improve the effect? That is where a man must use his judgment, and he would put a cloud in if he thought it would be an improvement. He thought it possible to get the exact tone value of a blue sky if it were required. Mr. Cox objected that you could not get the luminosity of the sky. Mr. MUMMERY said you could not get the luminosity of the setting sun, but you could get a tolerably correct representation of it by lowering the tone of the picture to correspond. The discussion was continued by Messrs. Forbes, Wall, Pither, Cherry, and others, the general opinion being, that if a cloud would help the picture it might be put in.

Woolwich Photographic Society.—November 9.—There was a big muster of members at St. John's Schools to see the lantern slides that had been sent in for criticism. About 160 were passed through the lantern, after which a set of sixty slides taken by members of the Manchester Camera Club were shown, and greatly applauded. It added very much to the interest centered in this set that Mr. W. H. Dawson, who acted as lanternist, was forced to announce that he was a Manchester man, and, as the slides were put through, gave the audience a lot of information respecting the spots chosen for illustration.

Brooklands (St. John's) Photographic and Scientific Society.—Ordinary Meeting held on Tuesday, November 7, Mr. F. J. Simpson in the chair.—Nine new members were elected. Mr. M. W. THOMPSTONE delivered a lecture on *Photographic Printing Processes*, in which he dealt with the methods of working the platinotype, carbon, Obernetter, Nikko, silver, and gelatine-chloride processes, exhibiting several prints done by each process. The growth of photography was traced from the year 1835 to the present day, the latest improvement, and most interesting part of the lecture, being the development of partially printed prints on printing-out paper. After briefly describing the process, the members were treated to practical illustrations of this new method of printing. Several prints were passed round, the image in some being just visible, the length of exposure being stated as one-tenth of the full printing time. It was satisfactorily shown that, however much under-printed the image might be, it could not be told from a fully printed one after development. The prints were immersed in a solution of potassium bromide, the recommended strength being potassium bromide, one ounce; water, half pint; and left in for two minutes. Having been thoroughly washed, they were put in the developer (as recommended by the Paget Company), when the image gradually increased in depth until it resembled an ordinary print, care being taken that the prints were removed from the developer just before fully out. It was pointed out that a thorough washing was then necessary, as, if this was neglected, development would continue and spoil the print. The prints were then toned in a sodium acetate bath, and, when fixed, resembled in every way a print done in the ordinary way on printing-out paper.

Gosport Photographic Society.—The ordinary meeting of this Society, held on November 8, was devoted to an exhibition of lantern slides. They were greatly appreciated, especially the architecture and flower studies. Next meeting November 22, at the Society's rooms, 46, High-street, Gosport.

Newcastle-on-Tyne and Northern Counties Photographic Association.—The monthly meeting was held on the 7th inst., Mr. J. P. Gibson, President, in the chair.—The Chairman opened a discussion on printing processes, which was continued by Messrs. Auty, Arnott, Brewis, Brown, Park, Parry and Watson, who exhibited specimens of almost every process. The details of the forthcoming Exhibition were discussed and decided upon. Next meeting, November 21, exhibition of prize slides.

Widnes Photographic Society.—November 8, the President (Mr. V. C. Driffield) in the chair.—Mr. PRIESTNALL gave a demonstration on *Flashlight Photography*, and took a photograph of a group of their members by means of magnesium light. He used an apparatus with twelve lamps, each burning three grains of magnesium powder. The exposure was made on a Marion half-plate, Hurter & Driffield actinograph speed No. 70, using a Ross rapid symmetrical lens, eight inches focus, working at *f*·8. The plate was developed with pyro and ammonia, fixed, and handed round for inspection. It turned out to be a good negative, and Mr. Priestnall promised to bring some prints of it to the next meeting. The following questions were discussed:—1: Do rapid plates take longer to fix than slow ones? If so, why? The general opinion was that the answer to this should be, No; and it was not at all safe to assume that fixation was complete immediately on the disappearance of colour from the back of the film; and it was advisable to allow plates to remain in the hypo at least fifteen minutes, in order to ensure all the silver salt being dissolved therefrom. 2: In developing plates out of the same box, some take longer to fix than others. Is this a sign of over or under-exposure? The answer to this was: Exposure does not affect the time in fixing; but some plates were more thickly coated than others, owing to the glass used not being perfectly level, and it took longer to dissolve the silver salt from those. It was agreed that next meeting be reserved for the exhibition of members' lantern slides.

Dundee and East of Scotland Photographic Association.—The second general monthly meeting of the Session was held in Lamb's Hotel, Dundee, on Thursday, the 9th inst., Mr. J. D. Cox (President) in the chair.—After routine business, Dr. J. K. TULLOCH read a paper entitled, *Remarks on Hand-camera Work and Hand Cameras* [see next number]. Mr. FEATHERS, curator of the Society's album, drew attention to his difficulty in procuring prints for the album from the members, and hoped that in future they would conform to the rule of contributing at least one print each. The prizes for the best pair of prints taken at the Association's excursions during the past season were awarded to—1st, V. C. Baird; 2nd, Rev. E. J. Gough; and, 3rd, J. Thow.

Photographic Society of Ireland.—November 10, Mr. MORGAN gave a demonstration on the new developers, *Amidol, Metol, and Glycin* (Hauff). Some negatives were developed, and proved very satisfactory. Mr. Morgan also exposed a few lantern slides in the presence of the members, and produced first-rate results by the use of both amidol and metol respectively. The demonstration excited a deal of interest, and terminated with a free discussion on the subject. Several new members were elected.

FORTHCOMING EXHIBITIONS.

1893.	
November 17–25.....	*Stanley Show (Photographic Section), Agricultural Hall. Manager, Walter D. Welford, 57 and 58, Chancery-lane, W.C.
,, 20–25.....	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18–Jan. 22, 1894	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE QUESTION OF COPYRIGHT.

To the EDITOR.

SIR,—I have lately heard that it is not necessary to register a photograph in order to secure the copyright. To state a case:—I ask a popular clergyman to give me a sitting for his portrait; he consents, and I only send, say, half a dozen cabinets for his acceptance. I am told that the copyright of such a portrait is vested in myself alone, and no one has any legal right to copy it without my consent. You will see no money passes between us, and the clergyman's coming to be photographed is tantamount to his consent. I shall be glad to know if this is absolutely correct.

I have also been informed that it is now the custom of many photographers in London to charge twenty-one shillings for granting permission to any publishing firm to reproduce any copyright photograph. Is this also correct? I hope it is, for the barefaced way one's photographs are reproduced without permission demands some kind of check, and the photographer is only within his rights to demand a fee. I have had scores of photographs copied, and they think they are very generous if they purchase a photograph at two-thirds the price and attach your name to the reproduction.

Some editors of papers are honourable enough to send a fee for photographs supplied, even unasked; I have met with two such instances lately. This is as it should be, and promotes a much more healthy feeling. Kindly reply in your next issue.—I am, yours, &c.,

London-road, Ipswich, November 12, 1893. W. VICK.

FILMS *VERSUS* PLATES.

To the EDITOR.

SIR,—I notice in the JOURNAL of the 10th inst. a letter by W. J. Stillman, and am not going into the question of "Films *versus* Plates," as your readers all know by this time I am in favour of films; but I must object to the *last few* lines of his letter, where he says, "But a photographer who depends on amidol for a rapid work can have only a *limited* knowledge of what can be done."

Now, I strongly object to these remarks, as I have written, said, and proved that amidol, when used by one who knows how to use it, is the best developer I know for rapid work, and I am sure both you and your readers have samples of really instantaneous work done by me and developed with amidol, that prove what I have said about that developer is right. As to whether I work it at the $\frac{1}{50}$ or the $\frac{1}{100}$ cannot matter a cent as long as I am able to catch the object moving so as to be sharp, and as to one having a limited knowledge of developing because he uses amidol, well, such a remark I call absurd.

I do not say that other developers are not as good in the hands of those who can use them, as every one has a right to have his own opinion about such matters; in fact, my opinion is, it is not the developer, but the man who uses it, as one used to development ought to be able to get good results with any developer. The only reason I have noticed these remarks are that I have written one or two articles for the papers and Year-books on amidol, and do not fancy being told that I have a limited knowledge of what can be done.

Mr. W. J. S. is quite right to use any developer he may fancy; but certainly he must give others that right without making such remarks.—I am, yours, &c., A. R. DRESSER,

Springfield, Bexley Heath, Kent, November 11, 1893.

THE BURSTING OF AN OXYGEN CYLINDER.

To the EDITOR.

SIR,—I notice in to-day's paper that another lamentable fatal accident has taken place with an oxygen cylinder, and I wait the arrival of a Bradford paper for fuller details. The report that the cylinder was of cast iron is surely a mistake; but, if a *steel* cylinder exploded with the shock of a fall of only two or three feet, it is high time that the Board of Trade, the oxygen companies, the merchants, and the users of cylinders defined the best and safest method of handling these dangerous goods. I called a meeting of my staff to discuss the matter to-day, and it was suggested the cylinders might be cased in leather, stout American cloth, or thick canvas sacking, and delivered home on a barrow instead of per bearer.

And yet our meeting was no sooner over than seven cylinders were delivered from a lorry at our goods entrance, and laid down naked upon the hard Whinstone kerb.

I maintain that the highest intelligence should be directed to the minimising of risk to those called upon to handle such goods, who, like the unfortunate messengers, carters, railway men, and others, may be quite ignorant of their dangerous nature. It would be interesting to know whether there have been more accidents since the introduction of compressed oxygen than with that made from a retort and filled into gas bags.—I am, yours, &c., ARTHUR SEET.

November 9, 1893.

MR. WOODBURY AND THE PAGET PROCESS.

To the EDITOR.

SIR,—In reply to Mr. Wilson's letter to you regarding my publication of the Paget method of developing printing-out papers, I hasten to set right the evident misunderstanding.

At the time the matter was divulged to me I was making experiments in the same line myself, and had already succeeded by a preliminary conversion of the free silver into chloride and iodide, using the Paget lantern-plate developer.

I was then informed of the method devised by Mr. Wilson using bromide of potassium. This I found superior to my own method, but was asked not to divulge same, nor have I ever done so until the publication of Mr. Wilson's method in a recent issue of your magazine, when I immediately wrote an article on the subject, which appears in the issue of the *Photographic Times* now in the press. I send you an advanced proof herewith, and you will see that I give the fullest credit both to Mr. Wilson and the Paget Prize Company.

In the formula I gave in the *Photographic Times*, and to which Mr. Wilson refers, an iodide is used. A similar process I tried nearly eight years ago, the only difference being that I substituted the Paget lantern-plate developer for an old ferrous-oxalate one. I am willing to give every credit to the Paget Company for the perfection of a simple and effective method of development, far superior to anything else I know.—I am, yours, &c., WALTER E. WOODBURY.

New York, October 28, 1893.

MR. H. P. ROBINSON AND EXHIBITIONS.

To the EDITOR.

SIR,—The letter from Mr. H. P. Robinson in the BRITISH JOURNAL OF PHOTOGRAPHY, of the 3rd inst., raises an important question relating to Exhibitions, and that is, the right he assumes for a small body of photographers to dictate to societies and exhibition committees throughout the country the rules and conditions under which their exhibitions should be conducted; coupled, too, with the suggestion concluding his letter, that those that are not arranged in conformity with the regulations that these men approve of for the time being, should be boycotted, that the ever-increasing army of photographers should be persuaded to prevent such exhibitions being successful by refusing to contribute to them.

Surely, it is time that those who have the management of Exhibitions, and, still more, the far larger class, those who contribute to them, should protest most strongly against the arrogance of a clique presuming to regulate in such an arbitary manner all competitions, and, if consenting to officiate as Judges, overriding at their own will the published conditions under which photographers have been induced to contribute.

Mr. Robinson's reference to the Photographic Society of Great Britain as an example to follow is, at the present time, singularly inopportune; its recent exploit in medal awarding could only be quoted as an instance of what photographic societies *should avoid at any cost* if they have any regard at all for the progress of photography, either pictorially or technically. What would Mr. Robinson, or other leading workers, have said if such a production as *Watching and Waiting* had been awarded a medal at any suburban or provincial society's exhibition, even had it been in a novices' class. In such an instance, instead of estimating work fairly on its merits, the "judging" seems to consist in the judges airing their eccentricities, and passing over meritorious work in order to favour that that is treated according to their peculiar prejudices. There are many men whose views are so warped and distorted by the extremes to which they carry their "fads," that it is an absolute impossibility for them to form a fair judgment on any work submitted to them.

Judging at exhibitions is a most difficult and delicate task, and no one is more anxious than the writer than awards should only be given for thoroughly good work; but how can Mr. Robinson expect photographers to respect the decisions and deliberations of these twenty-four when they marked by such glaring inconsistencies? What one will extol as the only true faith in matters artistic, others will consider rank heresy, and even the same man will not always hold the same opinion for twelve months at a time. There are many, who, if they are not so skilful as photographers, are still equally competent to arrange conditions and rules under which work shall be accepted for competition. The capricious awards and decisions of many of these twenty-four whom Mr. Robinson considers should lay down the law for all societies, *are far more in need of reform than the conditions and rules of the exhibitions that they condemn.*

The remark that "the hunt after medals is chief amusement for which recent exhibitions seem to be instituted,' might with greater propriety have been omitted from the letter of a man who has taken so many medals as Mr. Robinson has done; considered in conjunction with his view that the "best exhibitions are those that offer no medals," it would seem that they who have taken scores of medals in the past are those who would have medal awarding abolished, as they are unwilling that the coming generation of photograpers should share with them the honour and distinction that medals unquestionably give, although the conditions of success are increasingly difficult each year, by reason of the larger number of men producing throughly artistic work. Nothing teaches so much as to see our own work side by side with that of others. Without medals most suburban and provincial exhibitions would not attract the good work that they frequently receive, and many would never have the opportunity of seeing and learning from the productions of those who excel in pictorial photography.—I am, Sir, yours truly,

Dacre House, Arundel-street, Strand, W.C. HENRY W. BENNETT.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—Will you kindly allow me to say a few words in reference to a subject which has been treated in a strangely unjust manner? I allude to some of the awards in the late Photographic Society of Great Britain's Exhibition, and I particularly allude to Nos. 55 and 254.

To me it seems altogether strange that so many should get hopelessly fogged in reference to these awards, and that so many otherwise intelligent persons cannot see that the ordinary canons of photography are in these cases entirely inapplicable, and consequently improperly applied. The absurdity of some of their conclusions ought at least to make them pause and consider whether there is not some error in their premises, which, if true, would make the Judges of this Exhibition not only grossly incompetent, but simpletons and fools into the bargain. Dare these gentlemen draw such a corollary as this? I think not. Even the most reckless amongst them should certainly hesitate to apply such conclusions to men whose great merits have shed so distinct a lustre upon the profession. This being the case, it is certainly amusing to read the effusion over the *nom-de-plume* "Free Lance" in your last issue. This gentleman

simply justifies his assumed name, for he applies with singular felicity those principles to writing which governed the actions of that historically notorious personage. Free he most certainly is in reckless assertion, without the slightest attempt to justify it by legitimate criticism or a fair statement of facts. He certainly displays no modest diffidence in slashing at the adjudicators' feelings, or in passing his cock-sure judgment upon their decisions. Yes, certainly, photography would become a laughing stock for the whole world if its dignity and character depended upon such champions as this; but, thank fortune, there are too many good and true men in its ranks who can take good care of its well-being without the assistance of rant or the reckless display of ignorance of the fundamental principles of honest criticism.

Allow me also to make some remarks upon No. 254. I found it, to my surprise, a modest, unassuming, and refined picture, one in which the principles of art are as successfully carried out as the materials and controlling conditions will permit. I found neither dirtiness, ignorance, nor want of experience displayed in its manipulation. On the contrary, I found clearness of tint with knowledge in its lines, composition, and treatment of its light and shade, in short, a well-conceived and harmonious picture completely representing its title—

> "*Watching and Waiting*, weary and sad,
> Hope seems departing in dim twilight clad.
> Yet still she sits watching upon the cold stone,
> While moonbeams seem mocking that true heart so lone."

You can, therefore, infer from what I have already written that I approve the decisions of the Judges, and, in addition, I must also say that I admire the moral courage which can treat with disdain those critics whose ignorance and conceit are so much more conspicuous than their knowledge, discrimination, and taste.

In conclusion, let me congratulate those gentlemen who have inaugurated and carried to a successful termination the Salon Exhibition. They have demonstrated that art wedded to photography is now a recognised fact, with full certainty that no man can sunder them. Let me also advise those who have so thoughtlessly assailed some of the awards in the Photographic Society of Great Britain Exhibition to gain a little knowledge of that art. It will save them from such folly in the future, and will, to a considerable extent, atone for their injustice in the past.—I am, yours, &c., A. R. E.

November 13, 1893.

BRISTOL EXHIBITION.

To the EDITOR.

SIR,—Anybody who wants to improve the world, or contribute his little mite towards that doubtfully desirable object, should proceed very cautiously, or unlooked-for effects may be produced. In my desire to see some reformation brought about in provincial Exhibitions, I wrote what I thought was a very mild and innocent letter, explaining why I could not exhibit, to the Hon. Secretary of the Bristol Exhibition, and it seems to have sent that official into a "ten-knot gale of royal rage" at sight, and he appears to be so pleased with his reply that he not only sends what he apparently mistakes for an answer to the two papers in which my letter appeared, but also to another, whose readers must wonder what it is all about. He does not give me the least credit for honesty of purpose, but, "in anger insignificantly fierce," accuses me of animus, misrepresentations, and evident and petty desire to damage the Exhibition, also of discourtesy, a desire to coerce others, and to play "Sir Oracle." Brave words, but not convincing. They neither confute my letter, nor prove anything, except, perhaps, the ten-knot gale to which I have alluded. I still maintain that, if photography is to be advanced, the best work must be attracted to Exhibitions, and that will never be done while exhibitors find medals are so numerous and cheap as to afford no incentive to excel, and so easily won that no lasting value can be placed upon them. The ease and number attract mediocrity, and the diminished value produced by lack of rarity repels the best workers.

In a mysterious paragraph Mr. Bond refers to some correspondence at a former Exhibition, which he says I must remember. I am afraid he places more importance on this correspondence than I do, for I have only a dim recollection of something of the kind with somebody at Bristol, but I don't think it was Mr. F. B. Bond. On referring to my register of pictures sent to Exhibitions, I find I exhibited at Bristol ten years ago, and was awarded a medal for a *genre* picture for a landscape photograph. It is possible I may have called attention to the absurdity, just as I am now calling attention to the absurdity of offering a medal to about every other exhibitor.

I must admit I overlooked the part of a paragraph empowering the Judges to withhold medals for want of merit; in the prospectus it is mixed up in a paragraph about the Hanging Committee, and escaped my attention.

Mr. Bond accuses me of discourtesy in not intimating to him that I intended to publish my letter. I do not see the discourtesy (it was not *his* letter I was publishing without his permission), but I ought to have seen the necessity of calling his attention to it if I may infer, from a few words in a letter I received from him, which he must excuse me for quoting, that he never reads the photographic journals. He says, "I don't remember to have seen the document you refer to as drawn up by the Photographic Society of Great Britain." This was the "Rules and Recommendations" which appeared, and were commented upon, in every paper. Obvious moral: The photographer who neglects the photographic press is liable to get into trouble.—I am, yours, &c.,

Tunbridge Wells, November 10, 1893. H. P. ROBINSON.

To the EDITOR.

SIR,—Mr. H. P. Robinson's letter of the 3rd inst. is, to my mind, nothing more nor less than a direct and premeditated attack on the Bristol Photographic Society and its exhibition. Mr. Robinson's only reason for writing seems to be that, as the rules are framed, he cannot exhibit any of his unmedalled work, and therefore he wants to try and stop other workers from sending in exhibits.

To hide this reason, he makes the conference rules a cloak.

If Mr. Robinson had such great faith in the conference rules, why did he not further back them up by exhibiting some of his pictures at Pall Mall this year? Mr. Robinson must not forget that, in years gone by, he was just as eager to gain awards, and sent to quite as many exhibitions, as the so-called "*pot-hunter*" of the present day.

Possibly Mr. Robinson's "*bushel basket is full now*," and therefore he does not want any more.

Perhaps he would have been satisfied if they agreed to place his exhibits in the centre of a wall and surround them with the less fortunate workers, so that his work would have been shown to the disadvantage of others, as notice the late exhibition held at the Dudley Gallery.—I am, yours, &c.,

Central Photographic Club, Coleman's Hotel, Henrietta-street, Covent Garden, November 14, 1893. JOHN H. AVERY.

YELLOW STAINS ON P.O.P.

To the EDITOR.

SIR,—We gladly welcome Mr. Pentney's valuable contribution to our information on this subject, and, with his permission, we will give it the wide-spread circulation it desires by embodying it in the next edition of our pamphlet on the working of P.O.P.

We confirm Mr. Pentney's view that Mr. Bothamley was not asked to investigate the causes of staining after fixing. We limited the scope of Mr. Bothamley's inquiries into the matter, because all the correspondents who wrote on the subject had found the staining occur only in the earlier part of the manipulations.—We are, yours, &c.,

THE BRITANNIA WORKS COMPANY, LIMITED.

Ilford, London, E., November 10, 1893.

OPERATORS AND THEIR SPECIMENS.

To the EDITOR.

SIR,—With reference to a letter in last week's JOURNAL by an operator whose specimens have not been returned, I may say, as an employer, that on advertising some time back for a retoucher, I had some forty or fifty replies, and among them about four did not enclose specimens with their letters, but in a separate package by Book Post, with no name or indication of who the sender was. As several came from London, the post-mark was of no service as a guide, and I had nothing to do but guess at the handwriting. It is very possible that some of these went wrong, but I never heard. Assistants in want of a situation might do well to remember that a photograph of themselves with the word "self" marked at the corner does not convey all that is needed to identify their work from others.—I am, yours, &c., ERNST LAMBERT.

32 *Milson-street, Bath.*

THE ACTION OF A LENS SIMPLY EXPLAINED.

To the EDITOR.

SIR,—Were it not that Mr. Taylor's letter (published in your issue of October 20) is an unjust and ungentlemanly attack upon me, I should be inclined to smile at the ridiculousness of his statements.

I entirely deny having copied Mr. Taylor's article (the use of his diagram I have already explained), and challenge you to reprint the two articles in *full* in your magazine, and take the opinion of your readers. The idea of comparing a sentence here and there, and taking such ones as, "The angle of view of a lens is determined by the relation of its focal length to the measurement of the image it can best define," is absurd in the extreme. Does Mr. Taylor claim any originality for this statement? That my own sentence is almost the same can only be regarded as a coincidence—and not a very extraordinary one either, considering it is one of the fixed laws of photographic optics, explained in every work upon the subject.

Then, again, the sentence, "As sound is transmitted by a wavelike motion of this luminiferous ether." The comparison of sound and light-waves is surely not original with Mr. Taylor? He will find it in almost every elementary book or article on light.

With regard to the explanation of the reflection of light from opaque bodies, Mr. Taylor's comparison is, to say the least, very unfair. He takes half of one of my sentences and compares it with a whole one in his own article. The true comparison is as follows:—

Mr. Taylor's Article.	*Supposed Plagiarism.*
A surface capable of being seen must be, to some extent, rough. The roughness acts in this way: Waves of light meeting the surface and reflected from it are broken up by the rough particles. Each projecting particle becomes a centre, from which reflected waves of light spread out in all directions.	Waves of light meeting the surface of an object, provided it be to some extent rough, are broken up. Each particle becomes a centre, from which waves of light are reflected and spread out in all directions; each point becomes, as it were, the stone in the water, sending out waves of light which reach the eye, where they are brought together again, and condensed to a similar point on the retina; and in this way we see the object.

It will be seen that I am working on a different illustration altogether, having previously compared the light undulations with those produced on a still pond when a pebble is thrown in, an illustration by no means new. Your readers will, I hope, at once see the injustice of the comparisons.

I will not take up more of your space, but only ask you, in justice to myself, to print the two articles in parallel columns *in their entirety*, and let others judge of the truth of your or Mr. Taylor's accusations.

With regard to the language and epithets Mr. Taylor has thought to make use of, I will say nothing, but try, at least, to remain a gentleman.

—I am, yours, &c., WALTER E. WOODBURY.

New York, October 30, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange Watson's Premier 15×12 three double backs, for Watson's Acme 12×10 three double backs.—Address, H. L. MOREL, Market-place, Nottingham.

Wanted to exchange magic lantern by Newton & Co., with four-wick lamp and screen, also sixty slides—subject, Holy Land—and a few comic ones, for a whole-plate portrait lens by a good maker.—Address, D. G. THOMAS, 51, Hope-street, Wrexham

Will exchange quarter-plate camera, lens, double dark slide, and tripod for magic lantern with four-inch condenser.—Address, W. H. HEMING, East Cliff Studio, Whitby.

Dallmeyer rectilinear lens whole-plate, complete, list price, 6*l.* exchange for portrait lens half-plate or whole-plate by good maker. Address A. J. TILEY, 203, Newport-road, Middlesbrough.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

A. W. CARTER.—Messrs. Ross & Co. will shortly issue the Goerz lenses.

NON PLUS.—There are no plates made by Pettit in the market. The "Sandell" plate is probably what you require.

GEO. B. TURNER.—A parabolic reflector may be used for ordinary lantern exhibitions, but should never be employed for photographic enlarging.

PYRO.—The cause of the stains is that the prints were washed in water that was not clean, probably in a dish contaminated with hyposulphite of soda.

C. C. C.—In quoting the weight of cameras and slides, it is not usual for makers to include in the weight the plates they are to carry. If the apparatus weighs only what the catalogue states, there is no cause for complaint.

S. W. E.—We fear the N. A. P. P. will not assist you, as you are not a member. Even if you were, we doubt if it would be otherwise, as we have never heard of their taking proceedings against any one for infringement of copyright.

T. W. STILES.—Enamelled iron dishes may be used with safety for toning prints provided the enamelled surface is perfect. If it is not, the gold will be precipitated. Porcelain or earthenware dishes are far more reliable for gold solutions.

J. P.—The portraits are fairly good as portraits, but they are spoilt as pictures by the light background, which is about the same tint as the faces. They would have been better also if less front light had been used, so that they would have had greater rotundity.

T. W. C.—Although the orthographic lens is a very good one for many purposes, it has but a very small commercial value. If you advertise it at the price you suggest, it is very doubtful if you will obtain a purchaser. Indeed, it is doubtful if you would at half that price.

C. J. EMENY.—By removing the Steinheil lenses from their present mount, and setting them in one shorter by half an inch to an inch the area of illumination will be increased to the dimensions required. A small stop will have to be employed. Do not tamper with the original mount.

W. JENKINS.—All that has been published on chromo photo-mechanical printing has appeared in our pages from time to time. No work specially devoted to the subject has been published as yet, and we doubt if one will be at an early date, as most workers—that is, those who work commercially—treat the subject rather as a trade secret.

A ROGERS.—It would certainly be illegal to make lantern slides from music, although it may bear the intimation that the song may be sung in public without licence. This does not give permission to make copies of it; indeed, on most works it is stated that making copies will be an infringement of copyright, and will be dealt with as such.

H. T.—After starch has been made a few days, it becomes thin, so your experience is not unique. In that state it should not be used, for it has then lost much of its adhesive properties, and, furthermore, it is likely to act injuriously on the prints. Starch paste, when used for mounting photographs, should be made fresh the day it is used.

B. RENNIE.—If the steel plate of the rolling press is as rusty as described, we imagine that it will be better to obtain a new one. When rust has eaten very deeply into a plate, it will frequently cost quite as much to have it repolished as to purchase a new one. If, before the press was stored away, the plate and rollers had been coated with beeswax, they would not have been affected by the damp.

A. BENTON.—The best extemporary light for taking portraits at the fancy ball is either the magnesium or the aluminium flashlight. If the building is illumined by electric light, cannot you arrange to have an arc light at your service? With that, and one or two extemporised reflectors and screw, more satisfactory results could be obtained than with the flashlight, and the sitters would feel more at ease.

JOHN DICKIE.—1. Zinc plates ready for use may be had from such firms as Winstone & Co., Shoe-lane, E.C., or Hughes & Kimber, West Harding-street. 2. The former firm supply the paper. No cement is required to attach the transfer ink to the metal, the pressure alone is sufficient. 3. Fine plaster of Paris, suitable for the purpose, may be had from any of the stereotypers, and plumbago from those who supply electrotyping materials, or philosophical instrument sellers.

F. J. QUICK.—1. Ordinary sheet glass will suffice. Extra white glass may be had at an additional cost without corresponding advantage, and it is liable to change colour. 2. Yes, if the curtains be thick enough. 3. Quite a matter of convenience. 4. No. Much on the subject may, however, be found in the back volumes of the JOURNAL. 5. A very suitable material may be had from the tailors' trimming warehouses under the name, we think, of "casban." 6. Suitable red glass can be obtained from any of the dealers in photographic materials.

SUNLIGHT says: "Having a studio facing due south, I am anxious of obtaining a subdued light; in fact, it is absolutely necessary. I shall, therefore, esteem it a great favour if you will give me your advice as to the best material and means to obtain this end."—During the winter months thin muslin strained on light wooden frames, so that they are easily removed when the sun is not shining, will be the most convenient means. In summer the glass itself should be stippled over with starch paste, to which a little whiting has been added. This is readily cleaned off when the dull weather again approaches.

OMEGA writes: "I should be obliged if you would tell me whether I am right as to the quantity of acids used in converting a half-sovereign into chloride of gold. I am not sure, but I think it was one and a half ounces muriatic acid and half an ounce nitric acid with a small portion of water. 2. When dissolved, do I evaporate to dryness before diluting and neutralising?"—In reply: 1. Two and a half ounces of the former acid to one of the latter, with three ounces of water, is a better proportion, but a little more than a quarter of this quantity will suffice to dissolve the half-sovereign if assisted by gentle heat. 2. Theoretically, the solution should be evaporated, but in practice it is not necessary.

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THE BRITISH
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CURLED GELATINE FILM NEGATIVES.

We direct attention to an article by Mr. S. Bourne, on another page, in which this gentleman speaks of the inconvenience experienced by the tendency of thin celluloid film negatives to curl into a scroll when dried. This is a topic in which many, ourselves included, feel much interested. Every allowance can be made for feelings of irritation experienced by the individual who, having developed and washed his pellicular negatives, pins them up by one corner to dry, only to find next morning that each one has in course of drying curled itself up as if trying to rival the dimensions of a pencil case, and resisting with all its springy power every endeavour of the artist to get it opened out and laid flat.

Fortunately, it is not difficult to reason from the evil to its cause, and from that to the cure. While we write we have on the table beside us a number of negatives taken during the last Convention at Plymouth on that particular kind of Eastman rollable film made for the Kodak, in which instrument the exposures were made. These are all bright and clear, and, what is more to our purpose at present, they are all flat, in the sense of there being not the slightest indication of curling.

On the other hand, we have negatives taken on a portion of the *same* spool as those mentioned, and developed in the same way, but which are now curled up like a cedar pencil, in which state they were when dried. It is very evident that, all the other conditions being equal, there must have been something different in the subsequent treatment of the two sets of negatives, that is, their treatment after having been taken out of the washing tank. Such was really the case.

Every worker with gelatine knows that, after having been wet, it contracts with great force as it becomes dry, and certain industries, not related to photography, are based upon this property. When a thin film of celluloid has received a coating of gelatine, which, in course of treatment, is softened and surcharged with water, it naturally follows that, if during drying there be no counteracting agency, the contraction of the gelatine film must overcome the resistance of the celluloid, which does not undergo any contraction. If the celluloid film were thick and strong enough to remain unaffected by the shrinkage of the gelatine, then would the latter succumb, as it were, to the resistance it met with, and dry without shrinking.

The application of this principle to the flat drying of a rollable film negative is not difficult. On taking it from the washing trough, remove all the surface water by a cambric pad, as we described in an article recently on the quick-drying of negatives, and then allow the drying to be effected under conditions which will prevent the film negative from assuming other than a perfectly flat position. Among these may be mentioned placing it between the leaves of a folio, which must be kept closed under pressure, if necessary; cementing by the margins to a plate of glass, or anything flat and rigid; super-imposing upon it a thin and moderately heavy frame, which shall rest upon the margins only. By employing these or any like means for keeping the negative flat until complete desiccation has taken place, the negative will ever afterwards give no trouble in printing from any tendency it may have to curl.

When not in the printing frame, film negatives should be stored either between the leaves of a folio or between tw sheets of millboard or stout card, round which one or two Indiarubber bands have been passed.

What has been said applies to the prevention of curling. But it also effects a cure in the case of those that have already become curled. To this end it is only necessary that they be opened out perforce and soaked in water until the gelatine has absorbed as much as possible, when the treatment previously recommended for drying must be had recourse to.

We shall be pleased to hear the opinions of others relative to the flat drying of negatives taken on *thin* celluloid

PHOTOGRAPHIC PIRACY.

Complaints are frequently made that the existing law on copyright is in a very unsatisfactory state. But, unsatisfactory as it is, it is amply sufficient to reach a certain class of offenders when it is put into force. Last week, one Walter Perry, described as a picture dealer, was mulcted in penalties and costs amounting to a little short of three hundred pounds, with the alternative of fifty-six weeks' imprisonment, for infringing the copyright of several popular modern engravings and photogravures, the property of different well-known publishing firms. The negatives were also impounded. This exemplary sentence was, doubtless, partly due to the fact that the defendant had previously been fined for a similar offence some time back at Manchester, and in connexion with some of the pictures included in this prosecution. The works pirated included such pictures as the *Village Wedding*, *The Ruling Passion*, *The Day of Reckoning*, *The Roll Call*, &c., the prosecutors being Messrs. Agnew & Sons, Tooth, H. Graves, Arthur Lucas, Mendoza, the Berlin Photographic Society, and others.

It is exceedingly hard upon publishers who have possibly paid several hundreds of pounds for the copyright in a picture, and perhaps a similar sum for the engraving of a plate, to have the work pirated and its sale materially injured by un-

principled photographers. Although the piracies are often publicly sold, it is, we are told, exceedingly difficult to reach the real offenders—that is, those who actually produce them. Not very long ago we saw a number of photographs, including most of those enumerated, displayed against a hoarding close to one of the principal railway stations in London. The prints were about fifteen inches by twelve, were of excellent quality and neatly mounted, with large margins ready for framing. The price asked for them by the itinerant vendor was, if we remember rightly, four shillings or four and sixpence per pair. At that price, considering there must already have been one or more profits on them, one would have thought that it would not have been worth the risk incurred by the producer. In cases of piracy of this description, the prosecutors usually try and get at the principal delinquents—that is, those who make the negatives, although the vendors of the prints are equally liable to the penalties.

The law is just the same with regard to the copyright in photographs as it is with engravings, and the penalties for infringing it are the same in both cases; yet photographs are pirated daily, and we seldom hear of prosecutions in connexion with them.

Under the present law the owner of a copyright has two courses open to him upon its infringement. He can either proceed summarily before magistrates, as in the case just cited, or sue in a superior court for damages, injunction, and forfeiture. Not long ago a case of this kind was decided in the Queen's Bench Division. It was this: A firm of Continental fine-art publishers issued photographs of works in which they held the copyright. A London firm, who advertise on a very large scale, had one of these photographs reproduced by lithography, to be used in connexion with one of their advertisements. An action was instituted for damages, and an injunction to restrain farther use of the pictures, and forfeiture of all copies, stones, &c., asked for. In the result the plaintiffs obtained substantial damages and costs, an injunction restraining further issue of the copies, and forfeiture of all the prints in the defendants' possession, amounting, we were told, to some hundreds of thousands. These proceedings were taken under the International Copyright Act, which confers upon foreign artists the same rights in this country as they enjoy in their own.

Defective as the existing copyright law undoubtedly is in some respects, it is manifest that it is equal to protecting the general run of copyright works if put into force. This is, however, seldom done by photographers, though, as we have just mentioned, their works are being pirated right and left, particularly by some of the illustrated periodicals. The maximum penalty, according to the law, is ten pounds for every copy sold. This would be no slight matter in the case of a large circulation, if enforced.

A very flagrant example of the piracy of photographer's work is many of the cheap varnished lithographic views, bound up as albums, of holiday resorts, produced in Germany. In many instances these are direct piracies of the local photographer's productions, and from their being sold at such a cheap rate they must necessarily materially injure the sale of the originals. If proceedings were taken when this is the case, there is little doubt that substantial damages could be recovered. In the case of infringements by the illustrated press, it is doubtful if sueing for damages would be the best procedure, inasmuch as it might be difficult to prove that the sale of the photographic prints had been seriousiy damaged by the piracies of them in a periodical. Therefore, under these circumstances, the better way would probably be the summary, and less expensive, one before a magistrate.

It will be noticed that almost always, when proceedings are taken for infringing the copyright in engravings, publishers combine and work together in the prosecution. But this is rarely, if ever, the case with photographers. They appear to have very little unity amongst themselves, even when it would conduce to their mutual welfare.

PLEA FOR AN HISTORICAL MUSEUM.

VERY numerous indeed are the applications continually being made to us relative to whether this, that, or the other thing is new; and nearly equally numerous are the inquiries made as to where one can see apparatus, at one time well known, but which have now fallen into desuetude, having been supplanted by other and more improved forms of the same.

This implies the desirableness of establishing an historical museum, one in which can be seen a history of photographic advance from the earliest times up to the present moment. We know that historical collections in a more or less perfect form exist, or are being made in connexion with a few clubs and societies, and are to be found in the hands of private individuals; but, in the former, the examination of these is, in a large measure, restricted to such of their own members as have an archæological turn of mind, while the latter naturally may not feel inclined to throw open the doors of their private residences for the benefit of an inquiring public.

What we advocate is the establishment of a public museum, to which all interested might have ready access, whether they belonged to any photographic society or not, one which shall be open at all times, and be placed under the selective management of a small committee competent to deal with the matter, and who, as such, should not necessarily be connected with any photographic society.

It is possible that some of our public museums, *e.g.*, the South Kensington or Patent Museums, might be found to willingly allocate a corner of the space at their disposal for so worthy an object were proper representations made to the respective authorities, and we feel certain that, were this effected and confidence in the managing committee established, many of those who now possess such objects of historical interest as those we have in view would readily part with them, even for a terminable period, for such an object.

We have often thought it a pity to see, at auction sales of private scientific effects, objects replete with interest from an historical point of view sold for almost nothing. For example, a lens, guaranteed to be that by which Daguerre took many of his pictures, brought seven shillings and sixpence; a collection of prints, together with the paper negatives of the time of Fox Talbot, only about half of this sum; a Sutton's panoramic camera, complete in every respect, including a costly spherical lens for a dozen shillings; and so forth with regard to other articles which might fittingly stock a public museum, but which private individuals could not afford space for in their possibly already crowded shelves.

What an interesting collection might be made of cameras and lenses from the earliest period, of panoramic and pantascopic cameras, of stereoscopic cameras and stereoscopes, printing frames, stands, roll-holders, projecting lanterns, and the thousand other things that are for years suffered to accumulate on one's hands until by death or the removal into another house the fiat goes forth to clear them all away. If a well-

accredited public museum existed, many who now break up their apparatus, rather than send them to the auction room, where, as they say, they fetch only insulting prices, would gladly present them to such museum. We spoke with one of this class only quite lately, and he had actually broken up some apparatus and given it to his servants to use as fire-lighters for the reason given. As with apparatus so with books. Fortunately, the Free Library of the Patent Office, in Southampton-buildings, Holborn, contains a valuable collection of books relating to our art, more particularly those of recent and current date, and, as this is daily open to the public from ten o'clock in the morning till ten at night, and contains all the best works and serials devoted to photography, the necessity for any other library of a public nature does not appear, except this, that a museum would take charge of albums or portfolios of pictorial works of a by-past epoch which could not find a place in the Patent Office Library.

We throw out this plea for an historical museum of photography in the hope of some energetic and public-spirited individuals taking it up.

VARIATIONS IN WINTER DEVELOPMENT.

Two or three weeks back we referred to the necessity that arises at this time of year for the adoption of special precautions in order to ensure something like uniformity in the conditions of working in the dark room, our remarks then being mainly confined to the question of temperature. Although this forms the chief point of difference between summer and winter working, there are other circumstances that may be examined, in which, if temperature cannot be wholly excluded, it plays only an indirect part.

In our previous articles we alluded to the desirability of preserving a certain uniformity of temperature in the dark room, but more especially of the solutions themselves, and of course, if this matter were rigorously attended to, there would be little ground for further trouble. But, whatever may be the theoretical possibilities in this direction, it is absolutely impossible in practice, even in the most perfectly arranged establishments, to maintain a really uniform temperature throughout the year, or indeed, in view of the sudden climatic changes experienced at all seasons in this country, from day to day.

It may be found comparatively easy, in the manner we suggested, to secure a constant temperature of the developing and other solutions by the use of warm or tepid water in mixing them, and to thus ensure that their work is at least commenced under fixed conditions. But it is obviously impossible to keep the atmosphere of the developing room automatically or otherwise at the same normal temperature, and consequently, but especially in cold weather, the solutions exposed as they are in open dishes must tend constantly to change. It is in the cold season, when the outside temperature may be thirty, forty, or even fifty degrees below that selected as the normal, that the difficulty will be greatest, for under such circumstances, even if actually *hot* when poured into the dish, the developer will in a very few minutes have sunk far below the desirable point.

In well-equipped establishments—that is to say, in the professional laboratory, fairly well-heated and ventilated, and where work is constantly proceeding with regularity, the trouble will be at the minimum, and is easily met; but it is the amateur, who perhaps only has occasion to go to work at irregular intervals, and with inadequate means of securing the necessary conditions, who will be the greatest sufferer. Let him be as careful as he will, say, in warming his solutions as directed, he omits to take into account the rapid fall in temperature that goes on in the chill atmosphere of the unheated room; the developer acts too slowly, and, believing he has done what is necessary, he wrongly attributes the result to under-exposure, or to insufficiently energetic solution. He strengthens it up with alkali, and presently finds he has got all he can out of the plate, and that the result is far from satisfactory. Then he proceeds to increase his exposures, and so blunders on from bad to worse.

Now, under conditions such as these, although it may not be practicable to secure uniformity of temperature, it is possible, by other means, to minimise the trouble that arises from accidental variations. It is well known that developing solutions behave very differently as regards the proportions of their ingredients, but more especially the quantity of restrainer required, when the temperature is considerably altered. Thus a pyro solution may be used in winter with a proportion of bromide that would be altogether inadequate in even moderately warm or temperate weather, while some of the newer developers may safely, if not indeed beneficially, be employed without restrainer at all.

Some years ago we conducted a series of experiments with a view of testing the effect of temperature in development, pyro and ammonia being employed, and the solution being used at various temperatures artificially reduced to nearly the freezing point. The result showed that as the temperature was lowered the necessity for bromide was reduced, and *vice versâ*, and that the brightness and vigour of the image increased with the cold, while softness and a tendency to veil resulted from a warmer solution. At the same time, the lowered temperature greatly increased the time occupied in development, and almost necessitated a considerable reduction in the proportion of bromide, or a corresponding increase in the quantity of alkali, the former course proving the preferable one.

During the next three months or so we expect to hear many complaints of failure from under-exposure and insufficient density; but where such occur we would strongly counsel, not an increase of exposure, nor a strengthening up of the developer with alkali, but a reduction of the proportion of bromide, the temperature of the solution, it being always understood, being raised to 65° or 70° to commence with. Where pyro is used in conjunction with sodium sulphite the proportion of the latter may also be reduced to the lowest available point, as this too has, especially in cold weather, a retarding action in development.

Hydroquinone is scarcely the developer that would be selected for winter use—for negatives, at least; but, if it should be used, bromide must be altogether dispensed with, and sulphite seems scarcely needful at any time. With this developer, too, the temperature is of more importance than with any other, a very few degrees making all the difference between fairly rapid and altogether tedious development. For this reason alone hydroquinone is scarcely a suitable agent for winter use, particularly now that there are other equally clean and, at the same time, more rapid ones.

Para-amidophenol and its hydrochlorate may be used with advantage, without bromide, but the sodium sulphite in this case cannot be dispensed with, its function being apparently, as with amidol and metol, of equal importance with that of the alkali. The very low degree of solubility of these substances

especially the former, renders it necessary to see very carefully to the temperature of the solutions, otherwise much of the active agent may crystallise out.

With amidol and metol, which appear to promise best as winter developers, it is a question whether the bromide can be safely omitted altogether. With some plates, no doubt, it may, but with the majority it will be found safer to use it in moderation. Thus, where in summer weather we have used as much as one grain of bromide to the ounce of developing solution, when the very cold season comes we should not use more than one-tenth of that quantity, or even less where the plates are of a particularly clear character.

It follows, from what has been said regarding the increased effect of bromide in retarding development in cold weather, that at the present season the growing practice of using the developer repeatedly is not likely to prove as successful as during the summer months. It must be borne in mind that each film developed adds a very considerable proportion of bromide to the developer—a fact in itself sufficient to account for a good deal of want of uniformity—while, unless the temperature is attended to after each development, the gradual fall added to the increased restrainer will prove fatal.

For negative purposes, where ferrous oxalate is used, the bromide may be considerably reduced, if not altogether done away with; but for positive work both bromide and acid will be better retained in order to keep the whites clear.

A Prize Shutter.—The prize of 1000 francs has been awarded by the French Society for the Encouragement of Industry to M. Decaux for a new photographic shutter.

Solubility of "Insoluble Salts."—Herr A. F. Holleman has been investigating by an electrical method the extent to which certain salts, usually termed insoluble, are capable of being dissolved in water. Selecting from his lists those salts only which are of interest to photographers, we find that silver iodide is soluble in 1,074,040 and 420,260 parts of water at 28·4° and 40·4° temperature, respectively. For bromide of silver we have 1,971,650 and 775,400 at 20·2° and 38·4°, and chloride is set down at 715,800 and 384,100 at 13·8° and 26·5°.

Removal of Pyro Stains.—These stains are really more difficult of removal than silver from woven fabrics, and quite as difficult with the fingers. For the latter, perhaps, the best plan is to well wash or rub together with dilute acid—tartaric, oxalic, acetic, &c.—and then to well rinse under the tap. If the latter precaution be omitted, the stains will reappear when the hands are washed with soap. For linen, &c., the dye is too much fixed for this treatment, and other methods have recently been under discussion in our contemporary, the *English Mechanic*. The following method is one of those recommended:—Immerse the fabric in a saturated solution of oxalic acid, and leave it to steep for some little time. Next place the material, now impregnated with the acid solution, in a ten per cent. solution of bleaching powder (so-called "chloride of lime") till the stain disappears, and finally well wash in clear water. A little rubbing facilitates the removal of the stains. Another correspondent describes a simpler method, which he states to be superior. It consists in the use of a one-solution made by boiling together, in water, bleaching powder and carbonate of soda.

Photographing Sound.—This feat has actually been performed by Dr. Raps, as explained by him to the Berlin Physical Society. The method is based on the use of a Jamin's refractometer, which produces interference phenomena by means of reflection and refraction of a ray of light at the surfaces of two thin parallel glass plates. When the air between these two plates is transmitting sound waves, the interference bands are displaced, and, by means of a slip of sensitised paper, kept in motion on a drum and placed behind a slit, the aerial vibrations are recorded. The first experiments were made with a closed organ pipe, near whose end were two openings facing each other, but covered with glass. Upon varying the pressure of the wind blown through the pipe, photographs of different characters were obtained describing certain curves indicating this pressure. Open-pipe experiments were more difficult, but even with these successful photographs were obtained. Dr. Raps had also obtained photographs of the vibrations from the singing of vowel sounds, which exhibited several interesting relations of the component parts of the sound to one another. He also exhibited photographs of the vibrations produced by the sounding of a hunting horn.

Photo-chronographic Work in Paris.—*La Nature* has a long article on this topic, showing how it is now employed in what may be termed a State-recognised study. At the Saltpetrière Hospital in Paris a special open-air laboratory has been fitted up for conducting experiments, on a complete and extended scale, of the play of the various muscles and parts of the body during various phases of muscular exertion. The camera contains a dozen lenses, and is mounted either on a studio stand or a field tripod. The exposures are made by electricity, and aware of the fact that some control of the duration of exposure is needed, so as to obtain sufficient detail and not mere silhouttes, under varying lights and distance of object, every provision has been made for carrying out this requirement. With regard to accurate measurement of the time, though Foucalt's metronome is valuable, it cannot be used for very brief periods of time. Ultimately, a modification of Trouvé's interrupter was devised, and found to be excellent for the purpose. In the article in question will be found excellent illustrations of the whole arrangement, showing how very complete an installation has been carried out. One view in particular gives a very good idea of what the arrangement is capable of. It represents the apparatus at work taking a series of photographs of a workman stripped to the skin, striking an anvil with a heavy hammer. There cannot be a doubt that such photographs taken in half-tone will be of the greatest value in many physiological investigations.

PHOTOGRAPHY IN WARFARE.

The subject of photography applied to military purposes is one that is now receiving a little of the attention it merits. That photography may be made of valuable assistance in warfare is a self-evident proposition, but hitherto its applications have been limited in extent, and it is only the scientific branch of the army—the Royal Engineers—that has practised it. Much of the work done at the School of Military Engineering at Chatham is familiar to us, and it is here that many of the photo-mechanical processes have been worked out, or, it might even be said, have originated. The Ordnance Survey Maps are testimony to the perfection to which our "brave defenders" have attained in the photographic process by which they are produced. In the application of photography to the numerous uses to which it might be put in the field on a campaign, we seem, however, hardly to have kept pace with the times, and the paper recently read before the Photographic Society of Great Britain by Captain Mantell, R.E., entitled *Balloon Photography Applied to Military Purposes*, appears to support this view. It may be gathered from the paper that, until recently, there has been little done in experimenting in a direction which, it is evident, must be an important one in warfare—that of obtaining maps or, rather, bird's-eye views of the country at the seat of operations by means of a captive balloon. The difficulties to be overcome are not few. The effects of the motion of the balloon, even in moderately calm weather, are described as being very unpleasant, and, in anything like a wiud, as being far worse than those experienced on a vessel in the heaviest sea; so that, in addition to photographic and manipulatory difficulties, the nausea of sea sickness, or its equivalent, has to be contended against. The actual photographic work is not the plain sailing it might appear to be. The gyration of the balloon and its rolling motion render it exceedingly difficult to point the camera in the desired direction at the

moment of exposure, and, owing to the movement being in the camera itself, the duration of the exposure must necessarily be very brief to obtain a sufficiently sharp result, one-sixtieth of a second being about the maximum possible, even under favourable conditions. In a wind of the velocity of ten miles an hour, negatives could be obtained showing no appreciable amount of blurring, but when the wind attained a velocity of sixteen miles an hour, all work was found impossible. With a free balloon the work was much simpler, as, instead of tossing about, the balloon moved with the wind. It will be seen, from these few facts, that balloon photography is anything but play; but Captain Mantell may be trusted to advance matters if he has the opportunity afforded him. He certainly has that valuable qualification in an investigator, that he is not ashamed to admit his want of knowledge and to ask assistance.

Another aspect of military photography is the subject of an extremely able article in the *Pall Mall Gazette* of the 30th ult.—an unsigned article, but evidently from the pen of a practical photographer. The writer points out that, although photography has been hitherto entirely the province of the scientific branch of the army, the Royal Engineers, there is no reason why it should remain so. There are, in all branches of the service, officers who are excellent practical photographers, and whose attainments might be utilised in a way which the existing system does not recognise. A photographic contingent might be attached to every army corps, a body trained in the use of the camera for the purposes of reconnaisance and expert in map reproduction and all the branches of photography likely to be useful in active service. The material for such a contingent could be easily obtained from the non-commissioned officers and the rank and file, for modern developments have rendered previous scientific training comparatively unimportant, and the service would certainly be popular, owing to the great fascination of photographic work, whatever its application. The necessary technical training might be conducted under the supervision of the Royal Engineers, with the Chatham School of Photography as a centre, but with local centres at the various military stations throughout the country. The cost of this would be comparatively trifling, whereas, as a set off, there would be in a short time, in every corps throughout the army, at least one officer and two or three non-commissioned officers or men who could use the camera in a reconnaisance instead of, or in addition to, the pencil.

The idea commends itself at once to photographers as one quite capable of being carried out. It is obvious that, while photography remains the exclusive prerogative of one department of the forces, the extension of the uses to which it is applied is likely to be made but slowly, and, as Engineers are not ubiquitous, on many occasions when photography might be employed with advantage, it must necessarily be dispensed with, on account of the absence of operators. For military purposes in the field pictorial excellence is quite a minor consideration; the rapid production of prints is important, and of more importance still is certainty, that is, that every plate exposed shall result in a negative capable of giving prints good enough to tell the tale intended. The utmost portability and simplicity of apparatus are essential, but there is no reason to fear that a demand in this direction would remain long unsatisfied.

Before the authorities at headquarters are likely to consent to the "extension of the camera" in the direction indicated, they will have to be fully convinced that photography, as a means of graphic expression, is better than the pencil, that its employment need not entail any great addition to the provisions made for transport, and that the expense to be incurred will not be great. However, we have learned —happily from the experience of other nations—that success in warfare is largely dependent upon the advantage taken of arts which can be cultivated in times of peace, and, whatever may have been our errors in the past, we have every reason to believe that those to whom we have entrusted the duty of providing for the defence of our country are fully alive to the responsibility which rests on them, to neglect no means available for the purpose. A. Mackie.

STANLEY SHOW PHOTOGRAPHIC EXHIBITION.

The second annual Photographic Exhibition in connexion with the Stanley Show of Cycles at the Agricultural Hall, was opened on Friday, November 17, and will remain open until Saturday next, November 25. The Judges on this occasion were Messrs. Henry Sturmey, J. Traill Taylor, and E. J. Wall, and medals were placed at their disposal by the Committee with considerable lavishness. The management of the Exhibition was in the hands of Mr. W. D. Welford, who must be congratulated not only on the success of the show as a whole, but in particular of the hand-camera class, which was a particularly strong and good one. If rather weak in the champion class, other departments of the Exhibition sufficiently atone for it, and the total display was undoubtedly good and interesting. This year the pictures were wisely separated from the apparatus, the latter being arranged in the outer gallery. In the room devoted to the pictures we should have been pleased not to see the flags and streamers with which it was adorned, as to our thinking such garish attempts at decoration are best omitted from a display of photographs, which have nothing to gain from their presence.

In Class A (Champion), the gold medal went to Mr. C. S. Roe for his *Sedge Gatherers*, a crisp, forcible study of a man and two women engaged in that occupation—easy and natural in its arrangement. Mrs. Main, with her Alpine series, *Frost and Sunshine*, took the silver medal, and Mrs. Marriott (somewhat luckily, we think) the bronze medal for an Irish seashore view, carefully exposed and printed, but otherwise not very striking. Messrs. Mendelssohn, Byrne, and Pym exhibited good portrait work, which, to our fancy, deserved recognition, particularly the first-named two. Mr. Burrow's mining series were also passed over.

Class B (Landscape) was really so good all through that we are sure the Judges must have had a tough job in coming to their decision. The gold medal went to Mr. R. S. Webster for *When the Evening Sun is low*, a boat with two occupants near a rocky shore; the silver to Mr. Warneuke for one of his Pall Mall Landscapes; the bronze to Prince Barma for a pretty and painstaking view, *On the River at Tipperah, India*; and diplomas to Messrs. J. H. Anderson for *Winter's Morning*, a riverside study, effective from a realistic point of view, but not otherwise noteworthy; and J. Kidson Taylor for *A Snug Berth*, a capital bit portraying a ship at anchor in a small bay, like all Mr Taylor's work, sound in execution. A view of *The Tower Bridge*, by Mr. W. Howell; a bold *Sunset* and a tender *Eventide* by Mr. W. Norrie; a capital *Sunday Morning*, an old fellow escorted by a young woman emerging from a church, by E. S. Baker; and noticeable work by Messrs. J. Avery, Hartley Bros., E. Hankins (an excellent hoar-frost bit), E. Benson (a meritorious *Mountain Stream*), and others are included in the class.

Class D (Figure Studies, *Genre* portraiture) was also a remarkably good one; indeed, although small, we go so far as to say that it includes some of the cleverest work of its kind we have seen this season. The gold medal is well won by Mr. D. J. Scott for *Dividing the Spoil*, a humorous group of three schoolboys, one receiving a bite from an apple held by another, while a third, over his slate, is smiling unctuously. The youth holding the fruit has the attitude and the expression of "Don't take it all!" A very clever bit of work this. Prince Barma takes a silver medal for a figure study of a young girl, one of a series of princesses of the House of Ancient Tipperah; Messrs. Lutzel Bros., a similar award for a frame of delicate and refined portrait studies, chiefly of ladies and children. Mr. C. E. Wyrall the bronze for a large study, *Is oo Cross?* a little lady asking the question of a dog whom she has dressed up in fantastic garb; and Mr. Byrne, a diploma for a series of charming portraits in red carbon. Messrs. Werner, Terras, Treble, Count Gloeden, &c., also exhibited in the class, Messrs. Lutzel's and Byrne's other exhibits being particularly striking.

Class E (Hand-camera Studies) was, as we have said, particularly strong, the gold medal going to Mr. J. A. Sinclair for a frame of four of his now familiar Swiss and Italian excerpts, well chosen, beautifully defined, and technically admirable. Mr. Sinclair had three other frames all in his best (or Continental) style. Awards also went to Mr. J. Kidson Taylor (delightful land and waterscapes, quite worthy of a stand camera deliberately used), Charles Knight (shots at soldiers on the march), J. H. Gear (sheep in a farmyard), Charles Job (rustic studies). To this class, which we unreservedly salute as a tribute to the potentialities of the hand camera as capable of the highest artistic expression in photography, a great many other well-known workers contributed good examples of their skill.

In Class F (Beginners since 1890) Mr. J. H. Gear (who seems a very old "beginner") received the silver medal for a splendid interior of Whitchurch Church; Mr. Stewart Smith the bronze for an interior group of the Glasgow Art Club (very good); Mr. A. Kemp a bronze

for *My First Love* (portrait of a very old lady), and Mr. J. H. Anderson took a diploma. We have seen no better beginners' class than this: it was good in landscape, portraiture and interior work, and only the cruel exigencies of space prevent us from paying many of the competitors some pretty compliments.

Class G was for pictures taken with apparatus carried on cycles, and this contained some fairly good land and seascapes. Messrs. Barron (silver), W. B. Dart (bronze), and Harry Wade (diploma) were successful. In the Society Competition the Gosport, East London, Midland, and South London competed, and the last two secured awards, the South London being particularly strong in architecture and interiors. Take it all in all, the Exhibition was far above the average of its kind.

The show of apparatus was remarkably strong, and we can conceive that the casual visitor must have been greatly gratified at the display. Handsome stands were occupied by Messrs. Adams & Co. (hand cameras, changing boxes, lanterns, stands, &c., in profusion). R. & J. Beck (whereon the philosophy of the "Frena" was expounded in all its ramifications), Sands, Hunter & Co. (cameras, lenses, &c.), Cresco-fylma Company and Morgan & Kidd (with an effective display of enlargements in carbon, collotype, bromide, &c.), Wormald & Co., Morley & Cooper, Holmes & Watson, Platt & Witte, W. Wray, &c.

Now that so many photographers are cyclists, and *vice versâ*, we are sure that followers of both pursuits must have visited the joint Exhibition with considerable pleasure and as much profit.

CAMERAS AND FILMS.

Like your own, Mr. Editor, my photographic experience dates far back into the past, embracing a period of nearly forty years. Having passed through every phase of the art from the early days of collodion through the various so-called dry or preservative processes, I can only marvel at the wonderful developments of these later days, and the facilities now afforded for the practice of our old and favourite pastime. I compare the ready-made dry plates, their marvellous sensitiveness, the light, compact, and admirable cameras of to-day with the heavy cameras, cumbersome tent, the silver baths, bottles of chemicals, and all the bulk and weight of the paraphernalia required by the landscape photographer of the old days, and can only congratulate the latter-day followers of the art that their lines are cast in such pleasant places, and that they have so goodly a heritage.

One of the greatest strides that has been made, and one of the most useful practical steps of modern photography, has been the introduction of films to take the place of glass for negatives in landscape work. Even young men and strong, to say nothing of men whose growing years have not abated their ardour, can, on a hot summer day, appreciate the enormous advantage of a film-carrier containing thirty exposures on a spool only a few ounces in weight over the burden of six heavy plates in three double slides. But here, I am afraid, my record of progress in this direction must stop.

Much as has been done there is still something wanting, and the object of this communication is to call the attention of our camera-makers to a matter of much importance, and to urge them to exercise their ingenuity and inventive faculties a little farther, and make one more addition to our present appliances.

These rolled films are exceedingly light and easily developed, but after this our troubles begin. They are difficult to dry flat, soak them in glycerine as we may; but, when we come to print from them, then it is that one's temper gets ruffled, one's patience exhausted, and certain ejaculations hardly fit for ears polite are apt to escape us. No power that I am acquainted with can keep these films flat or prevent them rolling up to the size of a lead pencil, especially in a warm room. And the difficulty of unrolling them, adjusting the paper, and getting them into position in the printing frame, is tremendous, involving much loss of time and temper. This is owing to the films being so thin. With cut films the case is different; being thicker, they do not curl up in the same way. But with these cut films as used at present we lose one of the great advantages of films, viz., the command of a large number of exposures, with a minimum of weight and trouble in changing.

What is wanted, therefore, is an arrangement not much larger or heavier than the present roll-holders, which will carry, say, twenty-four cut films, each of which can be easily displaced after exposure, and another brought into position. But perhaps some one will say this has already been done, and I shall be referred to this or that hand camera for proof. This may be quite true, but I am not speaking of hand cameras, with which I am not much in love, but of ordinary sizes, say, up to whole-plate or 10×8.

Whoever will give us this boon will deserve and will receive the grateful thanks of thousands of amateurs, and will also, I doubt not, lay the foundation of a profitable business. If the problem has indeed been solved as regards hand cameras, it needs, one would think, very little ingenuity to adapt the principle to larger sizes. If the inclusion of as many as twenty-four films increases the difficulty, reduce the number to twelve, but twenty-four would be an advantage.

I have taken as many as twenty-four negatives in one day, notably once at the Lakes of Killarney, which I could not otherwise have got, and the last four exposures were amongst the finest things I have ever done. This was, of course, by means of a roll-holder, as there was no dark room handy for changing.

I commend this suggestion to our camera-makers as one most thoroughly practical and useful, and trust by next summer the piece of apparatus I am pleading for will be *un fait accompli*.

S. Bourne.

REMARKS ON HAND-CAMERA WORK AND HAND CAMERAS.

[Dundee and East of Scotland Photographic Association.]

I confess to having been for a long time a very great sceptic as to the possibility of doing even decent photography with a camera held in the hand. The excellent slides shown at some of our meetings from negatives said to have been done in hand cameras almost persuaded me that the thing could be done, however, and I immediately set about a mild kind of inquiry into two or three points which specially interested me.

Whether it be from use and wont, habit, prejudice, or what you like, I am a "stickler" for definition. I go in chiefly for lantern-slide work, and, however tolerable a 14×12 fuzzytype (as they have been jocularly called) may be, want of definition in a little picture three and a quarter inches square has always been singularly abhorrent to me.

For this reason it was a long time till I could bring myself to believe that a hand-camera negative need not necessarily be blunt. I have proved to my satisfaction now that a *high* degree of sharpness is attainable in a hand-camera negative. A good deal of the work done by the hand camera is not sharp, but it need not have this defect, and this was the first question I determined to test, "To what extent must one be prepared to sacrifice definition in taking to a hand camera?"

Andrew Pringle, in his classification of amateurs, has a class of *mechanical* amateurs. It seems that their hobby finds expression in the designing and making of hand cameras. I plead guilty to being of this class, and furthermore plead guilty to having made no fewer than four hand cameras this season. When I say I have made four hand cameras, I mean this in a certain restricted sense. For certain reasons which may appear later on, I soon decided in favour of dark slides as against a magazine arrangement, and it is to be understood that in my home-made hand cameras I did not make the dark slides. But, to begin at the beginning, when I first decided to take up hand-camera work, I sought to make a camera having the following conditions or qualifications. First, it must be small, light, and portable, strong, weather-proof, capable of carrying eight to twelve plates, easily changed. The shutter must be not over-fast, and not liable to get out of order. Lastly, but most important of all, it must be well within my power of construction.

I first of all sent to Mr. Wray, of London, for a simple stereoscopic lens of five inches focus. I decided upon a single lens for the following reasons. First, as I only wanted the lens to cover a lantern plate, a single lens of five inches focus is practically rectilinear even under trying conditions upon this size of plate. Secondly, a single lens gives a crisper and more brilliant image. Thirdly, this stereoscopic lens by Wray, working as it does magnificently at an aperture ratio of eleven, was abundantly fast for all ordinary purposes; and, lastly, a single lens even by a good maker is comparatively cheap, this lens by Wray, for instance, costing but twenty-five shillings.

To have gone in for a rectilinear I would have had the advantage only of working with a larger aperture, and this with the disadvantage of giving me less depth of focus, or requiring me to arrange some focussing arrangement on my camera before I could have taken advantage of the large aperture for near and far objects. By contenting myself with an aperture of f-11, I secured such depth of focus as to render any focussing arrangement on the camera unnecessary—a huge point, I think. A single lens has other points of

advantage which I need not advert to, such as the ease with which a shutter can be fitted on it, and so on.

The lens having been duly received, I set about the construction of camera No. 1 as followa:—A well-made pine plate-box with grooves for twenty-four plates was procured. This box was divided into two chambers or divisions by a thin partition of wood. The front half was the camera proper, the back half the magazine. The lens was placed on the end of the box, having upon it a shutter, which I need not describe, as it did not turn out satisfactorily. The hinges and hasp were blackened with chloride of copper, and the whole box covered with morocco leather. It had quite a respectable appearance. Although there had been no attempt made to disguise the true nature of the machine, if one carried it under the arm (and it was small enough for this), with the lens looking to behind you, not in front, people passed by, like the Levite of old, and took no notice.

The plates were changed in a simple and certain way. I had a small bag made of two thicknesses of black twill. The mouth of the bag was opened, the camera dropped in, and the bag tightened by means of a running string round the wrist. This done, the catch of the lid was turned, the lid opened, and the plate taken from the back half of the camera (where were a dozen plates in the grooves) and slipped down in front of the partition, where it was ready for exposure. I used this camera some half-dozen times, but soon found that it had two faults.

In the first place, while the plates were most easily and rapidly changed, the manœuvre was conspicuous and objectionable in streets and crowded places, where one would most naturally use a hand camera.

In the second place, the movement of the hand and arm to release the shutter caused the camera to move, and my pictures were blurred. At first I thought I had not set my lens to focus. I tested this by setting my camera on a stand, and exposing with a cap. The picture was sharp. I then thought the shutter vibrated the camera. I tested this by holding the camera myself and getting a friend to release the shutter. The picture was sharp. I therefore concluded that it was the movement of the hand and arm in the act of releasing the shutter that did the mischief. I may remark here that I am convinced that many of the blurred pictures got from hand cameras are brought about, not by vibration of the shutter, not by unsteadiness in holding in a general way, but from this special movement made unconsciously in the act of releasing the shutter. Later on I will describe some trials I made to determine how prolonged the exposure might be without blurring, this movement being eliminated.

Seeing that the mode of the changing of the plates was unsuitable, and the shutter difficult to release without movement, I determined to make another camera. I cannot show you this first camera, for the simple reason that I have used certain parts of it as material in the subsequent cameras. In thinking over the question of an easy release for a shutter, I remembered that I had a simple drop shutter, which was all that could be desired in this respect. I hunted it out. A simple unaccelerated drop shutter gives about the speed I like. It is not prone to stick or get out of order, but it is cumbrous; over and above this, it adds considerably to its size to have it on the camera in a set state. Still the drop shutter had so much to recommend it that I determined to adopt it and bring all other conditions to suit it. As I had no means of keeping the light from entering the camera while setting the shutter, I abandoned the idea of any magazine arrangement, and decided to have dark slides. Having little experience of magazine cameras, I can give no opinion upon them. All that I can say is, that the dark slides have given me unbounded satisfaction. You can carry one in this pocket, one in that, so that you never feel them about you. You can fill Nos. 1 and 2 with quick plates, and Nos. 3 and 4 with slow, and expose them how you like. You can slip down to the harbour with only a single plate or with eight, just as you like, and the changing is simple and rapid. I am a great believer in the dark-slide system. As dark slides are not child's play to make, I ordered four from Mr. Birnie, and meantime set about devising camera No. 2.

I thought myself almost to distraction as to how I could contrive to design a box with a drop shutter on the end of it to look tidy and unconspicuous. While busy over this question, I remembered that camera No. 1 had not proved weather-proof; indeed, I was convinced that it was not possible to make a hand camera weather-proof, and, if this were to be remedied by having a water-tight case of any kind for the camera to be carried in, seeing that the camera would be only exposed for a moment during the exposure of the plate, I might as well have the camera any handy shape I liked, independent of appearance altogether. This simplified matters hugely. I designed a simple box, of proper dimensions at the back to take the slides, but getting narrower towards the front, to allow my hand to lie naturally to the release of the shutter. The body of the camera I made of stout millboard, attached with brass screws to a mahogany front for the lens, and a mahogany frame behind for the dark slides to work in. The whole was covered with stout morocco leather, and, as you will see, is quite presentable. I thought I would require no finder, but placed a circular spirit level on the top. This camera I thought, at first, a great success. I got my saddler to make me a nice leather case to hold it and the dark slides, and thought I had come to my journey's end.

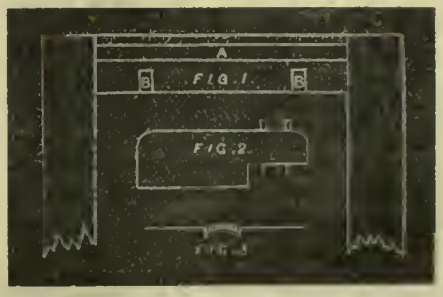
J. K. Tulloch, M.B.

(To be continued.)

A COMMON DEFECT IN PHOTOGRAPHIC DOUBLE DARK SLIDES, AND ITS REMEDY.

A very common defect in double dark slides of the ordinary book form is the admission of light between the shutter and the top rail of the slide framing when the shutter is drawn out to expose a plate. It is none the less dangerous that it may not show itself for some time. If the camera is kept carefully covered with the focussing cloth while the slide is withdrawn, all may be right, but some day the cloth may be blown off just at the critical moment, and the result may be one or two streaks of fog across an otherwise good negative. Having had some valuable negatives spoiled by this means, I speak from experience, and it is in order that my experience may be of use to others that I now explain the remedy, which is very simple.

It is in those dark slides where the shutter is prevented from coming completely out by two small screws that this defect is most



likely to occur. In order to permit of the entire surface of the plate being exposed in the camera, there are pieces, B B (fig. 1) checked out of the top part of the slide frame to receive these screws. This leaves only a small part of the frame to keep out the light, and it is seldom so well fitted as to be quite light-tight.

The remedy consists of a piece of narrow black velvet ribbon glued across the top of the frame, as shown at A (fig. 1). The shutter must be entirely withdrawn, first unscrewing the two small screws before referred to. If it is prevented from coming out by means of a narrow strip of veneer glued across near the bottom edge, which is also a very common plan, this strip of veneer must be carefully chiselled off.

If the shutter is a very loose fit, as is often the case, the ribbon may be glued right on the surface, but it generally requires a shallow groove cut to take up some of its thickness.

The velvet ribbon may be got in a draper's, and cotton back is to be preferred before silk; a quarter of an inch broad is sufficient, but broader may be used with advantage if there is room for it. Fig. 3 represents the ribbon and its groove in section.

If three dark slides are to be done, and it is an improvement even to the best, it will save both time and trouble to make the small tool shown at fig. 2. A piece of hard wood about four inches long, one and a half inches broad, and a quarter of an inch thick, has a check cut at one end; two small nails are driven in at suitable distances from the check and from each other, to form a gauge for cutting the sides of the groove; the points of these nails project about a sixteenth of an inch, and they are further sharpened by means of a file. By using this tool as a carpenter's gauge is used, the sides of the groove are neatly and easily cut. The groove is then cleaned out with a narrow chisel, leaving it higher in the centre than at the edges. The edges of the ribbon will thus be well under the surface of the wood, and, if properly glued in, will not be liable to be torn off by the shutter.

Kentigern.

LEYTONSTONE CAMERA CLUB EXHIBITION.

A big step in advance has been made by the Leytonstone Camera Club in the Exhibition, the second annual one, which was opened last Monday, and is to remain open all this week, not only in the quality of the pic

ures hung, but also in their arrangement and disposition. Last year we felt it our duty to pass a few strictures on certain features of the Exhibition, and we are happy to observe that they have been profited by, the result being a thoroughly representative collection of pictures illustrative of photographic art up to date, presented to the public in a praiseworthily careful manner, and one, moreover, which would do credit to much older photographic organizations than the Leytonstone Club. At the same time, we must temper our praise with one recommendation, and that is, while the Club does its best to avoid skying frames, it should also endeavour to abstain from "flooring" them. On this occasion, what we were informed the Judges considered one of the best photographs in the room the hanging authorities had hung on the floor, as the Irishman says, so that, in all probability, nineteen out of every twenty visitors would miss seeing it. The Judges were Colonel Gale, Mr. Cembrano, and Rev. F. C. Lambert.

Class A (Landscape and Seascapes—members of the Club) was not, as is generally the case with members' classes, too large. Mr. G. H. Cricks took the silver medal with *An Essex Swamp*, which we have previously noticed, and also showed *A Summer's Eve at Canvey*, a characteristic study on the Essex flats. Mr. D. G. Riddick was prominent in the class, securing the bronze medal with *Where Twines the Stream*—a soft, pleasing study of river, wood, and meadow, skilfully composed. He also showed *The Silent Brook* and *By Mead and Stream*—two similar subjects ably handled. Messrs. E. S. Coleman, H. E. Farmer, E. A. Golledge, H. H. Summers (bronze medal), F. W. Wates, and A. E. Bailey also showed excellent work. Class B (Architecture—members) was a small one, Messrs. H. E. Farmer and J. H. Gear being prominent, the latter gentleman taking the bronze medal for a technically good view of *The Choir, Westminster*. No awards were made in Class C (Portraiture and Figure Studies, including animals); Mr. Tom Symmons was perhaps most successful with a large picture of a young lady, *Que Voulez-vous, M'sieu*, offering fruit for sale. In Class D (Enlargements—members) Mr. Symmons received the silver medal for a fine enlargement, badly hung—*Winter*, and Mr. C. A. Russell the bronze for a study of a *Sunset*, treated in the diffused style. Mr. Gear showed *Whitchurch Church*, which was medalled at the Stanley Show. In the Members' Lantern-slide Class Messrs. A. E. Bailey (silver) and W. E. Farmer (bronze) were successful.

There were three open classes. In the Champion Mr. W. Thomas took a silver medal for a series of hand-camera river studies, and Mr. Wellington a similar award for *Eventide*. The class though small was good. In the open lantern slides a special silver medal was awarded to Mr. P. Martin for a series of imitation statuary, *Characters from London Streets*, full of humour and carefully made. Mr. Hankins also won a silver medal for a series of slides from hand-camera negatives. For Class G (prints of all kinds by any process) nearly 200 pictures were in competition, the silver medal going to Mr. Bhedwar for *The Voice of Silence* (which was shown at the Salon), and the bronze to Mr. J. H. Anderson for an *October Sunset*, a study of sky and water. This was undoubtedly a very fine class indeed. Messrs. West & Son (yachts), W. Thomas (hand-camera), Sandland (animals), S. B. Angle (a clever flashlight photograph of a dancing lady), Cadby, H. P. Robinson, Warneuke, Oakden, Howell, and Byrne (some remarkably good portraits) being among the prominent exhibitors. A loan collection of photographs, in which work by Messrs. Elliott & Son, Horsley Hinton, Ralph Robinson, the Autotype Company, Karl Greger, the Stereoscopic Company, Waterlow, and the Platinotype Company was shown, constituted a fine exhibition in itself.

Altogether the Leytonstone Club may congratulate itself on having organized a show of fine photographs which will surely not be beaten by any of what are known as the minor Exhibitions.

ON THE PHOTOGRAPHY OF THE LUMINOUS RAYS OF THE SHORTEST WAVE-LENGTHS.*

With a slit of the width of 0·020 mm., and an exposure of one minute the Leyden jar spark of cadmium gave all the main lines but the two most refrangible, No. 25 and No. 26, in contrast to the others, strikingly pale. As it might have been expected, this difference in intensity did not disappear, even on prolonged exposure, until solarisation became perceptible in the more intense lines. The difference in intensity which regularly followed on normal exposure would not have attracted my notice if I had not had at my disposal several cadmium proofs of extraneous origin—three original plates, for which I am indebted to the kindness of Mr. W. N. Hartley, of Dublin—which have also been taken upon silver bromide gelatine with a quartz prism and quartz lenses.

These proofs showed the difference in the intensity of the above-named lines decidedly less than my plates. They therefore justify the assumption that Hartley's experimental arrangement had in some manner relatively assisted the photographic action of the lines No. 25 and No. 26. I was confirmed in this conclusion by three other cadmium photographs by the same spectroscopist, good photographic reproductions of which accompany one of his treatises (*Scientific Transactions of the Royal Dublin Society*, "Photographs of the Spark Spectra of Twenty-one Elementary Substances," vol. i. series 2, pp. 231–238, 1882), and which, in contrast to the above-named original plates, are in harmony with my plates; whence, therefore, the difference among Hartley's proofs? This question was of essential import for the continuation of my work.

Hartley, on the ground of the plates of his two negatives above named, had marked with a diamond the date 1880; his treatise appeared in 1882 My investigation began in the year 1889. As regards the arrangement in taking Hartley's plates above mentioned, I merely know that an apparatus with quartz prisms had been employed. Hartley's treatise explained his arrangements in taking the other spectra. From reasons, the exposition of which would prove tedious, I have below, in the solution of the above question, kept myself exclusively to the proofs. This was admissible, since they display a difference palpable for the present case. The length of the spectra is different. If measured between the cadmium lines No. 9 and No. 26, it amounts in the plates to 82 mm., and in the figures to 157 mm. As both spectra show no appreciable difference in the re-solution of their crowded lines, it was permissible to assume that the dispersion of Hartley's spectral apparatus was the same, and that merely the focal distance of the lenses was different. Therefore the lengths of the aërial transit of the rays of both apparatus must have differed from each other approximately in the same proportion as the focal lengths. It has been already proved by Cornu (*D'Almedia J.*, x. pp. 5-17, 1881) that the transparency of the air decreases with the wave-lengths of the rays, especially in the ultra-violet, though certainly in strata of much greater thickness than those of Hartley's apparatus. Still, I have felt compelled to uphold the resistance of the air as the sole cause of the above-named difference in the intensity of the two most refrangible lines of cadmium. On the one hand, because Miller's proofs already showed that a stratum of air, even of moderate thickness, may prove an insuperable difficulty in the photography of the ultra-violet; and, on the other hand, because all further experiments which I instituted to detect other causes for this phenomenon proved fruitless. An experimental strengthening of this assumption, the necessity for which seemed more urgent on every new photograph, had to be postponed until the conclusion of the connected examination of the spectra of zinc and aluminium, on account of procuring the necessary instruments.

The zinc spectrum in its most refrangible part acted still more feebly than the cadmium spectrum. For instance, an exposure of three minutes was required for the appearance of the most refrangible line, No. 29. Like the efficacy, the intensity showed a further decrease. Of all the main lines of cadmium and zinc, none appeared so slightly as the zinc line No. 29. The combined spectrum of both metals showed better than any other that the intensity decreased with the wave-length as yielded by a spark springing over between these electrodes. (When employing three electrodes, I connect the pair of electrodes with the current circuit, whilst the single electrode of the other metal was introduced with its extreme end into the track of the spark, where it then took part in the discharge in a normal manner.) Few metals are here at all suitable like zinc and cadmium.

Contrasts in the intensity of adjacent ultra-violet lines are shown in the inflection spectrum better than in the refraction spectrum, since the deflection of the rays does not succeed progressively with the wave-length as with the prism, but proportionally. Hence the lines towards the more refrangible end are more and more crowded together, whilst in the refraction spectrum they recede further from each other. Proofs which I took with a concave grating revealed still better the decrease of the intensity and efficacy of the lines in question.

According to Cornu's hypothesis (*Comptes Rendus*, lxxxviii. pp. 1285–1290, 1879), a stratum of air of the thickness of ten metres suffices for the absorption of the rays of the wave-length 211·84 $\mu\mu$.

The rays Nos. 27, 28, and 29, the wave-lengths of which are smaller, are consequently absorbed by such a stratum of air in a still stronger degree.

I utilised this fact in order, even before the completion of the above-named new apparatus (see *ante*), to procure a more certain basis for the measurement of the absorption of the more refrangible rays in the air than was afforded by the former observations. To this end I execute

* Continued from page 739.

some proofs with the quartz apparatus, in which the sparks and the photographic plate were distant from each other, not ten, but seventeen metres. The light was conducted directly into the apparatus. Two quartz lenses placed at the focal distance of the rays arriving at the plate in front of the slit and the sparks co-axially with the collimator, collected these rays in the aperture of the slit of the collimator. After fifteen minutes' exposure all the zinc lines appeared, contrary to expectation, although very thin and devoid of expression, which, however, was this time unimportant. The important part of the result was the fact that the atmospheric air, as tested by brom-silver gelatine, is far more pervious to light than might have been expected according to Cornu. In addition, the thickness of the stratum of air employed by no means corresponded to the limit of transparency. According to my firm conviction, a much thicker stratum of air would have led to the same result. How did my assumption of the influence of the air upon the photographic efficacy of the most refrangible rays agree with this result? Little as I could bring them in harmony, the cadmium phenomena furnished ground enough to uphold them unaltered. That the numerical values which Cornu has given for the aërial absorption could no longer serve as a basis after they had been found doubtfully trustworthy in my photographs of the zinc spectrum need not surprise us. Cornu's statements are founded on the behaviour of the wet-collodion plate, whilst my proofs were taken only with the gelatine plate. The sensitiveness of both plates is fundamentally different, and in that part of the spectrum which exclusively concerns us it is totally unknown. How the sensitiveness of both plates may vary in the ultra-violet we have hitherto no observations to show.

I next proceeded to take the spectrum of aluminium. The first experiments were fruitless. Not until I had enlarged the slit to the unusual extent of 1½ mm. and had exposed for twenty minutes did I succeed for the first time in recognising on the fixed plate at least traces of the line No. 30, and the less refrangible components of the double line No. 31. The image of lines was certainly so faint that under ordinary circumstances it was visible neither by transmitted nor by reflected light. To perceive it distinctly especial precautions are required. In the same manner I subsequently obtained, after an exposure of forty-five minutes, the remaining aluminium lines. Thus I had arrived at the region of the smallest wave-lengths, but had by no means attained my purpose. My proofs certainly supplied evidence that the most refrangible aluminium rays after traversing a stratum of air of two metres in thickness could still exert upon silver-bromide gelatine an impression capable of development; but an application of such proofs in spectroscopy, at which I was aiming, was not to be thought of. The clearness of the lines was insufficient.

An attempt to obtain better results by elevating the energy of the rays failed completely. What I effected with an induction apparatus of unusual size, constructed by Keiser & Schmidt, of Berlin (length of sparks 50 cm.), expressly for these proofs, demonstrated merely that the object could not be approached in this direction.

More for the sake of completeness than with a hope of success I executed an aluminium proof with the above-mentioned grating apparatus. I never obtained even a trace of a line. The grating was well suited for taking the zinc lines, but with the aluminium lines of the shortest wave-length it failed entirely.

Nothing remained but to take a photograph with a thicker air stratum; After I had studied the behaviour of my plate in the aluminium light under normal conditions, the thickening of the stratum of air seemed a more suitable expedient for the direct demonstration of the influence of the air upon the photographic efficacy of the most refrangible rays than previously. I employed for this purpose the same experimental arrangement which I had used in taking the zinc spectrum. The track of the rays in the air up to the photographic plate measured consequently again seventeen metres.

Not a single exposure now left an impression upon the plate, not even when I exposed for an hour and a half with very energetic sparks. The thickening of the stratum of air had therefore caused all the light-rays, which in the former case had left an impression, to become enfeebled on their passage to the plate to complete inefficiency. Thus I had at last obtained experimentally the confirmation of my supposition on the aërial resistance in the most refrangible ultra-violet, and at the same time the certainty that, if with the resources of the present day a further advance is feasible, this can be effected only after sufficient diminution of the resistance of the air. No apparatus in my possession could be adapted to this condition. The continuance of the experiment was therefore effected chiefly with newly acquired instruments, mentioned under "Cadmium," the arrangement of which had been brought into accord with the experience collected in photographing the most refrangible rays.

B. With especial apparatus.

The leading idea in the design of the new spectral apparatus which my next photographs required was the utmost possible reduction of the resistance of the air. My reflections had led me to three different constructions, according to which the stratum of air was to be reduced, either diminishing the focal distance or by exhausting the tubes of the collimator and the camera, whilst retaining the original focal distance, or by exhausting the entire spectrum apparatus.

The entire removal of the air from the track of the rays in the apparatus would certainly ensure the most favourable result conceivable, if the desired object is attainable in this manner. But the difficulties of obtaining such a spectrum apparatus, exhausted of air in the manner of Geissler tubes, seemed so considerable, that I even renounced the less serious project of partial exhaustion, and decided on the diminution of the focal distance.

A very short focal distance yields, if a single quartz prism is employed, spectra of a minute length. Spectra rich in lines, such as that of the sun, are then no longer capable of resolution. For such photographs the apparatus is almost useless. This applies more to the visible spectrum than to the ultra-violet, and in the most refrangible part of the ultra-violet, where the lines, according to their wave-length, are relatively much more remote from each other than in the less refrangible part, the conditions are still more favourable. Here, therefore, as I show below, the resolution of densely crowded lines, which in such cases are decisive, can be effected with microscopical minuteness, even with a very small apparatus.

An increase of dispersion by means of a greater number of prisms cannot be admitted, on account of the loss of light involved. The result of the experiment depends, in the first place, upon preserving the energy of the rays.

In order that the proofs, in spite of their smallness, might meet the most severe demands, everything was done which could promote the sharpness and distinctness of the image, both in the construction of the apparatus and in the selection and arrangement of the auxiliary apparatus required for taking the photograph.

Concerning the measurement of the focal distance I have remained for a long time undecided, as all the data for the effects of a greater or less reduction of the length of the tube were wanting. The numerical values which Cornu has established for the absorption of the most refrangible rays in the air were here unsuitable, from the reason mentioned. So much only seemed certain, that a moderate decrease of the length of the tube would scarcely lead to a decisive result. Proceeding from the assumption that the greater energy of the rays, and in like manner the complete sharpness of the image, were connected with a smaller length of the tube, and that a small but sharply defined image was preferable to one large but less clear, I selected a lens of only 150 mm. focal distance.

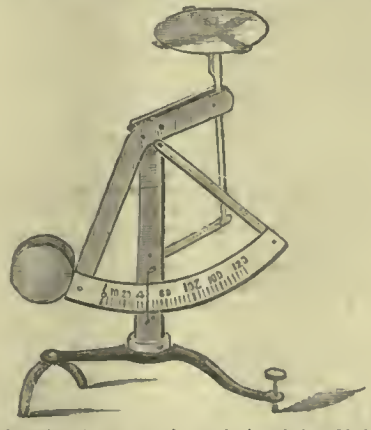
VICTOR SCHUMANN.

(To be continued.)

Our Editorial Table.

A PHOTOGRAPHER'S BALANCE.

THE cut shows a cheap balance just brought out, for weighing photographic chemicals, which it does with a surprising degree of accuracy. It has a glass pan which can be easily detached. The quadrant is



graduated to twelve drachms, apothecaries' weight (divided by scruples).

When we say that this really well-made balance can be obtained

from any dealer at a shilling, or possibly a very little over this sum, it will evoke wonder how it can be made to sell at the price.

The "Lucerna" Finder.

Under this pretty name Mr. J. R. Gotz, 150, Shaftesbury-avenue, W.C., has brought out an elegant and well-made finder, which is capable of being placed on the top of a hand camera to look down upon, or on a camera brought up to the level of the eye when the view is seen by looking through the finder. In either case the image is characterised by conditions of luminousness quite equalling those under which the view is seen by the eye. The principle of construction of the Lucerna is that of the conjunction of a plano-concave lens and a plane-silvered mirror which is capable of being erected at an angle, or allowed to fall flat against the bottom of the finder.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 21,675.— 'Improvements in and Relating to Carriers for Photographic Dry Plates." J. McL. Dobson.—*Dated November* 14, 1893.

No. 21,686.—"A Reflecting and Ventilating Device or Apparatus for Photographic Exposure by the Magnesium Light." Communicated by J. Köst-W. Fairweather.—*Dated November* 14, 1893.

No. 21,727.—"Improvements in Photographic Cameras." Complete specification. Communicated by The Magic Introduction Company. O. Imray.—*Dated November* 14, 1893.

No. 21,880.—"A Portable Apparatus for Producing Enlarged Copies of Photographs. E. Clifton.—*Dated November* 16, 1893.

No. 21,890.—"A Safety Covering for Metallic Storage Cylinders, Cases, or Bottles in which Compressed or Liquefied Gas or Air is Stored, such as those Used for Storing Oxygen and Hydrogen at High Pressures for the Oxy-hydrogen Limelight-burners and for Storing Condensed Carbonic Acid Gas, Oil Gas, Coal Gas, and other Gas." A. Lupton.—*Dated November* 16, 1893.

PATENTS COMPLETED.

Improvements in Plate or Film-holding Changing Backs or Slides for Photographic Cameras.

No. 23,229. Thomas Samuels, Monken Hadley, Middlesex.—*October* 21, 1893.

My invention relates to multiple plate or film-holding changing boxes, or dark slides of that kind, in which a number of sheathed plates or films are placed in front of one another in a box-like chamber, and are transferred in succession from one end of the series to the other through the medium of a flexible light-tight bag enclosing the open side or end of the said box, the plates or films either facing all one way or being placed back to back in double sheaths so as to form a double series facing in opposite directions, according as the box or holder has a shutter at the front only or at both front and back.

My present improvements relate particularly to the means whereby the transfer of the sheathed plates from one end to the other of the series is effected, and they have for their object to facilitate the operation of transferring the plate and admit of the flexible bag being so reduced in dimensions that it may be folded wholly within the open mouth of the changing box which it encloses, and be itself enclosed and protected when thus folded by a hinged lid. My improvements also have for object to guard against double exposures.

According to my present improvements, the lifter or frame, whereby a plate to be transferred is partially withdrawn and caused to project sufficiently into the bag to enable it to be seized by the fingers, is adapted to act, not only as a sliding lifter, but also (when it has fulfilled its purpose as a lifter) as a lever to transmit a backward pressure to the whole series of plates, in order to force them backwards sufficiently to make room in front of them for the plate which has just been brought from the other end of the series. This lifter is constructed of a U-shaped frame having cranked and inwardly projecting legs at the ends adapted to engage with the sheathed plate to be withdrawn, the side members of the lifter being guided by the sides of the plate chamber, and when the lifter is drawn out to its full extent working on fulcra thereon, or the side members of the lifter may be jointed and work on these joints as fulcra. The mouth of the flexible bag is affixed within the aperture of the plate-holding box, and the bag is attached at a suitable point to the cross member of the lifter, so that, when the lifter is drawn out and swung slightly backwards, the bag will be distended and brought to the proper position to enable the plate raised by the lifter to be seized through the bag, raised wholly within the latter, and transferred to the other end of the series, without shifting or relaxing the grip until the operation is completed.

The means whereby the swinging of the lifter in the forward direction is caused to transmit a backward pressure sufficient to cant the whole series of plates backwards to admit of the introduction of the plate to be transferred, comprise intermediate levers pivoted to the sides of the plate chamber on which the side members of the lifter act, and which levers, in turn, engage with, or terminate at, their opposite ends, in presser pieces, bearing against the front flanges of the foremost plate sheath, and presenting inclined surfaces to the incoming plate, so that, after having made room therefor, they, as well as the intermediate levers by which they are actuated, will be restored to normal position by the act of introducing said plate.

In order to guard against double exposure, especially in the case of a changing box or slide having a shutter at both front and back, and containing a double series of plates placed back to back in double sheaths as above mentioned, I provide an automatic or partly automatic locking device, whereby a shutter having been once drawn cannot be drawn a second time until the hinged door, which closes in the bag, has been opened, which, of course, is only done for the purpose of obtaining access to the bag and transferring an unexposed plate to position for exposure. This automatic fastening consists of a latch adapted to permit the withdrawal of the shutter a first time, but to oppose a second withdrawal of the shutter on the latter being closed, and to be itself locked or engaged by a latch or detent mounted on the inside of the door, and which may be in such operative connexion with the fastening of the door that the act of unfastening and opening the door restores the locking device to its initial condition of disengagement or freedom, so that it no longer obstructs the withdrawal of the shutter. Each shutter would be provided with such a locking device, both controlled in the same way and by the same or by independent means.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 27 ...	Camera Club	Charing Cross-road, W.C.
,, 27 ...	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 27 ...	Lantern Society	20, Hanover-square.
,, 27 ...	North Middlesex	Jubilee House, Hornsey-road, N.
,, 27 ...	Putney	Boys' Gymnasium, Charlwood-road.
,, 27 ...	Richmond	Greyhound Hotel, Richmond.
,, 28 ...	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 28 ...	Great Britain (Technical)	50, Great Russell-st., Bloomsbury.
,, 28 ...	Hackney	206, Mare-street, Hackney.
,, 28 ...	Halifax Camera Club	
,, 28 ...	Lancaster	Springfield Barracks, Lancaster.
,, 28 ...	Leith	165, Constitution-street, Leith.
,, 28 ...	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 28 ...	Paisley	9, Gauze-street, Paisley.
,, 28 ...	Warrington	Museum, Bold-street, Warrington.
,, 29 ...	Bath	Roy. Lit. & Sc. Inst., Terrace-walks.
,, 29 ...	Burnley	Bank Chambers, Hargreaves-street.
,, 29 ...	Leytonstone	The Assembly Rooms, High-road.
,, 29 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 29 ...	Southport	The Studio, 15, Cambridge-arcade.
,, 30 ...	Camera Club	Charing Cross-road, W.C.
,, 30 ...	Glossop Dale	
,, 30 ..	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 30 ...	Hull	71, Prospect-street, Hull.
,, 30 ...	Liverpool Amateur	Percy-buildings, Eberle-street.
,, 30 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 30 ...	Oldham	The Lyceum, Union-street, Oldham.
December 1.....	Brighton and Sussex	Librarian's Room, Public Library.
,, 1.....	Cardiff	
,, 1.....	Central Photographic Club	Coleman's Hotel, Henrietta-st., W.C.
,, 1.....	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 1.....	Holborn	
,, 1.....	Leamington	Trinity Church Room, Morton-st.
,, 1.....	Maidstone	"The Palace," Maidstone.
,, 2.....	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

November 16,—Mr. G. W. Atkins in the chair.

Mr. Everitt asked for information as to getting vigour in the carbon process. He said that he had difficulty in obtaining a good image with a good negative; he thought that his sample of potassium bichromate might be in fault.

Mr. Debenham had given up the process on account of this difficulty. Tissue varied much; as to strength of bichromate bath he considered three per cent. sufficient and squeegeed the surplus solution off the surface as well.

Mr. Mackie judged the time of sensitising by the limpness of the tissue.

Mr. Everitt explained that he had used three negatives of different character, and yet could not get results; he was using the Autotype Company's Sepia tissue, as he liked the tone.

Mr. Debenham suggested that he should try their engraving black tissue.

Mr. Child-Bayley said that Mr. Burton had obtained great brilliancy with the tissue at the point of insolubility.

Mr. Rawlings asked for members' experience of Hill Norris's collodion dry plates.

Mr. Everitt remarked that some samples gave weak images, and he preferred to do without intensification.

Mr. Child-Bayley said that the image lost in fixing.

Mr. Teape had found no difficulty in getting density, but the image was rather hard. He found that a medium negative required for exposure half an inch of magnesium at a distance of about seven feet; an ordinary lantern plate required the same amount at two feet distance.

Mr. Child-Bayley said a collodion dry plate wanted three seconds at eighteen inches distance from a gas-burner. Pyro-soda developer gave violet-black tones.

Mr. Debenham said that he preferred hydroquinone. In answer to a question, he stated that the reason of collodion emulsion setting into clots on the plate was the absorption of water. The remedy was to dry off the solvents and redissolve. The new methylated spirit was injurious, giving veiled shadows.

Mr. Parfitt asked how best to copy without showing the grain of the paper.

Mr. Debenham said it was essential that the light should be low down, short of getting reflections. Oblique illumination showed the grain, therefore it

should fall as nearly perpendicular as possible, and a light in the opposite direction was useful.

Mr. PARFITT had heard of a cone of tissue paper being used, and

Mr. TEAPE suggested a black screen with a hole for the lens through it.

Mr. Welford was thanked for the presentation of photographic literature to the Association.

Mr. Rawlings passed round a print which was obtained from an enlarged negative, a print from which was rephotographed and worked up with the air-brush, a second negative being then taken from it.

MANCHESTER PHOTOGRAPHIC SOCIETY.

NOVEMBER 9,—The President in the chair.

Mr. LAWES reported results of the trial of "Una," a new toning medium, the general conclusion being that it gave no advantages over the usual gold solutions, and, as no indication of its composition was supplied, any opinion as to the permanency of the tones could not be offered. It was certainly very simple in application, and this was perhaps its only merit.

Mr. F. EDWARDS contributed some notes on the use of "Nikko" paper as used by himself for enlarging, and he found that for this purpose it gave much superior pictures to the ordinary bromide papers, and with ferrous-oxalate development very pleasing tones. A liability to blister had to be guarded against, otherwise he had no fault to find with the working of this paper.

The PRESIDENT opened a discussion on the recently introduced "Hill Norris" collodion dry plates for lantern slides. Personally, he was quite satisfied with gelatine, but considered the collodion plates good. In the discussion, the advantages over gelatine named were freedom from stains and the ease of intensification, and thus control over wrong exposure. The drawbacks were a difficulty of judging the right development, and a reduction during fixing.

A fine collection of enlargements of photographs of microscopic objects, kindly lent by Mr. W. I. Chadwick, were shown during the evening; these were bromide enlargements from quarter-plate negatives produced by the microscope.

Ealing Photographic Society.—November 16, Mr. W. T. White (Vice-President) in the chair.—One new member was elected. Dr. GIBBONS read a paper by Mr. F. L. Pither, entitled *Notes on Landscape*. The author of the paper strongly condemned mere mechanical work, and urged that the subject should be carefully considered with the view of producing the most artistic result possible. The art of selection must be carefully studied, and too much must not be reproduced in a given area. Individuality should be striven for, and nature should be depicted, not in one phase only but in all her varying moods. Whilst aiming at individuality, certain simple first principles must not be neglected. No prominent line or feature should equally divide the picture; as a general rule, no continuous line should run parallel to either edge of the picture, and parallel lines should be avoided unless much broken up or counterbalanced. Two most important qualities were breadth and atmosphere, and, if these qualities were not produced by the actual exposure in the camera, they should be indicated by the judicious application of light washes of Indian ink to the negative. The paper provoked a lively discussion, and regret was expressed that Mr. Pither had not entered into greater detail regarding his methods of work. The rules drawn up by the Council for regulating the use of the dark room were read.

East London Photographic Society.—Nov. 14, Mr. M. A. Wilkinson in the chair.—After the preliminary business had been disposed of, the CHAIRMAN called upon Mr. S. HERBERT FRY for his lecturette and practical demonstration on *The Paget Prize Printing-out Paper*. The lecturer prefaced his remarks by eulogising the great advantage that this paper would confer on all those—amateur and professional alike—who had only a minimum of time to devote to their printing and showed a print as an example which had only received (approximately) one-tenth of the ordinary exposure. This print he proceeded to develop. He preferred to leave the print in the bromising solution at least *ten* minutes, although the printed instructions advocated *two* only, as he found that better and more sure results were obtained. The thorough washing of the print after this first stage in development was strongly advised, as the majority of the failures in using this paper were traceable to insufficient washing. If greater contrast were desired in the print, a soaking in the No. 3 solution before development (not omitting the use of the bromising solution as instructed) would give the required result. Any form of gold bath would tone the developed prints, but he preferred the following formula:—Hypo, 1 pound; acetate of lead, 1 ounce; common chalk, 1 ounce; add water to make bulk equal to 80 ounces, and, for every 5 ounces of solution, add one grain of gold chloride, allowing 1½ grains of gold to each sheet of paper. Use once only. In reply to a question from one of the members as to a good method of intensification for gelatine negatives, he said that after the usual blacking, the negative should be placed in a gold bath and then redeveloped. The usual courtesies were passed to Mr. Fry for the lucid and practical manner in which he had treated the subject. A sample of Beecham's patent spotting and retouching medium and transparent water colours was handed to one of the members to test and report thereon at the next meeting.

Hackney Photographic Society.—November 14, Mr. Robert Beckett in the chair.—Members' work was shown by Messrs. Roofe & Sodeau. Several members showed specimens of lantern slides printed upon the new Barnet plates. The results were very good, and included a great range and variety of tone. Mr. Roofe showed prints of printing-out Paget and P. O. P. papers, toned with one ounce and a quarter of an ounce acetate of lead respectively. There appeared to be no difference in results. The prints required a little deeper printing than for sulphocyanide toning. Mr. Sodeau showed a platinum print torn in four pieces, toned with uranium to warm tones, three quarters being toned one and a half, three, and twelve hours respectively. The tone that pleased most was that subjected to three hours' toning. Mr. SMITH asked if there was any remedy for reducing an over-printed P. O. P. print to a normal print. Farmer's reducer was recommended. Mr. BARKER asked how long Alpha paper would keep under ordinary circumstances. Mr. BECKETT stated he had used it five to six years old. Mr. ROBERTS said he found the edges turn yellow after keeping some time. Mr. H. M. SMITH, of Messrs. Eastman, then proceeded with a paper upon enlarging generally, and dealt with some very interesting points in connexion with same, illustrated by diagrams. A demonstration was then given, and some excellent results were obtained.

North London Photographic Society.—November 7, Annual General Meeting.—The report of the Council was received and approved, and the following officers elected for the ensuing year:—*President:* Mr. J. Traill Taylor.—*Council:* Messrs. W. Bishop, J. Brewer, J. Douglas, J. Oakley, and E. W. Parfitt.—*Curator:* Mr. W. Few.—*Hon. Secretary and Treasurer:* Mr. W. T. Coventon, 50, Highbury-park, N.

Putney Photographic Society.—November 16, Dr. J. F. Farrar in the chair.—Mr. S. HERBERT FRY, having been unable to prepare the necessary prints to illustrate his promised paper on *Unconventional Printing Methods*, was compelled to postpone that subject until a subsequent meeting, substituting a demonstration on *The Paget Prize Company's Print-out Papers and Lantern Plates*. Mr. FRY stated that, as the same emulsion was used for the paper and plates, and the treatment was so very similar in both cases, he would confine his remarks chiefly to the plates. These, he said, had many advantages over most others. Their chief qualities were, however, their great range of tones, the tolerable certainty of being able to get any tint (warm or cold), absolute purity in the high lights, and, however deeply printed, great translucency in the shadows; in fact, these slides were quite equal to the old collodion. The plates could be treated in two ways, either printed out fully and toned, and fixed, or, if preferred, they could be only partially printed out and the image developed to full depth, the subsequent toning and fixing being the same as when fully printed out. There might at first be some little difficulty in printing to the proper depth, but generally it would be found advisable to print rather fully, as the image could readily be reduced by immersion in a two to three grain solution of ferrocyanide of potassium. This bath would also have the additional advantage of clearing the plate. If under-printed, there was a tendency to force the plate and to veil the high lights. As the developer could be be modified, great power was given over the resulting image, so that by this method good and artistic slides could be made from practically any negative. The development presented no difficulties, and the chemicals were those usually found in any photographer's dark room; the formula for the paper was the same as for the plates. Having brought an exposed plate, Mr. Fry proceeded to show how it was developed. Without previous washing, he placed it in a ten per cent. solution of bromide of potassium, explaining that it should remain there at least three minutes, but that fifteen would not be too long. After having been well washed it was transferred to the developer. As the image gathered strength, he warned the members not to allow development to go as far as in the case of fully printed-out plates, as the developed image appeared to stop more light. After development the plate *must* be well washed—fifteen minutes at least in running water—for, should any developer be carried in the film to the toning bath, the gold would be precipitated, and intensification as well as uneven toning might take place. Development should on no account be forced. If carried on slowly, the result would be well under control, and also more satisfactory. Should the plate, after being toned in the separate bath (but, of course, before being fixed) it could be redeveloped and retoned. Mr. Fry strongly recommended that the instructions and formulæ issued with the plates should be strictly adhered to, as they had been thoroughly tested, and could be relied on to give good results. This was specially so with the developer; in the case of the toning bath greater latitude was permissible, and any bath which had been found satisfactory with print-out paper would do very well. A combined toning and fixing bath should never be used a second time. Just sufficient should be made up for the work to be toned, and, having been used, must be thrown away. Stock solutions could, of course, be kept separately for a long time. Toning should not be carried quite so far as is desired in the final result, as both the paper and plate dry of a somewhat colder tone. A good washing should be given between toning and fixing, and after fixing the washing must be very thorough, the result depending greatly on the thoroughness of the washing. A hearty vote of thanks terminated a pleasant evening.

West London Photographic Society.—November 14.—Mr. J. C. DOLLMAN delivered an address on *Figure in Landscape*. After stating that the disposition of figures in a picture is mainly a matter of feeling begotten of the occasion, Mr. Dollman proceeded to deal with the title subject under the three headings, "Why," "Where," and "How." *Why* have a figure at all the landscape may possess a charm apart from "human interest." If figures be admitted into the picture they should be of secondary interest, subordinate to the principal idea. The figure may assist in intensifying the meaning of the subject, as a man struggling before the storm conveys the idea of wind, or a figure or group may give balance or point to the subject. Turner is the source of the highest instruction on this point. *Where?*—Genius is often an instructive guide. In photography the relative value of the figure is sometimes miscalculated, and the focussing screen, giving the image upside down seriously handicaps the photographer. A suggestion put forward by the lecturer was that the landscape should be photographed first, and a print taken. The print could then be examined at leisure, and the question of where the figure should come thought out. Subsequently the scene could be rephotographed with the figure in the position decided upon. Though troublesome, this plan should prove efficient, and it would give photographers the opportunity of showing what art they possess. The best place for figures is in the space between the mid-distance and the near foreground of the landscape, though a figure quite in the distance may be the making of a picture if judiciously introduced. *How?*—In posing your models, don't overdo it. Learn the value of restrained power, simplicity, and suggestion. *Never do it all.* Leave something for the spectator to do. Provoke inquiry, curiosity, fascination, *and* gratify it. Avoid the commonplace. Seek for simple, unaffected occupation for your figures. Figures in motion should have more space before than

behind them. Study variety in posing your models. Rather let the models pose themselves at your instruction, and seek for grace in disposing them. If the *pose* is *easy*, it will be graceful. Shun the conventional. A sympathetic model is alone the kind to employ. The lecturer concluded with some humorous references to the conventional costume of the day, with especial reference to men's clothing and the absurd persistency of the top hat.

Woodford Photographic Society.—November 16.—Among the items of interest were some lantern slides, shown by Mr. Malby, which very strongly emphasised the influence of temperature on development. Two plates exposed by artificial light under ordinary conditions of working refused to develop satisfactorily, though development was prolonged for three-quarters of an hour. On testing, the temperature was found to be about 47°. Two more plates, similarly exposed, produced most satisfactory slides in a developer identical in composition, but at a temperature of 68°. The President showed a bottle of pyro solution (with sulphite of soda) mixed in April 1888, with some plates exposed under a Warnerke sensitometer, and developed with this solution and one freshly mixed respectively. When the temperature of development was 70°, no difference could be seen between the two; when at 55°, there was a slight difference in favour of the freshly mixed solution. A discussion on *The form that the work of a Photographic Society should take in order to be of the greatest assistance to its younger members* was opened by Mr. H. T. Malby, who said that the first few steps in photography presented the greatest difficulty; if initial difficulties were thoroughly mastered, a sure step had been taken on the road to success. In development, it was useless to lecture, and not of much value to criticise plates after they might be spoiled. In order to teach a young photographer how to develop a negative, it was necessary for a more advanced worker to take him patiently through the actual work. A beginner could never tell when to stop development, and it was impossible to teach this other than by practical demonstration. He offered to give such assistance to any of the members of the Society who desired it at Saturday evening meetings, specially arranged for that purpose, the same afternoons being utilised for outdoor work, when assistance in exposure, management of camera, composition, &c., could be given. Next meeting, December 7, Mr. H. T. Malby on *Copying*.

Birmingham Photographic Society.—November 14, Mr. G. F. Lyndon in the chair.—In continuance of the series of one-man exhibitions, Mr. J. T. Mousley showed a large number of photographs illustrating his methods of working. The prints, which were mostly of architectural subjects, showed great skill and care in selection, and were of splendid technique. They illustrated many methods of printing, some fine sepia tones on gelatine paper being especially admired. Mr. Mousley also gave hints as to mounting and framing, some novel frames being laid on the table.

Liverpool Amateur Photographic Association.—*Life in Tripoli.*—This was the title of a lecture delivered on Wednesday night, 15th inst., by Mr. G. E. Thompson in the City Hall, Eberle-street, under the auspices of the Liverpool Photographic Association. Mr. Paul Lange, in the absence of the President, occupied the chair. Mr. Thompson paid a visit to Tripoli, in Barbary, last April, and secured a large number of admirable photographs, about 140 of which were shown on the screen by the aid of Messrs. Archer & Son's fine limelight lantern. The lecturer gave an interesting account of a week spent in the sunny oasis of Tripoli, among the Arabs, negroes, camels, fruit gardens, and palm forests. His views of the desert, with its boundless stretches of sand, were most telling; here and there were seen camels coming in from distant oasis, laden with esparto grass. This is a staple trade of Tripoli. Views were shown of one of the chief grass yards, where one hundred negroes are employed. The processes were described up to its shipment off to England, where it is converted into paper. The homes of the negroes were visited, including the huts and groups of the people.

On Thursday evening, November 16, Mr. Bynoe gave a lecture on *Hand-camera Work*, with special reference to the "Frena" system; he illustrated all the working parts by diagrams on the screen, showing the improvements in No. 2, the principal being the size, quarter-plate, and the alteration in the shutter, also the use of magnifiers for near objects; he explained and illustrated the great use and simplicity of the swing back. After answering some questions, he exhibited some specimens of pictures taken with the camera.

Glasgow and West of Scotland Amateur Photographic Association.—November 20, Mr. W. J. B. Halley (President) in the chair.—Twenty-one new members were elected. Mr. Victor L. Alexander demonstrated printing on "Nikko" paper, and gave his experience as to time of exposure for printing and enlarging. He showed excellent enlargements made on this paper and finished with a matt surface. Mr. William Goodwin read a paper on *The Factors that Affect Exposure*, stating the limits within which these factors may be expected to vary, and showing how tables of exposure are constructed. An exhibition of members' lantern slides terminated the meeting.

Glasgow Photographic Association.—October 19.—The first popular meeting was held in the large hall of the Philosophical Society's Rooms, Mr. William Lang, jun., F.C.S. (President), in the chair. Mr. William Lamond Howie, F.C.S., delighted a large and appreciative audience with his lecture, *The Scottish Alps*, the descriptions being illustrated with a large series of views taken by the lecturer during his ascents of the more important highland bens. The pictures of mountain scenery taken from the plains and from the snow-clad summits were greatly admired. A number of views of the snow scenery on the summit of Ben Nevis, photographed last Easter, were then passed through, the great precipices from various points, the curious configuration of the surface snow, and views of the Observatory on the summit, 4406 feet above sea level. The observers were shown at work, and one of the most striking being the summit hotel and restaurant. One view showed Beu Aonach with two figures standing on the brink of the precipice, which drops 2000 feet into Glen Nevis. The lecturer's experiences amongst the mountains were told in a racy and interesting manner. In contrast to the many snow scenes were shown some excellent landscapes of highland scenery, and also a few fishing and deer stalking scenes. On the motion of Mr. John Stuart a very hearty vote of thanks was awarded Mr. Howie.

November 16, Mr. William Lang, jun., F.C.S. (President), in the chair.—The President delivered his retiring address, and then after office bearers for the ensuing year were elected, Mr. John Stuart succeeding Mr. Lang in the Presidentship, which he has held for eight years, a number of photographic novelties, including new printing-out and developing papers, apparatus, and a Dallmeyer focussing view finder for attachment to a camera were shown.

Munster Camera Club.—The opening meeting of the session of the Munster Camera Club was held last week in the lecture hall of the Crawford School of Science and Art, when Major Lysaght (late president of the Society) gave an address on the subject of his visit to the Photographic Convention recently held at Plymouth. Mr. John Day presided. Major Lysaght, in the course of his remarks, explained that the meeting at Plymouth was the eighth that had taken place, and next year the Convention would be held in Dublin. He then proceeded to exhibit many photographic views that he had taken during the cross-channel trip and of places of interest in and around Plymouth. A group of the members attending the Convention was photographed and put upon the screen. Numerous other slides of a miscellaneous series were also shown, and dealt with interesting subjects. At the conclusion of the discourse Dr. Rinorose Atkins proposed a vote of thanks to Major Lysaght, and referred to the services that he had afforded the Society during his presidency. He considered that now the Society, having been so well established, should continue, and its members should rally round their new President. The Chairman, in conveying the vote of thanks, said the members felt that they owned a deep debt of gratitude to Major Lysaght for the interest he had taken in the Society, and the committee considered that they could not allow their late president to leave Cork without presenting him with some token of their esteem. Therefore, in putting the vote of thanks, he had also to ask Major Lysaght to accept the illuminated address that had been prepared, and that it was the desire should be presented to him on behalf of the Society. Major Lysaght, in replying to the vote of thanks, assured the members of the Society that the gift which they presented him with on the occasion of his leaving the city would be always appreciated by him. Though he would not be able to be amongst them in the near future, still any assistance that he could render would be most cheerfully given in the way of providing photographic lantern slides for the entertainment of the members of the Society. His desire would be that the members should fall in with Dr. Atkins's suggestion, and to assist their new President for the advancement of the Club.

Photographic Society of Japan.—Oct. 6 Mr. C. D West in the chair. Mr. W. K. Burton showed comparative results of work done with lenses of "symmetrical" or "rectilinear" type, and the new Zeiss anastigmatic lenses. The most interesting comparison was between an aplanatic (rapid rectilinear or rapid symmetrical lens) of exceptionally good quality and an anastigmatic, Series II. The difference was remarkable. Briefly summed up, the anastigmatic was with full aperture twice as rapid as the aplanatic. It gave the same flatness of field with twice the angular aperture (four times the rapidity) and, with a small stop, it acted as a wide-angle lens. The absence of astigmatism in the anastigmatic lens was remarkable. Aplanatic lenses of the same rapidity, or even greater than the anastigmatic, were made, but, used stop for stop, the roundness of field was greater than that of the somewhat slow aplanat that has been used for the comparative experiment.

FORTHCOMING EXHIBITIONS.

1893.		
November 24, 25	...	*Stanley Show (Photographic Section), Agricultural Hall. Manager, Walter D. Welford, 57 and 58, Chancery-lane, W.C.
" 24, 25	...	*Leytonstone Camera Club. Hon. Secretary, A. E. Bailey, Rose Bank, South-west-road, Leytonstone.
December	.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
" 18–Jan. 22, 1894		*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

News and Notes.

Lewisham Camera Club.—December 1, *Modern Plate-making*, by Mr. H. O. Drake.

The Photographic Club.—November 29, *Lantern Matters*, Monthly Lantern Meeting.

Liverpool Amateur Photographic Association.—November 30, *Quiet Corners in France and Italy*, Lantern Lecture by Mr. W. P. Christian.

Bristol International Photographic Exhibition.—The Judges already appointed are Messrs. Valentine Blanchard, Payne Jennings, and S. P. Jackson (painter).

Dark Rooms at Venice.—Mr. W. J. Stillman writes: "For the convenience of amateurs of photography, who are working in Venice, I wish to say that they will find at the establishment of Celso Mantovani & Co., Merceria del Capitello, Nos. 4861-2-3, well-fitted and spacious dark rooms, with water supply and electric light, as well as the ordinary chemicals."

The Thirty-eighth Annual Exhibition of the Photographic Society, which closed at ten p.m. on Wednesday, the 15th inst., has been, judging by the support it has received from the paying public, by far the most successful

on record, no less than 11,376 having passed the turnstile (exclusive of the staff of those members and others who visited the Exhibition at times when it was not open to the public) as against 9931 last year, which was the largest total up to the present. The Exhibition has been visited as heretofore by many of the best-known artists of the day. The Lantern Evenings were even more favourably attended than was the case last year, the gallery, especially for the last few nights, being packed.

CROYDON CAMERA CLUB LANTERN SHOW.—A densely crowded audience assembled at the Braithwaite Hall on the 15th, when Mr. Charles W. Hastings showed and explained a collection of lantern slides. Following the above, the President of the Club, Mr. Hector Macleau, F.G.S., acted as *cicerone* in explaining the features of a large number of views contributed by members of the Club. The fifty cricketing snap-shot studies by George Corden produced much interest and laughter, especially *Puzzle*, *Find the Secretary*, and another, which exhibited Mr. Sydney Eldridge attitudinising at "the nets." A series by G. R. White, who worked the lantern, of views at Boyton's Water Show, also went well, and brought out prolonged applause. Other members to show slides were Mr. Frost, H. E. Holland (some capital views in Devon and Cornwall), and Mr. Ryan, this last gentleman's Norwegian series giving great satisfaction. Last on the list were the unusually fine set of Indian palaces and other interesting features, by Mr. C.F. Oakley.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

EXHIBITIONS AND MEDALS.

To the EDITOR.

SIR,—I am pleased to find that my letter to the Bristol Executive, which you kindly printed, has elicited some correspondence, and I wish we could see the question thoroughly thrashed out, and settled for a few years.

Mr. H. W. Bennett will, perhaps, be surprised to learn that I almost entirely agree with him, and I reply with pleasure.

To his first paragraph:—It is, I think, admitted all round, and supported by the press, that Exhibitions have been divided into too many classes, and too many medals have been offered and are usually awarded. It is a good sign, and some evidence that I am right, that the promoters of many Exhibitions are now reducing the number. Mr. Bennett questions the right of a small body to dictate, &c. But somebody must "bell the cat." I am not a small body, but perhaps I have as thick a skin as any, which enables me to endeavour to perform that disagreeable office.

Mr. Bennett refers me to the recent judging at Pall Mall. He has me there. I leave the defence of the Judges to "A. R. E.," who does so with singular skill in the letter which follows Mr. Bennett's.

What I take exception to most in your correspondent's letter is when he says that the objection to medals might have been omitted from the letter of "a man who has taken so many medals as Mr. Robinson has done." My opinion about medals has never changed.

The Salon, among its other successes, certainly showed that a large collection of photographs could be got together without the assistance of prizes, but I am in favour of medals judiciously offered. I owe much to medals, and am very proud of my collection, which was nearly all won before medals were spread broadcast for every daw to pick at. Medals have done a good deal towards extracting the best work out of me that was there to bring out. This was when the medal was really a prize and the work was done in competition for it.

Writing to you five years ago on this subject, I said, "There was a time when winning a medal was an event, when the wonderful news was flashed off to you by telegraph," and more to that effect. Are medals so valuable now? For many years that I competed, medal-giving Exhibitions were so few that you could seldom take more than three prizes in a year, if you took all that were possible, both British and foreign. One of these medals was worth a score of those of the present day, when half a dozen have been known to fall to one exhibitor at one time. Do they induce photographers now to take more than a languid interest, or to do special work for all they are worth? Certainly not. To compete in the many subdivided classes, photographers seldom take more trouble than to select from what they happen to have by them.

There is also a letter dated from the Central Photographic Club, signed "John H. Avery." As the tone of this letter seems to be intentionally offensive, I shall pursue my usual course, and take no further notice of it.—I am, yours, &c.,

H. P. ROBINSON.

Tunbridge Wells, November 17, 1893.

THE SMELL OF OIL LANTERNS.

To the EDITOR.

SIR,—Your remarks upon the offensive smell when using oil lanterns are so fully to the point that, whilst endorsing them entirely, I would supplement them by reminding your readers that, if they will take the trouble to pour off all the oil remaining in the reservoir when the lantern is done with, then relight the wicks and allow them to burn out, all the residue and the oil with which the wicks are saturated will be consumed, and the lamp consequently will be perfectly clean and free from stale oil, which, as you correctly say, is the cause of the offensive smell.

By no other means can you free the lamp and wicks. I have now been using this method for the last two years and find it most efficacious. It may appear to give additional trouble, but such is not really the case, as no perpetual wiping is needed, and the lamp is always ready for use. You may remember I notified you of this method some time ago. Of course the reservoir must not be recharged till the lantern is in position for another entertainment.—I am, yours, &c.,

FRANK HOWARD.

The Chilterns, Wallingford, November 18, 1893.

PLATES *VERSUS* FILMS.

To the EDITOR.

SIR,—I think Mr. Stillman's letter in your issue of the 10th inst. needs some answer on my part.

In Mr. Stillman's letter of October 15, he writes as to "the results of trials of films of various makers against plates," and winds up with the sweeping statement that, "for work requiring the highest rapidity, films, as now put on the market, without regard to their make, are no substitute for glass plates."

I ventured to give instances in my own experience to show that films were made equal in all respects to plates. Mr. Stillman now tells me that I "have a very vague idea of what constitutes a test," and it is suggested all my tests were made by guess with different developers on different days.

In his letter of the 15th, Mr. Stillman says the very rapid films fogged after two months, a statement apparently meant to apply to all the various rapid films he had used; he now says it applies to Mr. X's films. The most astonishing, to me of Mr. Stillman's experiences, however, is that even the very rapid films were less than one-fifth the rapidity of the rapid plates, the plates, he says, being fairly exposed in one-thousandth of a second, and the films breaking down with one-two-hundredth of a second.

The experiences I gave were, like those of Mr. Stillman, made in ordinary work. The following, however, may be of interest to some of your readers, although I would not suggest that they are as conclusive or as accurate as experiments Mr. Stillman may have made.

I obtained, more than a year since, samples of three makes of films, A, B, and C, and plates of the same make as A, and bearing the same speed number, 25 W. The B make was also marked 25 W, and C no speed number, but the most rapid of the maker.

One of each make of films and a plate were put in a dark slide, side by side, and exposed with a shutter, the exposure being made on the evenly lighted front of a house. They were all developed together, in the same dish, with ferrous oxalate. Result, none of them quite sufficiently exposed. Film B was the best. With the film and plate A, by the same maker, the plate was slightly the best. Film C was slightly the slowest of the lot.

The difference between all of them was less than I expected, and in the case of A and B no more than I should in any case expect between different plates bearing the same number, W. The same experiment was repeated with hydroquinons, with practically the same result, only the hydroquinone did not develop any of them quite so far, due to either the light having gone off between the two exposures, or showing it to be a less powerful developer.

If there is any retarding action due to celluloid, I can only imagine it is due to the camphor in the film. I put several lumps of camphor in water, and left it for several days; the water then smelt and tasted strongly of it. I took two plates of the same batch as used in the other experiments, and exposed them together; they were then soaked for an hour, one in plain water, the other in the camphor water, and developed together. Result, no apparent difference whatever.

I have sometimes thought a plate ought to appear more exposed than a film with the same exposure, due to the reflection of light from the back of the glass. If this were so, a *backed* plate should be slower than an unbacked one.

As to amidol, it is the most powerful developer I know for short exposures, although Mr. Stillman does not think much of it apparently.—I am, yours, &c.,

H. G. M. CONYBEARE.

6, *Courtenay-place, Teignmouth, November* 15, 1893.

FILMS: CAUSES OF THEIR DETERIORATION.

To the EDITOR.

SIR,—We have noticed remarks in the photographic press from time to time about the action of free camphor in the celluloid film on the sensitive emulsion. We think we can now offer the real solution of the troubles said to have arisen, and we desire to sound a note of warning.

The Continental films that have so far come under our notice, while we admit they are most attractive in appearance, we have found in every

case, that they are either acid, or have a tendency to become so, under certain conditions taking quite a long time to develop. This is the fault of nearly if not all material that we have ever seen made by parties other than ourselves, and took us quite a long time in experimenting and the expenditure of a great deal of money to overcome in our goods.

Its presence is fatal in photographic negatives. The cause of films being bad is simply an acid tendency in the film acting on the photographic emulsion.

As I have mentioned above, the sheets or films may not show any acid by the ordinary tests when freshly received; it is a peculiar property of the material, when made by ordinary methods, to gradually develop its own acid. It is to a very slight extent at first, although quite sufficient to chemically affect the photographic emulsion, but once started keeps on growing, until the material disintegrates and eventually takes fire by spontaneous combustion. If English plate makers use this material or in fact any material but such as ours, they will surely experience this result and ruin the reputation of their plates. As I say, they cannot detect it at first, except in isolated instances, but, long after the plates are made, they will commence to deteriorate and become ruined. The assurance that ours are not the same in this respect is the fact that they have been in use for six or seven years, and have shown by the only test which is safe, namely, the test of time, that they are free from it.

If your readers do not believe all the statements that we have made, there is a test which we can point out to them, although it is not an absolutely certain one, and the material may still stand the test, and yet contain the elements which will lead to the results referred to. Heat has somewhat the same effect in developing the acid quality as time, although in nothing like the same degree, and we feel satisfied, from our experience, that in almost every case, if you take a piece of any film but our own, and press it between plates heated to, say, about 210° to 240° Fahr., leaving it, say, fifteen minutes or so, and then scraping off with a knife some fine shavings from the surface, and have them tested by a competent chemist for nitrous acid (not nitric acid), that, if his tests are sufficiently delicate, he will find traces of it. The traces may be only slight, but, once started, they will progress as before stated.

We are, of course, aware that it will be said that our statements are coloured by our own interests, but the facts, as given above, and as confirmed by our own experience in a number of tests, are literally so.

As regards the appearance—that is, its clearness and transparency—there is no trouble in accomplishing that. We can make it just as good, and even better, in these respects than the Continental samples, but it is not safe to do so, and we have always refused to make this class of material. It is in trying to preserve this appearance that one of the greatest dangers in producing an acid tendency in the stock is occasioned.—We are, yours, &c., S. Guiterman & Co.,

35 *and* 36, *Aldermanbury, London, E.C., November* 21, 1893.

CAN THE GRADATIONS IN OUR NEGATIVES BE VARIED, AND CAN INCORRECT EXPOSURES BE CORRECTED BY VARIATIONS IN DEVELOPMENT?

To the Editor.

Sir,—Permit me, through the medium of your Journal, to call the attention of your readers (doubtless many of whom were present) to the deductions of Mr. Howard Farmer, as enunciated in his lecture at the Polytechnic on Tuesday, November 7, entitled as above, which attacks a universally accepted and foregone conclusion respecting which very few, if any, of us practical workers ever had a doubt. I have studied under Mr. Farmer, and take him to be a man of practical common sense; but I think that here he has made a serious blunder. He sought to show, and finally made the statement, that gradation *cannot* be altered by modification of developer; and what really appeared to be such was a more or less amount of fog present, according to treatment by a more or less concentrated developer; and that in some instances this fog was graduated over the film, this bringing us to the conclusion that it was variation in thegradation.

Never was I more surprised at any statement, and Mr. Farmer's reasoning at the time seemed logical enough; but it was not until a day or so afterwards, when thinking quietly over the lecture, that it occurred to me that Mr. Farmer, while arriving at his conclusion, had lost sight of one fact, which would doubtless have had a very different effect upon the final result of his reasoning. I refer to the fact that printing density in a negative is reached long before the extreme limit of the action of light is brought out by the developer.

Let us by a simple test explain. Take the case of an under-exposure—presuming we know this before commencing development—and that the subject is a lady wearing a white dress, with a background of heavy foliage. If we start this plate with about a quarter the normal amount of accelerator, the dress will first appear, and, the development going on slowly, it will gain in density, and probably get as dense as it should be in a sufficiently developed negative for printing purposes before more than a bare outline of the features or trace of the background is discernible. Now, let us take another negative of the same subject, similarly timed, but at the outset treat it with dilute ammonia (or other accelerator, according to developer), and, when it has penetrated the film, pour it off and replace by the developer containing the full amount of accelerator, and diluted with water to about twice its normal bulk, and with the least admissible amount of restraining bromide. With this treatment all the available detail in the negative will simultaneously flash out, and as development is prolonged the lights build up proportionately as the light has acted, and by the time printing density is reached we have a negative entirely different in quality to the previous one, the contrast being nothing nearly so marked, the face sufficiently dense, and a fair amount of detail in background—in fact, a very passable negative. Now, is this difference due to fog alone? I say most emphatically, No. Agreed, there is a certain amount of fog in the forced negative, but not anything like sufficient to account for the difference in quality and gradation. In the one case we have a negative of a white dress; in the other an average negative with the proper amount of gradation. According to Mr. Farmer's arguments, there is the same amount of detail in both, the difference being entirely due to graduated fog. Judge ye! With Mr. Farmer I could agree, provided that development in both instances was sufficiently prolonged to bring out the extreme limit of the action of light; then we might get two negatives, the only difference between them being due to fog. I speak from long and exceptional experience, having developed for several years in succession almost the whole of the negatives of the leading—or, at least, one of the three leading—portrait firms in the West, in addition to several years' experience previously and since in business for myself. Should this come under Mr. Farmer's notice, we trust that he will at once see his mistake. — I am, yours, &c.,

H. W. Busbridge.

41 *Vanbrugh-park, Blackheath, S.E., November* 14, 1893.

EXPERIENCE, JUDGMENT, AND THE CALCULATION OF EXPOSURES.

To the Editor.

Sir,—One of the provincial Societies has given to the world the dictum that "no exposure tables or meters at present in use will entirely supersede judgment and experience," and you have touched upon the subject in an editorial paragraph last week.

I, in common with probably all other practical photographers, entirely agree with this very evident fact; but the phrase seems to be written under the assumption that all such "aids to exposure" *do* attempt to entirely take the place of judgment and experience, and are therefore failures.

Naturally I speak of the methods carried out in the exposure meter invented by me, and I do most emphatically say that it in no way attempts to supersede judgment and experience, save in the matter of testing the actinic power of the light. On the contrary, the very essence of its principle is that it provides terms for recording the result of such judgment and experience, and utilises these records in subsequent exposures. And there is the advantage in such systematic records that beginners can have part of the experience (in the matter of exposure) of older photographers communicated to them.

It is true that there is one factor—the character of the subject to be photographed—which will always require the exercise of the judgment of the photographer, and in my system the user of the exposure meter is given full play in the exercise of such judgment, only this is kept distinct from the more constant factors of size of stop and the relative speed of plate.

In one detail I certainly attempt to supersede the usual method of exercising judgment. The human eye is a most inadequate instrument for estimating variations in the chemical force of the light, and in the amount of light reaching a given subject, and in this matter of estimating light I find the readings of an actinometer far more reliable than the judgment of even an experienced photographer.

When, in the brewing trade, the saccharometer and the thermometer were introduced to take the place of old rule-of-thumb methods of estimating the gravity and temperature of the liquors, the cry was, no doubt, raised that "nothing would take the place of experience." But brewers now know that these indispensable instruments aid them by accurately recording the methods of experience, and enabling the same results to be obtained time after time. And so it will be with the use of the actinometer for photographic exposures.

I find it continually assumed that an exposure meter is something especially designed for a beginner. I must confess that I seldom thought of the beginner in designing my instrument. My aim was to get an accurate and simple instrument for the use of photographers who feel the need of help, more especially in difficult subjects, such as interiors, and it is within my knowledge that a very fair proportion of my instruments sold are used by photographers of experience.

There is a very funny assumption in the editorial paragraph on the subject which I must refer to. It is presumed that when a man has estimated an exposure by tables or meter, and the light changes just before he makes the exposure, he is slavishly bound to give the exact exposure just calculated. Surely he is in exactly the same position as if he had estimated the exposure by his unaided judgment, and is perfectly free to alter the exposure on the moment in accordance with the altered

light. In my experience the use of an actinometer quickens rather than dulls a photographer's perception of the variations of light.—I am, yours, &c., ALFRED WATKINS.

Hereford, November 18, 1893.

MEDALS AND EXHIBITIONS.

To the EDITOR.

SIR,—Not being exhibitors, we should like our humble opinion to be considered impartial. We fail to see why the Bristol Committee cannot make what rules they like independent of medal-hunters; they have held successful exhibitions in the past, and, we hope, will again. It seems to have been the custom to give medal-receivers the best positions, and award another medal mainly on account of prestige thus obtained, not altogether the superiority of their productions, passing over those of less known but perhaps equal merit who do not send pictures all over the kingdom, with the chance of being hung out of sight. The custom of recent years to give the same picture several medals in the same year we consider, rightly or wrongly, most unjust to others. We have in mind an extensive photographic business boasting of being awarded over forty medals, many of them for two or three pictures that were produced entirely by the *employés* of the person whose name they bear. We see many suggestions from week to week for improving business; one by a teacher of photography, who evidently wants teaching, of sending home pictures same day as taken. No one so far seems to have seen that what has tended to lower the profession most in the public estimation, and make it a hard struggle for many good men in a small way of business, is the system known as canvassing, in many cases swindling, by which big firms have reaped fortunes from every town, to great injury to their smaller brethren.—We are, yours, &c., RUDD & Co.

Dudley.

MR. WOODBURY AND THE PAGET COMPANY.

To the EDITOR.

SIR,—In reply to Mr. Woodbury's letter, will you allow me to say that I frankly accept his explanation; but, at the same time, would like it to be clearly understood that I was not aware of his experiments, and therefore derived no hint or assistance of any kind from them. Nor have I since been able to succeed with iodide. The whole affair seems to have arisen from a series of curious accidental coincidences, combined with a little indiscretion on the part of Mr. Woodbury; but, as he has now so fully and handsomely admitted our claim to what I must still hold to be the only practicable method, I trust that no more need be said. For my part, I am quite content to bury the hatchet. R.I.P.

A somewhat injudicious friend of Mr. Woodbury, who has been making a little sensational "copy" out of the incident, sees no novelty in the process, because, in the year 1881, Dr. Eder described how gelatino-chloride paper for development (not printing out) might not only be made from a chloride emulsion, but also by the roundabout process of sensitising chlorised gelatine paper on a silver bath, and then washing out the surplus silver, or converting it into chloride by floating again on a bath of sodium chloride.

There may possibly be some connexion between this and the new process; but I am somehow tempted to think of Tenterden Steeple and the Goodwin Sands, or to wonder whether any modern shipbuilding patents might be upset by showing that one Moses, a good many years ago, published a description of how a gentleman named Noah built an ark.—I am, yours, &c., WM. J. WILSON.

Paget Works, Watford, November 20, 1893.

ELECTRICITY FOR STUDIOS.

To the EDITOR.

SIR,—In his article last week "Free Lance" alludes to an article which I wrote, and then goes on to say, "I do not know if he is the same writer who gives an interesting letter upon electric heating. If so, I am afraid his sanguine hopes about the economy of electricity will be doomed to disappointment. He had been informed that the cost of heat from electricity would be about the same as gas. This is moonshine." Now, I cannot see how the question of heating by electricity can be in any way affected by the question as to whether I did or did not write an article on a different subject. I am the same writer, but how could my hopes be doomed to disappointment when I wrote, "this is a *practical realisation* of electric heating which I have long hoped for?" I felt gratified, not about the "economy," but because electric heating had become an accomplished fact. I said that the cost would be about the same as gas, or, if it cost a little more, less heat would be required, as there is no waste. He says, "This is moonshine." Electric *heating* gives no shine at all, it is produced and works in pitch darkness. Electric lighting by a large and lofty arc lamp is the nearest approach to actual moonshine that the world has ever yet seen. Who can forget those delightful summer nights at the old Horticultural Gardens at South Kensington when the coloured fountains used to play, and all London had a chance of a few hours of healthful enjoyment, enlivened by the cheerful strains of finest music, and inspired by pleasant rambles in the grounds, lit up by the refulgence of perpetual moonshine from the electric globe, even when the nights were dark and starless, and Luna was not due?

"Free Lance" is very droll when he tells me to "turn on the electric lights in any apartment for an hour, and then, after ascertaining the increase of temperature, burn an ordinary gas burner, gas costing, say, less than one-fourth the electricity, and see which gives the greater increase." Turn on the electric *lights* to *heat* any apartment, and that to test the suitability of the electric *light* for *heating* a photographer's *dark* room! Why, it is one of the greatest advantages of the electric light that the amount of heat emitted is so slight as to be almost imperceptible. He is quite unaware of the fact that electric heating is produced on entirely different principles, and does its work in a state of absolute darkness. You can easily cook a dinner by electric heat, but you must have either electric, gas, or oil light to do it by. Extinguish the light, the cooking will go on all the same. You can smell it and hear it, but you cannot see it; there is not the slightest spark of light to be obtained from the electric heating apparatus. The polished bottoms of the saucepans, kettles, &c., remain quite as clean as the tops.

"Free Lance" announces that electricity "is a toy for heating when any ordinary comparison of cost is instituted. I should like 'Palette's' informant to tell him what it would cost to heat enough water for a hot bath, and then to ask Mr. Fletcher what he would do it for with gas." I called on my informant, Mr. H. J. Dowsing, Member of the Institute of Electric Engineers, &c., of the firm of Crompton & Co., the acknowledged pioneers of electric heating; while waiting to see him I observed upwards of a dozen full-size electric ovens for cooking a dinner, including large joints, &c., they were marked "Sold to the City of London Electric Supply Company." I was told they formed portion of a sample order for twenty to be let out on hire to their customers, and that other electric companies were following in the same track. I showed Mr. Dowsing the challenge, and asked him if he would prepare an estimate for heating a bath; he replied, "Certainly not, at the bidding of a correspondent of whom we know nothing, and who himself knows nothing of the subject, but who yet can propose a test the most unreasonable and unfair that could possibly be devised; we are far too busy and our time is too valuable to be wasted for the benefit of any rival firm. Electric heating is a comparatively new thing, and we have only been working it out practically during the last nine months; a bath has never yet been heated by electricity, but, if a *bonâ fide* application were made to us, we should set about making experiments and calculations, and prepare an estimate. A "Fletcher's Patent Water-heater" is a costly apparatus, specially contrived for that particular purpose only; the water passes over such an enormous heating surface of copper, that almost the whole of the heat is extracted from the gas before it passes into the flue; it could not, therefore, afford a fair average test of the use of gas for ordinary heating purposes. Mr. Dowsing recently completed a new and greatly enlarged edition of the *Electrical Engineer's Price Book*, an important work of 406 pages, published last August by Griffin & Co. He states in his preface that, although there has been an ample issue of scientific works, up to the present nothing appears to have been done in the way of general information on the commercial aspect of electrical work, which fact has convinced him of the absolute necessity of affording it. He lent me a copy to look over, and kindly gave me permission to extract any information which might be useful to your readers. He mentioned that Mr. W. H. Preece, F.R.S., Chief Electrician to the General Post Office, in addressing the Municipal Engineers lately, stated that 1 lb. pound of coal distilled into gas will give a light = 17 candles per hour; 1 lb. do. in electric energy = 48 candles incandescent, or 288 arc. In the event of continuous demand for electric supply day and night, he calculates that the current could be supplied for light at a price equivalent to 1½*d.* per 1000 cubic feet of gas, charged at present 3*s.* I have it, on the same high authority, that 4000 candles for one hour will require 1000 cubic feet of gas at a cost of 2*s.*; 4000 candles can be produced by the arc light at 8*d.*, and by incandescent lamp for 4*s.* Average price paid for burner for gas (at 3*s.* per 1000) is 9*s.* per annum; ditto, ditto, for electric lamps, 10*s.* ditto.

In the General Post Office the price paid per gas lamp is 18*s.*; ditto, ditto, electric lamp, 22*s.* In the Post Office Savings Bank, owing to the improved health of the 1500 people employed there, 300 extra days' work were secured from the staff, and the value of this time exceeded the cost of the electric light. All large employers have received the same benefit; it is indeed the sanitary aspect of electricity that is ensuring its rapid advance. It can now be supplied cheaper than gas; the Great Northern Telegraph Company, at Newcastle, say that electric lighting is only two-thirds of the former cost of gas, which is 1*s.* 10*d.* per 1000; electric energy 4½*d.* per unit. I am told that at Ottawa, Canada, it is only 1½*d.*; that must be owing to cheap water power. There is no difference between the practical cost of electricity and that of gas. Gas at 3*s.* per 1000 costs the same as electricity at 6*d.* per unit. I visited the St. Pancras Electric Works, which they are rapidly extending, they supply the current for light at 6*d.*, and for heating and cooking at 3*d.* per unit; they charge 10*s.* for laying on the electric supply. In the City of London the price for heating is 4*d.* per unit. In chapter 12 of Mr. Dowsing's book, on "electric smelting and welding," he says, "it is only now that electricity is made available

or heating purposes on a large scale. No other form of furnace can produce such enormous heat as that generated in the electric furnace." Other firms are now beginning to supply the fittings for electric heating; I saw one pint of water, the other day, boiled in a copper kettle on an electric heater, at Verity's, in eight minutes, at a cost of one farthing. The heating stoves do not seem as yet to give so much heat value as the ovens, &c. I think they would be too expensive at present for a large studio, but a dark room could probably be heated admirably for about 50 per cent. more than gas; even if it cost double, it would be practically cheaper, considering its many advantages. This must be my final communication on the subject.—I am, yours, &c.,

PALETTE,

November 17, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Six-inch or a twelve-inch burnisher, for a good rolling press.—Address, J. WEBBER, Photographer, Canterbury.

Wanted, retort and purifier for making oxygen; in exchange for Postage-stamp camera, nine lenses, or lantern slides.—Address, EARL, 47A, Broad-street, Worcester.

Photographic News, 1875 to 1888, unbound; exchange for (secondhand) 12×10 or 9×7 field camera, tripod, or leather cases; difference adjusted.—Address, F. WATSON, 33, Alfred-road, Acton, W.

Will exchange background, exterior, canvas in oils, good condition, by Marion, for clouded background or good interior.—Address, ALBERT DURN, The Studio, Wotton-under-edge, Gloucestershire.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

GOLD CHLORIDE.—There is no danger of forming an explosive compound with the mixture of nitro-hydrochloric acids you name.

SUUM CUIQUE.—We should be glad to insert a letter on the abstract question as to whether an operator has a right to a copy of the work he does.

MARY CAMPBELL.—What is meant is that to the stock toning solution sufficient gold should be added to make up for that used, say, one grain per sheet.

COL. SPENCER NICHOLL.—Dissolve the silver nitrate first, and then add the cyanide until the precipitate formed is redissolved. You reversed the process.

W. BLAKE.—White hard varnish must be diluted with spirit to make it suitable for negatives. If it has been used as purchased, no wonder that "it has proved a failure."

PYRO writes: "Would you kindly give me the address of photographic publishers of views in Paris (French scenery), and greatly oblige?"—Perhaps some reader will oblige.

A. BURRIDGE.—Communicate with the local police in all such cases; but, better still, do not part with your money until you have taken reasonable precautions to ascertain the *bona fides* of the advertisers.

W. T.—We do not think that photography is systematically employed at the London hospitals. We can only suggest that you write to the secretaries of those institutions, stating your qualifications and wishes.

G. R.—It is quite a fallacy to suppose that the copies of paintings to be seen in the shop window are made from monochromes painted for the purpose of reproduction by photography. They are made from the originals, which, more often than not, are in very brilliant colours, as most Continental paintings are.

A. W. X.—Time is too short yet to pass any opinion on the comparative permanence of albumen and gelatine prints. The former process has been on its trial for forty years or more, and many of the prints are still without change. The latter has only been on its trial for a few years, and some prints, like others on albumen, have shown a marked change in the time.

R. A. E.—The safest way to fill an ether saturator by artificial light is to do it outside a window at which a light is burning on the inside. In this way, no risk whatever is incurred. The saturator should never be recharged in the room before the audience should it become exhausted. Apart from the danger, the smell of ether is objectionable to those who are not familiar with it.

A. J. writes: "Would you kindly tell me what is the best system of marking and storing negatives for a small business where the expense of separate envelopes for each negative does not appear to be advisable?"—Simply write or scratch the name and number on the negative, and, if envelopes are too costly, wrap them in plain paper with the number written upon it on the outside.

C. THOMAS.—You must not rely too much upon what is said on photographic matters in the daily press, otherwise you may believe in a lot of nonsense. We did not see the announcement in question, but it must have carried absurdity on the face of it.

J. A., JUN.—Write to Messrs. Schmiers, Weruer, & Co., Leipsic. They will supply the necessary machines, &c. The cost of a medium-size machine is, we think, between two hundred and fifty and three hundred pounds. The other appliances are not costly. You must have been exceptionally unfortunate in your experience with collotype printers. Had the work been entrusted to a good house, you would not have to reject half the prints.

W. J. FARMER.—We could only answer your numerous questions after a long series of experiments, occupying a great deal of time, which you are probably better able to afford than we are, or why not try these experiments for yourself? We are always glad, where possible, to help our correspondents in their difficulties, but in your case nothing less than an exhaustive treatise is required. At this (and especially by post) we must beg you to let us draw the line.

STEPHEN WILSON.—The collotype process is far more applicable to that class of work than Woodburytype. With the latter process delicate vignettes are not to be successfully obtained when working on a commercial scale. Furthermore, collotypes can be as easily printed with white margins, so that mounting is unnecessary, as without. If price were an object, it is possible process blocks would answer, that is, if the number required is tolerably large; for small numbers, collotype is cheaper than "process work."

LONDON, W.C.—The price of copper plates, surfaced and polished, ready for etching, may appear somewhat high, but we believe they are not, if of good quality, to be had at less than the prices quoted. The rolled sheet copper of the metal warehouses would require a great deal of laborious and tedious work to be bestowed upon it before it could be made available for photogravure plates. We are not aware that the plates used for this purpose on the Continent are any better than those sold here, and we doubt if they are.

ROBERT W. CONCHIE.—1. Better not mix up the formulæ; rather make comparative trials of the two, and use that which works best in your hands. 2. If the bath were made with pure materials, and in chemically clean vessels, the gold should not, and would not, be deposited. As your experience has been so unfortunate, we advise you to make up only sufficient bath at a time to tone the prints desired. 3. Yes, though it will keep better in a strong solution. 4. Lithographic chalk, or the ink used by lithographic artists.

W. A. T.—1. Unless the prints be treated with alum, the coating will dissolve if immersed in warm solutions. Alum the prints, and then proceed as you have been doing. 2. The spots are touched out in the negative. Only experience is required to judge of the right amount of colour to apply. That, of course, must depend upon the density of the image. 3. The yellow screen is of little use with ordinary plates. 4. It may be applied by itself or mixed with a little dextrine. Plenty has been said on the subject during the last few months.

B.—The electric-lighting plant supplied by the firm named is very complete, and is used in many of the London studios. They would doubtless supply it with any other lamp if preferred. If you make the apparatus yourself, it will certainly cost you less if your time is not of great value. We see no reason why the gentleman you mention should not be a practical adviser; a knowledge of photography is not necessary to make an efficient appliance for lighting an object—the sitter in this case. Nothing on the subject is needed beyond what has already appeared in back volumes.

F. J. R.—1. To have about equal quantities of silver converted into chloride and citrate respectively, the quantity of citrate of potash should be fifteen grains. The proportion here given makes a softer picture, but eight and fifteen would print better from thin negatives. 2. Chloride of ammonium at boiling temperature would decompose borax, forming tetrametaborate of soda; but we do not think it should in the cold. It may have some effect on old bleached lac. Try potassium or sodium chloride. It answers nearly as well, though it is more trouble, to size the paper first and then salt.

W. RATCLIFFE.—The fault—the mottled appearance in the prints—is due to the paper being insufficiently sensitised. A much longer floating, on that strength of bath, was required on account of the hardness of the sizing as it was applied. If the lac were good, the whole of it should have dissolved. Probably the sample used had been bleached for a long time, and so had lost its solubility. If you read the article again, you will see the solution is to be applied with a brush, not the paper soaked in it for ten minutes. This, in itself, was quite enough to account for the appearance when the paper was printed.

CONTENTS.

capable of being exercised on the sensitised gelatine by the celluloid support, Messrs. Guiterman & Co. have shown us the result of an experiment made by one of the experts of the Celluloid Company, Newark, N. J., U.S.A., of which they are agents for this country. In order to anticipate the action of time, two squares of celluloid—one a German production, the other being the American make—were placed on a thick pad of blue blotting-paper, and, after being covered with a thin paper, a laundress's flat iron heated to a temperature of 240° or 250° Fahr. was left on for five minutes, with this result, that the German make had become disintegrated and given off enough nitrous acid to show a decided decolourising of the paper in immediate contact with it. The American sample remained unaffected. As is well known, there are various ways of making celluloid, no two manufactures being absolutely alike.

A Good Word for Rollable Films.—If celluloid, *per se*, has really any deleterious action upon gelatine emulsion, it certainly takes a long time to assert itself.. We have in our possession two prints, and very good ones they are, from negatives taken on Eastman roll-holder films by Mr. Edward J. Smith, of Halifax. One negative was taken the same week the spool was received, the other *four years* later. The former represents a deep dell showing the half-dried-up bed of a river, and received an exposure of three seconds; the latter, a portion of the same spool and exposed half a second with *f*-22 four years afterwards, represents a somewhat trying scene, a vast crowd taking part in some public inaugural meeting all under a roof and imperfectly lighted, but well and fully exposed. Most undoubtedly no deteriorating influence had been exerted by the one film upon the other in this case; and we are pleased to be able to say that the same methods of preparing films that were employed four years ago are in force at the present time. In Mr. Edward J. Smith's letter he says, speaking of the film in question, "The film has not been kept wrapped in tin foil or treated with any special care, but has been in the roll-holder all the time, and has travelled some thousands of miles by sea and land."

Picture Pirates in America.—In reference to the article in last week's issue on *Photographic Piracy*, and an allusion to a suit decided under the International Copyright law, a correspondent directs our attention to the wholesale piracy of English and Continental pictures in America, and makes some very strong comments on the subject. Complaints are, we know, loud and deep amongst English publishers of the piracy, in America, of the works they issue. But it is not against such pirates as that referred to last week, who simply make silver prints; it is against otherwise reputable publishers who reproduce the works by photo-mechanical methods. Not long ago we were told by the representative of a London firm that, no sooner than they had issued a photogravure print of a painting, the copyright for which they had paid a large sum, and gone to a great expense in the production of the plate, the print was pirated and issued as a coloured supplement in one of the American journals. Quite recently we were consulted by a Continental art publishing firm as to whether it would be possible to make some additions to the printing ink that would prevent the prints being successfully reproduced, as it was suffering so severely from the piracy of their productions in the States.

Spotty Prints.—For many years past we have noticed and called attention to the fact, that at this season complaints of minute spots on silver prints are more prevalent than at any other time. We are not alluding to spots that make their appearance months after the prints have been mounted, but to those small ones that are frequently met with before they are mounted, or within a very short time afterwards. This year is no exception, and we have already seen several examples that have greatly perplexed those who have produced the prints, and who, in the generality of cases, have attributed the evil to anything but the right cause, namely, dust. It often happens that, at the time the prints are taken out of the washing water, sweeping and dusting operations are going on. Now, the dust of photographic workrooms is of a very pernicious character, consisting as it does of particles of hypo, pyro, and numerous other equally deleterious matters, rendered by the artificial heating of the apartment. It will at once be admitted that, if any of such particles settled on a moist print, they would cause trouble. Apart from the floating particles of the chemicals employed, there are often others present that are equally as deleterious, the dust from coke stoves, for example. When the fire is poked or the ashes are raked out, a dust of a sulphurous nature is created, which, if any particles settle on a wet print, is almost certain to produce spots. On one occasion we placed some moist prints near a coke stove, and then stirred the fire so as to raise a dust, which was then allowed to settle. The result was that, after a day or two, the prints showed as prolific a crop of minute spots as could well be imagined.

YELLOW STAINS ON GELATINO-CHLORIDE PAPER.

While the subject of yellow stains upon gelatino-chloride printing-out paper is on the *tapis*, I should like to give my own experience, and suggest an apparently unsuspected cause. Hypo has received such a bad name in years gone by that, as Mr. Pentney remarked a week or two back, we were too prone to lay all the blame of yellow stains, without any further inquiry, to its credit. But what about sulphocyanide of ammonium? It is as much a sulphur compound as hypo, and, although the combinations it forms with silver chloride are perhaps not so unstable as the hypo compounds, they are still subject to similar decompositions.

In addition to this, the gold compounds, formed by the mixture of auric chloride with the soluble sulphocyanides, are of an equally, if not more, unstable character than those of silver, and, under present conditions of toning, these are, it seems to me, quite sufficient to account for many otherwise obscure cases of yellowing.

Mr. C. H. Bothamley, in his recent report on this subject, alludes to the appearance of yellow stains in the course of toning, and which he describes as an occasional, though very rare, occurrence. This is very far from being the case, in my own experience at least, when sulphocyanide of ammonium or potassium is employed. I am not speaking of only recent experience, but will go back seven or eight years with gelatino-chloride, and I have had a similar discolouration with albumen paper when using a combined toning and fixing bath containing sulphocyanide. In fact, although not a constant or regular occurrence, this yellowing of prints in the toning bath itself has been a pretty frequent trouble with me, ever since I began to use the mixed gold and sulphocyanide toning bath first recommended for gelatino-chloride paper.

The formulæ originally published for this purpose contained, it will be remembered, a minute trace of hypo, for what reason introduced I do not know; but it was natural to blame the yellowness on to that, and, as I found the bath toned just as well without it, the hypo was discarded. But still the yellowness occurred at intervals, and what was worse, or rather more to the point, in fixing the evil on to the toning bath itself, was the fact that a bottle of the stock toning solution (in concentrated form), after standing some months unused, was found to have deposited a dirty yellow granular powder, while the sides were coated with a thick layer of a similar character.

But it was not until comparatively recently that, having taken up the working of gelatino-chloride paper more regularly, I have felt the full force of the trouble, with the result that I have, for some months past, given up using sulphocyanide altogether, and so got rid of the discolouration in the toning bath completely. I am referring solely to that kind of yellowing, or such as occurs between toning and fixing, *in the absence of any possible chance of contact with hypo*. Under such conditions, I think it may be set down to the effect of sulphocyanide; but, when there is any doubt as to the presence of hypo, "honours may be divided."

When the yellowing does occur, it will be either when the attempt is made to tone too many prints in the same solution, or, more probably, when the bath has been put away after being once used, but not exhausted. The danger is not so great in the first instance, as few of us are foolish enough to try to tone a larger number of prints than we know there is gold for; but it is different

or heating purposes on a large scale. No other form of furnace can produce such enormous heat as that generated in the electric furnace." Other firms are now beginning to supply the fittings for electric heating; I saw one pint of water, the other day, boiled in a copper kettle on an electric heater, at Verity's, in eight minutes, at a cost of one farthing. The heating stoves do not seem as yet to give so much heat value as the ovens, &c. I think they would be too expensive at present for a large studio, but a dark room could probably be heated admirably for about 50 per cent. more than gas; even if it cost double, it would be practically cheaper, considering its many advantages. This must be my final communication on the subject.—I am, yours, &c., PALETTE,

November 17, 1893.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Six-inch or a twelve-inch burnisher, for a good rolling press.—Address, J. WEBBER, Photographer, Canterbury.

Wanted, retort and purifier for making oxygen; in exchange for Postage-stamp camera, nine lenses, or lantern slides.—Address, EARL, 47A, Broad-street, Worcester.

Photographic News, 1875 to 1888, unbound; exchange for (secondhand) 12×10 or 9×7 field camera, tripod, or leather cases; difference adjusted.—Address, F. WATSON, 33, Alfred-road, Acton, W.

Will exchange background, exterior, canvas in oils, good condition, by Marion, for clouded background or good interior.—Address, ALBERT DURN, The Studio, Wotton-under-edge, Gloucestershire.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

GOLD CHLORIDE.—There is no danger of forming an explosive compound with the mixture of nitro-hydrochloric acids you name.

SUUM CUIQUE.—We should be glad to insert a letter on the abstract question as to whether an operator has a right to a copy of the work he does.

MARY CAMPBELL.—What is meant is that to the stock toning solution sufficient gold should be added to make up for that used, say, one grain per sheet.

COL. SPENCER NICHOLL.—Dissolve the silver nitrate first, and then add the cyanide until the precipitate formed is redissolved. You reversed the process.

W. BLAKE.—White hard varnish must be diluted with spirit to make it suitable for negatives. If it has been used as purchased, no wonder that "it has proved a failure."

PYRO writes: "Would you kindly give me the address of photographic publishers of views in Paris (French scenery), and greatly oblige?"—Perhaps some reader will oblige.

A. BURRIDGE.—Communicate with the local police in all such cases; but, better still, do not part with your money until you have taken reasonable precautions to ascertain the *bona fides* of the advertisers.

W. T.—We do not think that photography is systematically employed at the London hospitals. We can only suggest that you write to the secretaries of those institutions, stating your qualifications and wishes.

G. R.—It is quite a fallacy to suppose that the copies of paintings to be seen in the shop window are made from monochromes painted for the purpose of reproduction by photography. They are made from the originals, which, more often than not, are in very brilliant colours, as most Continental paintings are.

A. W. X.—Time is too short yet to pass any opinion on the comparative permanence of albumen and gelatine prints. The former process has been on its trial for forty years or more, and many of the prints are still without change. The latter has only been on its trial for a few years, and some prints, like others on albumen, have shown a marked change in the time.

R. A. E.—The safest way to fill an ether saturator by artificial light is to do it outside a window at which a light is burning on the inside. In this way, no risk whatever is incurred. The saturator should never be recharged in the room before the audience should it become exhausted. Apart from the danger, the smell of ether is objectionable to those who are not familiar with it.

A. J. writes: "Would you kindly tell me what is the best system of marking and storing negatives for a small business where the expense of separate envelopes for each negative does not appear to be advisable?"—Simply write or scratch the name and number on the negative, and, if envelopes are too costly, wrap them in plain paper with the number written upon it on the outside.

C. THOMAS.—You must not rely too much upon what is said on photographic matters in the daily press, otherwise you may believe in a lot of nonsense. We did not see the announcement in question, but it must have carried absurdity on the face of it.

J. A., JUN.—Write to Messrs. Schmiers, Werner, & Co., Leipsic. They will supply the necessary machines, &c. The cost of a medium-size machine is, we think, between two hundred and fifty and three hundred pounds. The other appliances are not costly. You must have been exceptionally unfortunate in your experience with collotype printers. Had the work been entrusted to a good house, you would not have to reject half the prints.

W. J. FARMER.—We could only answer your numerous questions after a long series of experiments, occupying a great deal of time, which you are probably better able to afford than we are, or why not try these experiments for yourself? We are always glad, where possible, to help our correspondents in their difficulties, but in your case nothing less than an exhaustive treatise is required. At this (and especially by post) we must beg you to let us draw the line.

STEPHEN WILSON.—The collotype process is far more applicable to that class of work than Woodburytype. With the latter process delicate vignettes are not to be successfully obtained when working on a commercial scale. Furthermore, collotypes can be as easily printed with white margins, so that mounting is unnecessary, as without. If price were an object, it is possible process blocks would answer, that is, if the number required is tolerably large; for small numbers, collotype is cheaper than "process work."

LONDON, W.C.—The price of copper plates, surfaced and polished, ready for etching, may appear somewhat high, but we believe they are not, if of good quality, to be had at less than the prices quoted. The rolled sheet copper of the metal warehouses would require a great deal of laborious and tedious work to be bestowed upon it before it could be made available for photogravure plates. We are not aware that the plates used for this purpose on the Continent are any better than those sold here, and we doubt if they are.

ROBERT W. CONCHIE.—1. Better not mix up the formulæ; rather make comparative trials of the two, and use that which works best in your hands. 2. If the bath were made with pure materials, and in chemically clean vessels, the gold should not, and would not, be deposited. As your experience has been so unfortunate, we advise you to make up only sufficient bath at a time to tone the prints desired. 3. Yes, though it will keep better in a strong solution. 4. Lithographic chalk, or the ink used by lithographic artists.

W. A. T.—1. Unless the prints be treated with alum, the coating will dissolve if immersed in warm solutions. Alum the prints, and then proceed as you have been doing. 2. The spots are touched out in the negative. Only experience is required to judge of the right amount of colour to apply. That, of course, must depend upon the density of the image. 3. The yellow screen is of little use with ordinary plates. 4. It may be applied by itself or mixed with a little dextrine. Plenty has been said on the subject during the last few months.

B.—The electric-lighting plant supplied by the firm named is very complete, and is used in many of the London studios. They would doubtless supply it with any other lamp if preferred. If you make the apparatus yourself, it will certainly cost you less if your time is not of great value. We see no reason why the gentleman you mention should not be a practical adviser; a knowledge of photography is not necessary to make an efficient appliance for lighting an object—the sitter in this case. Nothing on the subject is needed beyond what has already appeared in back volumes.

F. J. R.—1. To have about equal quantities of silver converted into chloride and citrate respectively, the quantity of citrate of potash should be fifteen grains. The proportion here given makes a softer picture, but eight and fifteen would print better from thin negatives. 2. Chloride of ammonium at boiling temperature would decompose borax, forming tetrametaborate of soda; but we do not think it should in the cold. It may have some effect on old bleached lac. Try potassium or sodium chloride. It answers nearly as well, though it is more trouble, to size the paper first and then salt.

W. RATCLIFFE.—The fault—the mottled appearance in the prints—is due to the paper being insufficiently sensitised. A much longer floating, on that strength of bath, was required on account of the hardness of the sizing as it was applied. If the lac were good, the whole of it should have dissolved. Probably the sample used had been bleached for a long time, and so had lost its solubility. If you read the article again, you will see the solution is to be applied with a brush, not the paper soaked in it for ten minutes. This, in itself, was quite enough to account for the appearance when the paper was printed.

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capable of being exercised on the sensitised gelatine by the celluloid support, Messrs. Guiterman & Co. have shown us the result of an experiment made by one of the experts of the Celluloid Company, Newark, N.J., U.S.A., of which they are agents for this country. In order to anticipate the action of time, two squares of celluloid—one a German production, the other being the American make—were placed on a thick pad of blue blotting-paper, and, after being covered with a thin paper, a laundress's flat iron heated to a temperature of 240° or 250° Fahr. was left on for five minutes, with this result, that the German make had become disintegrated and given off enough nitrous acid to show a decided decolourising of the paper in immediate contact with it. The American sample remained unaffected. As is well known, there are various ways of making celluloid, no two manufactures being absolutely alike.

A Good Word for Rollable Films.—If celluloid, *per se*, has really any deleterious action upon gelatine emulsion, it certainly takes a long time to assert itself. We have in our possession two prints, and very good ones they are, from negatives taken on Eastman roll-holder films by Mr. Edward J. Smith, of Halifax. One negative was taken the same week the spool was received, the other *four years* later. The former represents a deep dell showing the half-dried-up bed of a river, and received an exposure of three seconds; the latter, a portion of the same spool and exposed half a second with *f*-22 four years afterwards, represents a somewhat trying scene, a vast crowd taking part in some public inaugural meeting all under a roof and imperfectly lighted, but well and fully exposed. Most undoubtedly no deteriorating influence had been exerted by the one film upon the other in this case; and we are pleased to be able to say that the same methods of preparing films that were employed four years ago are in force at the present time. In Mr. Edward J. Smith's letter he says, speaking of the film in question, "The film has not been kept wrapped in tin foil or treated with any special care, but has been in the roll-holder all the time, and has travelled some thousands of miles by sea and land."

Picture Pirates in America.—In reference to the article in last week's issue on *Photographic Piracy*, and an allusion to a suit decided under the International Copyright law, a correspondent directs our attention to the wholesale piracy of English and Continental pictures in America, and makes some very strong comments on the subject. Complaints are, we know, loud and deep amongst English publishers of the piracy, in America, of the works they issue. But it is not against such pirates as that referred to last week, who simply make silver prints; it is against otherwise reputable publishers who reproduce the works by photo-mechanical methods. Not long ago we were told by the representative of a London firm that, no sooner than they had issued a photogravure print of a painting, the copyright for which they had paid a large sum, and gone to a great expense in the production of the plate, the print was pirated and issued as a coloured supplement in one of the American journals. Quite recently we were consulted by a Continental art publishing firm as to whether it would be possible to make some additions to the printing ink that would prevent the prints being successfully reproduced, as it was suffering so severely from the piracy of their productions in the States.

Spotty Prints.—For many years past we have noticed and called attention to the fact, that at this season complaints of minute spots on silver prints are more prevalent than at any other time. We are not alluding to spots that make their appearance months after the prints have been mounted, but to those small ones that are frequently met with before they are mounted, or within a very short time afterwards. This year is no exception, and we have already seen several examples that have greatly perplexed those who have produced the prints, and who, in the generality of cases, have attributed the evil to anything but the right cause, namely, dust. It often happens that, at the time the prints are taken out of the washing water, sweeping and dusting operations are going on. Now, the dust of photographic workrooms is of a very pernicious character, consisting as it does of particles of hypo, pyro, and numerous other equally deleterious matters, rendered by the artificial heating of the apartment. It will at once be admitted that, if any of such particles settled on a moist print, they would cause trouble. Apart from the floating particles of the chemicals employed, there are often others present that are equally as deleterious, the dust from coke stoves, for example. When the fire is poked or the ashes are raked out, a dust of a sulphurous nature is created, which, if any particles settle on a wet print, is almost certain to produce spots. On one occasion we placed some moist prints near a coke stove, and then stirred the fire so as to raise a dust, which was then allowed to settle. The result was that, after a day or two, the prints showed as prolific a crop of minute spots as could well be imagined.

YELLOW STAINS ON GELATINO-CHLORIDE PAPER.

While the subject of yellow stains upon gelatino-chloride printing-out paper is on the *tapis*, I should like to give my own experience, and suggest an apparently unsuspected cause. Hypo has received such a bad name in years gone by that, as Mr. Pentney remarked a week or two back, we were too prone to lay all the blame of yellow stains, without any further inquiry, to its credit. But what about sulphocyanide of ammonium? It is as much a sulphur compound as hypo, and, although the combinations it forms with silver chloride are perhaps not so unstable as the hypo compounds, they are still subject to similar decompositions.

In addition to this, the gold compounds, formed by the mixture of auric chloride with the soluble sulphocyanides, are of an equally, if not more, unstable character than those of silver, and, under present conditions of toning, these are, it seems to me, quite sufficient to account for many otherwise obscure cases of yellowing.

Mr. C. H. Bothamley, in his recent report on this subject, alludes to the appearance of yellow stains in the course of toning, and which he describes as an occasional, though very rare, occurrence. This is very far from being the case, in my own experience at least, when sulphocyanide of ammonium or potassium is employed. I am not speaking of only recent experience, but will go back seven or eight years with gelatino-chloride, and I have had a similar discolouration with albumen paper when using a combined toning and fixing bath containing sulphocyanide. In fact, although not a constant or regular occurrence, this yellowing of prints in the toning bath itself has been a pretty frequent trouble with me, ever since I began to use the mixed gold and sulphocyanide toning bath first recommended for gelatino-chloride paper.

The formulæ originally published for this purpose contained, it will be remembered, a minute trace of hypo, for what reason introduced I do not know; but it was natural to blame the yellowness on to that, and, as I found the bath toned just as well without it, the hypo was discarded. But still the yellowness occurred at intervals, and what was worse, or rather more to the point, in fixing the evil on to the toning bath itself, was the fact that a bottle of the stock toning solution (in concentrated form), after standing some months unused, was found to have deposited a dirty yellow granular powder, while the sides were coated with a thick layer of a similar character.

But it was not until comparatively recently that, having taken up the working of gelatino-chloride paper more regularly, I have felt the full force of the trouble, with the result that I have, for some months past, given up using sulphocyanide altogether, and so got rid of the discolouration in the toning bath completely. I am referring solely to that kind of yellowing, or such as occurs between toning and fixing, *in the absence of any possible chance of contact with hypo.* Under such conditions, I think it may be set down to the effect of sulphocyanide; but, when there is any doubt as to the presence of hypo, "honours may be divided."

When the yellowing does occur, it will be either when the attempt is made to tone too many prints in the same solution, or, more probably, when the bath has been put away after being once used, but not exhausted. The danger is not so great in the first instance, as few of us are foolish enough to try to tone a larger number of prints than we know there is gold for; but it is different

when an unexhausted bath is used a second time. Under such circumstances, although there may be ample gold present, and the solution itself may be uncoloured, the toning will be extremely slow, if, indeed, any change take place at all beyond a slight *reddening* of the image. More gold is added to hasten the matter, but this only makes matters worse in all probability, and, though with perseverance some sort of "tone" may be got in time, the whites of the print will be pervaded by a sickly yellowness, and the solution itself will acquire almost as decided a colouration as the plain solution of chloride of gold—that is to say, a rich, bright yellow. The precise composition of the bath does not appear to matter much, provided sulphocyanide be present; I have had equally pronounced colouration with plain sulphocyanide and with the mixed sulphocyanide and acetate bath.

Another circumstance that seems to lend strength to the suspicion of sulphocyanide is this: If a plain gold and acetate bath, that has been put away after use, but not exhausted, be used a second time, the toning will proceed much more slowly than when previously employed, and it may happen that it will refuse to tone at all, as already described. Here, again, the addition of fresh gold proves useless, or worse, only hastening the decomposition of the solution; but, in this case, the colour developed by the bath itself is the well-known pink, or purple, according to the degree of change, while the prints either remain white or take a delicate pink tint.

I am not inclined to blame the sulphocyanide altogether for being the cause of the decomposition of the bath and the arrest of toning, but it certainly seems to alter the character of the products. The original cause of the changes referred to is undoubtedly to be found in the paper itself, and the rapidity and extent of the decomposition will depend upon the care with which the prints are washed before being introduced into the gold bath. If free silver be left in the prints to any extent, it is converted into chloride at the expense of the gold and then dissolved by the sulphocyanide. The first effect is a weakening of the bath, and after that a process of sulphur toning is set up by the dissolved silver.

But scarcely any amount of ordinary washing can be expected to entirely remove the slightly soluble citrate of silver contained in the paper, and this will be as readily acted upon by the gold solution as any free nitrate that may be left. Therefore, unless the prints be treated with weak chloride of sodium before toning, as directed at page 699, there seems to be always a chance of a certain amount of sulphur toning occurring when sulphocyanide is used; and, if the bath be used to exhaustion, then the yellowing will occur. Where the sulphocyanide is absent, the effect is confined to a reduction of both silver and gold in the toning bath and the destruction of its toning powers.

W. B. Bolton.

REMARKS ON HAND-CAMERA WORK AND HAND CAMERAS.*

The first fault that I had to find with it was this: I had placed the lens centrally to the plate, and this gave me my horizontal line too high, I had too much foreground by far. I see from time to time writers in the journals crying out for a rising front for the hand camera; I have no desire for any such addition. Let the lens be so fixed as to give, with a level view, a horizontal line about one-third up the plate, and the cases must be few indeed requiring further elevation. That was the first fault; that I remedied by altering the position of the lens. Now, some one may be inclined to say, "If you had had a view finder you could have had the horizontal line just where you liked by tilting your camera." True, but in that case my architecture would have been, so to speak, "to the dogs" without a swing back, and who has time to stand in a crowded street arranging a swing back? No, I found, after the alteration of the lens, the camera was all that could be desired, as far as performance was concerned.

What, then, was fault No. 2? It was this. I said that I had got my saddler to make me a case. Now, a saddler makes a solid and substantial job, not, however, erring on the light side. Again, a case to hold a quarter-plate camera, which does not fold down, together with four double dark slides, must needs be of considerable bulk, and this was fault No. 2—the camera and slides made a too heavy and bulky parcel. If you slung the thing over your shoulder, it was big enough to be conspicuous; if you carried it in your hand, where were you to dispose of the case while you made an exposure. It was weather-proof, and fulfilled every other condition, but it was too bulky. Of the few dozens of plates which I exposed in this camera, not one showed the slightest blurring, but, on the contrary, seemed, to the naked eye at least, to be as sharp as any stand camera picture. Once or twice I carried the camera out without the case (it has a leather handle for the purpose), stowing the slides in my pockets, but I found that the brass mounting of the lens, the spirit level on the top, &c., attracted too much attention. It is, however, the most reliable hand camera I have, as far as performance goes.

* Continued from page 751.

Having the dark slides, and having other lenses in my possession, I determined (keeping No. 2 just as it was) to design and make up camera No. 3. The conditions which I set myself to fulfil were these more particularly: that the camera must be light and small, and quite inconspicuous in appearance, so that it could be carried through the streets without attracting attention.

By this time I had given up the idea of having the camera itself weather-proof, a condition which, as I stated before, I did not see how it was at all possible to fulfil; and, even with regard to a weather-proof case for it, I had come to this idea, that a square of India-rubber cloth, carried in the pocket for emergencies, was all that was actually required.

I had now only one difficulty, and that was, how to fit neatly and inconspicuously a drop shutter to the camera, so that the whole apparatus might have the appearance of one box.

Although I gave much consideration to this question, I found no solution to it. I finally abandoned the idea of a drop shutter (which I am extremely partial to) with great regret. One would imagine that there ought to be little difficulty in enclosing a drop in the end of the box somehow; but a patent difficulty is this, if the drop is kept at "set," you almost double the length of the shutter, which either sticks out awkwardly beyond the sides, or, if you make the body of the camera large enough to conceal it, makes a large camera. If you keep the shutter half way, no part projects; but the lens is now constantly exposed, and thereby liable to dirt or destruction. An easy way out of this difficulty would be to have a leather plug to place in the aperture of the shutter. This seemed to me to be makeshift and unsightly, for, by it, it entailed another movement, to be remembered and carried out at the moment of exposure.

Having abandoned the drop shutter, I cast about for a substitute. The conditions to be fulfilled were these: it must be small, so as to be enclosed as part of the camera; it must be constant in its speed, not over-fast; and, lastly, it must be easy of release and easy to make. All these conditions seemed to point to a pivoted quadrant of some kind, and this was the form I eventually adopted.

It will be easier to show you than describe camera No. 3. It is a plain mahogany box, covered with morocco, an oblong aperture at the back to take a dark slide, while the lens is carried on a false front, two inches from the actual front, and which two inches of space are taken up with the lens mount and shutter. The actual front fixes with a spring catch, so that I can easily get in to the diaphragm plate, while, at the same time, it gives facilities for the repair of the shutter, should such be needed.

The lens I use in this camera is a Wray 5 × 4 wide-angle landscape. When making the shutter, I arranged it so as to be actuated by an elastic band, and it worked smoothly and well. The speed was greater than I liked. It was getting well into October when this last camera was finished, and I found that the light was too poor to give me well-exposed pictures with this shutter. A trifling alteration made it, that I could drive the quadrant over by a touch of the finger, and this I found by experience to be an excellent idea. It was now possible to give exposures of almost half a second. It occurred to me, as it must occur to you, that, with an exposure so prolonged, definition was bound to go. To my surprise, I found this not to be the case. Once or twice I did get blurred pictures, but in general they were quite sharp. Thinking over the matter at home one day, and making a few experiments to determine the matter, I found that the blurred pictures were not due to tremor of the hand, but rather to the general sway of the body on the legs.

At my next outing with my camera, I found that it was almost always possible to get something to lean on while exposing the plate, and from that moment I had no more blurred pictures. Until one has experienced it, he can have no idea how opportunity favours him in the matter of "leans." In the short time I have had this camera I have exposed a few dozens of plates, not once have I been disappointed in a "lean." This is by no means only a matter for amusement—it has its important side. It simply means that throughout the year the hand camera need never be laid aside as useless. I may say, as a parting remark on camera No. 3, that it has proved in every way very satisfactory.

Being still possessed of the spirit of camera construction, and my

material not being quite used up, I determined on a fourth camera As in camera No. 3, I had sounded the depth, so to speak, of prolonged exposure, my aim now was towards very rapid exposures.

I have had in my possession for a good many years a diminutive portrait combination. The equivalent focus is about three inches, and it gives fine definition over a circle of about two and a quarter inches, with full aperture about an inch. This was manifestly the very lens.

I have no wish to dwell on the making of this camera. Artists and nations are said to have their periods of gradual ascension and decline—clearly I was following the same law. I had reached the high-water mark of construction in camera No. 3, and there came to me the fixed and rooted notion that No. 4 would be a botch.

To set out upon any enterprise in this frame of mind was to bespeak failure. At every turn some cursed thing turned up to annoy and disconcert me. A piece of wood, which a moment ago measured five inches, now, for some unaccountable reason, measured six, my solder refused to run, the glue got thick and burned in the pot. Reverses are supposed to do people good in the long run; my reverses raised the very devil in me, I got more determined every moment; once I very nearly knocked off a finger with my hammer, I forbore to utter a single sound, I sat dogged with my finger in my mouth, and thought of Arnley's fine verse,—

> "In the fell clutch of circumstance
> I have not winced, nor cried aloud
> Under the bludgeonings of chance;
> My head is bloody, but unbowed!"

It was under such circumstances as these that camera No. 4 was dragged into existence. The shutter, a modified roller blind, works fast enough, and, indeed, is the one redeeming point in the whole thing. Having no leather to cover the body, I used American cloth, and this turned out one of the biggest mistakes I made. American cloth is cold and clammy to the hand, and, being waterproof, the glue which fastens it on seems never to dry. I have exposed not more than a dozen of plates in camera No. 4, and, as was to be expected from such an ill-starred venture, every one, for some reason or another, turned out a failure. Only one good negative out of the lot, and the mark of Cain was upon it, in the shape of a running boy with legs in ridiculously preposterous positions.

Having now described my four cameras, this incident of the running boy suggests to me the remarks I have to make upon hand-camera work. In my reading up of the subject, I notice that both Mr. Dresser and Paul Lange recommend a swift shutter. I confess to not seeing the force of this.

If these gentlemen have light, and lenses, and plates requiring so short an exposure, I have nothing to say. If, on the contrary, a high speed is thought to be necessary, either to prevent the appearance of hand-shake in the picture or to take without signs of movement rapidly moving objects, then I part company from them here.

I have proved to my own satisfaction that a very prolonged exposure may be given without signs of hand-shake in the picture; and, as for the photographs of rapidly moving objects, is it not a great mistake to photograph them at all? Examine a photograph of a street scene. Let us say that it is such a scene as requires a very fast shutter, that is, where the moving objects are not far from the camera. Can any one seriously argue that the resulting pictures, with their novel, if not grotesque, posing, are things of beauty. Is it not rather the fact that, in a great many instances, the postures of both men and beasts suggest drunkenness or imbecility? The argument that the positions shown by instantaneous photography are the correct ones, and that the poses and positions painted by artists are conventional and erroneous, will not stand a moment's serious consideration. When an instantaneous photograph of a number of persons moving about is shown round, what is the very first thing that is noticed and remarked upon? Is it not the ridiculous position of the limbs, and the apparently impossible attitudes in which the individuals are discovered?

Why should these things appear so absurd and strange? Do we not all day long see people walking up and down in every-day life? How can any representation such as this be said to represent what we really see when nobody recognises the truth of it—nay, I go a step farther, when the great bulk of people even deny the possibility of its truth?

To say that we have all along been deceived by the artist, and that, when we have outgrown the bad lesson, we will see the truth of the photograph, is nonsense. How has it never occurred to mankind that he was being deceived before? He had all along his every-day experience and his eyesight to guide him. The truth is, photography renders outside nature *not* as we see it, but as it really is, a very different thing.

There is a wide sphere and a great future for the hand camera; but, in my opinion, the first lesson that must be learned is what the hand camera can *not* do.

J. K. Tulloch, M.B.

HOW LENSES ACT.*

We now come to a property of lenses which is comparatively little understood, viz., depth of focus, or the power of defining sharply at the same time objects both far and near, and while considering it shall assume our lenses to be free from defects, such as spherical aberration, &c. I must apologise for having to introduce mathematics here, but it will not be very much, and I could see no other way of showing what I want without their use.

Suppose we have two objects at different distances, A B, sending rays to a lens, rays from A coming to a focus at (*a*), and rays from B at (*b*). A screen at (*b*) would receive a sharp image of B, but not of A, for these rays have not come to a focus, and at (*b*) would form a circle of light.

Similarly, if the screen be placed at (*a*), A would be in sharp focus, but rays from B would have passed their focus, and be in turn represented by a circle of light.

If the screen be placed midway between (*a*) and (*b*), neither would be sharp; each would form a circle of light half the diameter, or a quarter the actual size of the circles of light at (*a*) or (*b*). These circles of light are called circles or discs of confusion.

Now, the human eye is not microscopic in power, and if an image is not really sharp, but nearly so, it appears sharp, and is so for all practical purposes, so that, if the disc of confusion be made sufficiently small, images formed at both (*a*) and (*b*) will be practically sharp on a screen placed midway between them.

Most authorities agree that a want of sharpness, or blurring, or disc of confusion to the extent of $\frac{1}{100}$″ is inappreciable, and no harm to the picture, although, of course, they would like less if possible.

Assuming $\frac{1}{100}$″ to be permissible (although I do not agree with it), it follows that, if this small distance be $\frac{1}{100}$″, images properly formed at (*a*) and (*b*) would be in sufficiently good focus on a screen placed midway. This means that both A and B would be sharp, and also any object between them, but any object nearer than A would not be sharp.

Suppose the lens to be working at *f*-8, xy = $\frac{1}{100}$ focal length stop = $\frac{1}{8}$, It will be observed that their lengths depend entirely upon the angle at which the rays meet, and, provided that the angle remains constant, the lens may be what it likes—single, rapid rectilinear, portable, symmetrical, wide-angle, &c.; and, as in all such lenses, the combinations of which are close together, the rays, with similar stops, do come in at the same angle, the distance, (*a*) (*b*), is the same for all of them. There may be, and probably is, some difference in the portrait lens, the combinations of which are often three or four inches apart.

This distance, (*a*) (*b*), remain constant also when the focal length varies, as with *f*-8 the rays come in at an angle of 1 in 8, no matter what the focal length may be, and ditto with the other stops.

What I want to impress upon you is that, with any particular stop, the length, (*a*) (*b*), is the same, no matter what the form of the lens or its focal length may be; and, assuming the disc of confusion to be $\frac{1}{100}$″, these lengths are, with *f*-8 $\frac{1}{8}$″, *f*-16 $\frac{1}{4}$″, *f*-32 $\frac{1}{2}$″.

It now becomes necessary to see what happens to A and B, and this is where the mathematics come in.

$$\frac{1}{D}+\frac{1}{d}=\frac{1}{f},\ df+Df=dD,\ df=D(d-f)\ D=\frac{df}{d-f}$$

$$d=f+ab,\ \text{and}\ ab\ \text{with}\ f\text{-}8=\tfrac{1}{8}$$

$$\therefore d\ \text{with}\ f\text{-}8=(f+\tfrac{1}{8}'')$$

$$\text{Substituting we get}\ D=\frac{(f+\frac{1}{8}'')+f}{(f+\frac{1}{8})-f}=\frac{f^2+f\cdot 6}{\frac{1}{8}}=(f^2+f\cdot 6)\times 6=6f^2+f$$

$$D=6f^2+f\ \text{for stop}\ f\text{-}8$$

$$\text{Similarly}\ D=3f^2+f\ \text{for stop}\ f\text{-}16$$

We see from this that halving the diameter of the stop nearly halves the value of D, which is the distance of B from the lens, and therefore the depth of focus increases as the stop diminishes.

An interesting practical point comes in here. Suppose we are on the pier at Kingston, and have a quarter-plate camera with two lenses 6″ × 12″ focal length. There is a yacht a couple of hundred yards out, some trawlers in the distance, and some rocks which would make a good foreground close to. We find everything can just be got sharp with the 6″ lens at *f*-8, but very small; now, with what stop can we get everything sharp with the 12″ lens? We have just seen that, if the focal length be doubled, the stop remains at *f*-8. We could only get the rocks sharp if they were four times as far away, say 73 : 0 instead of 18 ; 6″. To rectify this, we must use a smaller stop but we have also seen that, to reduce the distance to quarter, we must reduce the diameter of the stop to quarter, and the one quarter of *f*-8 is *f*-32; therefore, a 12″ lens, with *f*-32, will only give the same definition, to both rocks and distance, as a 6″ lens with *f*-8, and the loss in rapidity is as 8 is to 1. This

* Concluded from page 737.

shows the very great advantage of short-focus lenses for instantaneous work. In this case the *f*-8 stop of the 6″ lens is $\frac{3}{4}$″ diameter, and the stop *f*-32 of the 12″=$\frac{3}{8}$″ diameter, or $\frac{1}{2}$ the diameter of the stop used with the 6″ lens. It will be noticed, however, that this use of a 12″ lens is rather unfair to it, as both lenses are used on a quarter-plate, whereas, if a 6″ lens were used on a quarter-plate, a 12″ lens would, for the same view, be used on a quarter-plate, and, as I stated before, the disc of confusion for a large picture is permissibly greater than that for a small one. This would permit the stop of the large lens being somewhat increased, and in general practice it will be found that, if a $\frac{3}{4}$″ stop can be used with a 6″ lens for any view, the same size stop, viz. $\frac{3}{4}$″, is the largest which can be used *for the same view* with any lens, no matter what may be its focal length.

I stated before that a single lens, with a large aperture, gave what I called a false depth of focus. The upper half represents parallel rays, and the lower half rays from a near point. It can be seen that a screen at any position will receive a soft image of both objects, and of all objects between them. Using a stop would destroy the false depth of focus, but would increase the true depth of focus.

Curvature of Field.—Another fault in a lens is curvature of field, which is as shown. A stop cures this by increasing the depth of focus, and so enabling the oblique rays to form a sharp image on the screen. For ordinary landscape work, a little curvature of field is often of advantage, as the objects to one side are almost always near, such as foreground, hedges, &c., and, being near, their images would be behind the screen were it not for this curvature of field.

Stops.—I should like here to say a few more words upon stops. I have frequently been asked, What is the use of having a great big lens in heavy mount, when a small stop is always used, which only utilises the middle and best part of the lens? could not the surplus glass and mount be cut away, and so give us a more portable lens? Although a small stop be inserted, the whole of the lens is utilised. You will see this if you look through a camera from behind, turning and twisting it about while doing so. The very oblique rays pass through the extreme edge of the lens, while those in front pass the middle of the lens; the more oblique the rays, the nearer the edge of the lens. There is less aberration with a double lens than with a single one, and this means we can get a sharp image with a larger stop; hence this form of lens has great advantages for rapid work. It was found that by lengthening the distance between the combinations, both curvature of field and aberration could be improved, and thus allow of a still larger stop, with its consequent extra rapidity. Placing the lenses further apart greatly reduces the field of view, while placing them closer together increases it. For ordinary fast work there is little objection to curtailing the angle of view; it only means that the focal length of the lens used must be increased a little; but, for wide-angle work, a large field must be obtained at all costs, and therefore the combinations of such lenses are kept close together; this means that aberration and curvature of field are not so much reduced as they might be, and in actual work must be remedied by using a smaller stop. This explains why wide-angle lenses are short and stumpy, and work with a smaller stop than a rapid rectilinear lens.

A lens could be made, the combinations of which could be varied in position, either placed closer together or farther apart. Such a lens could be used for both wide-angle work and rapid work, although probably no great gain would ensue for the same size picture, for the focal length would only be very slight, affected by the change of position; but by such a change the rapid lens, suitable for a quarter-plate, might become a wide-angle lens suitable for a whole plate. Mr. Traill Taylor says on this point: "Hence, by adopting suitable precautions in the reparation, a doublet lens may be made to act either as a wide or narrow-angle objective. The expediency of adopting a mount of this kind is, however, open to question, as there might not be one out of ten who would know "how to use its power aright were it placed in their hands."

Achromatism.—We now come to the last and most beautiful thing about a lens, which everybody has heard of, but the meaning of which, like many terms connected with optics, they have rather shady ideas, I mean achromatism. In one of the first diagrams, I referred to the light passing through a prism as being bent or refracted. But something else also happens, it is split up into all the colours of the rainbow, technically it is dispersed.

Not only is it thus split up, but each of the coloured rays is sent out a different angle, as shown on diagram.

Suppose another prism to be placed underneath, and a ray of light be sent through it, it would be similarly dispersed. Now, if the prisms were rounded off into lens form so that all rays would come to a focus, we should have a focus for red rays, and consequently a red image, next a focus for yellow rays and a yellow image; and similarly green, blue, and violet images, and each of these coloured images would be in different positions.

The rays which give most light, in other words, those which most affect the human eye, are orange and yellow, while the actinic rays, or those which most affect the sensitive film, are in and beyond the blue.

Now, if we were to focus a picture with an uncorrected lens, we should place the screen somewhere about the focus of the yellow rays, as these are the chief light-giving ones. On developing the plate, however, we should find a very poor, blurred picture, because the plate was not in the correct focus for the chemically active rays.

Now, if we turn to our prism again, a ray of light is refracted and dispersed; but, if we place a second prism, inverted, behind the first, this second prism will just undo what the first has done, and our ray of light will pass on without refraction and without dispersion, just as if a bit of ordinary glass had been there.

Now, it was discovered by Dollond, the optician, or, at least, the knowledge was first applied by him, that different substances and different kinds of glass had different powers of refraction and dispersion.

Hence refraction can be obtained without dispersion. This means that, if our second prism be properly designed, we can get a ray of white light to emerge from the prisms *white*, but with some refraction.

By rounding the prism into lenses, Dollond had made a lens in which the negative or diverging lens gave the same dispersion as the positive or converging lens, and being equal, they neutralise each other; but, the refractions not balancing, enough was left to make the lens work properly. Such a lens is called an achromatic combination.

I said that the dispersions balanced and neutralised each other, but unfortunately they cannot yet be made to do so completely.

When making a telescopic lens, not only do they make the curves to suit the axial rays, as I mentioned before, but they also so arrange the achromatism so as to give the best visual image, which is probably done by making the orange and light green to coincide, while the blue and violet rays, being visually unimportant, are uncared for, and have foci all to themselves somewhere; hence such a lens is not suitable for photographic work. There is in the Queen's College, Cork, a very fine 8″ refracting telescope, by Sir Howard Grubb, and they wanted to take photographs of the moon with it, but they found that, the lens being only visually achromatised, they could only get blurred pictures by focussing in the ordinary way. But after many experiments, and probably calculations, they at last found the actinic focus, which was, I believe, nearly 3″ nearer the lens than the visual focus. Similarly, with all other lenses made for visual purposes, correction has to be made; but I understand that the use of isochromatic plates, which are sensitive to the yellow, are causing a change in this matter.

For photographic lenses the maker's endeavour is to make the actinic focus coincide with the chief light-giving focus, so that no after-adjustment has to be made. In conclusion, I should like to impress upon you the importance of the formulæ $\frac{1}{D}+\frac{1}{d}=\frac{1}{f}$, for with this, and remembering that the size of both image and object are proportional to their distances from the lens, almost any question that is likely to occur to the average photographer can be successfully worked out.

J. H. Harorave.

TELE-PHOTOGRAPHY.

[West London Photographic Society.]

The first thing that strikes one in using a tele-photographic lens is that it is different in construction from ordinary lenses, *i.e.*, all ordinary lenses are fixed systems, having one definite equivalent focus, and form an image in one definite plane, upon which the focus for parallel rays is received. This plane is invariably constant for parallel rays, and when the lens receives parallel rays the extension of camera is at the shortest possible. This plane is, however, farther and farther removed from the lens when focussed for nearer objects, obeying the well-known law of conjugate foci applied to any definite fixed system of known focal length. This focal length is measured from one of the nodal or Gauss points contained in the lens system to the principal focal plane. As a matter of fact, there are *two* such points and planes for every system, and for any *fixed* system their position is readily and accurately defined, and they are unalterable. With the tele-photographic lens, however, the position of the plane upon which the focus is received is quite undefined, in fact any position may be chosen at which to place the focussing screen, either in close proximity to the lens itself or at any distance whatever farther away, focussing being performed by a proper adjustment between the separation of the positive and negative lenses of which the system is composed. The two nodal points or planes of both positive and negative systems are in themselves fixed and definite, but, when used together, forming the tele-photographic lens system, the separation between the nodal points in the two systems for the time being will determine the two final nodal and principal focal points of the entire system. This element of separation is most important in regulating the positions of the particular nodal point of the whole system from which the focus is measured and the principal focal plane for the time being. This separation is a very delicate adjustment, and by very slight alterations the focus is obtained upon any chosen plane of the focussing screen or plate.

The second initial difference that is noticeable in the use of this type of lens is that for equal extension of camera the image given is very much larger than that of a fixed system of an ordinary character. This is explained by the fact that the particular nodal point from which the focus is measured in ordinary types of lenses is con-

tained within the lens mount, whereas in tele-photo systems the particular one of the nodal points which determines the focus for the time being is situated considerably outside and beyond it. It is determined, not only by separation of the individual lenses forming the system, but also upon the ratio of their foci, thicknesses, &c.

At the outset, I may state that the crux of the utility of such a system rests upon the comparison between enlargement from small images as against the direct enlarged image thus given. The example which I show you, that was exhibited at the late Photographic Society's Exhibition, is an undoubted proof of the incomparably better results obtained by the direct method. This result was obtained for me by Professor Burton, who wished to satisfy himself as to its utility, and he told me that he conducted the experiment with a view of testing the relative merits, being, if anything, prejudiced in favour of subsequent enlargement at the outset on account of its greater facility.

The elements necessary for the exact determination of the capabilities of a tele-photographic system are:—

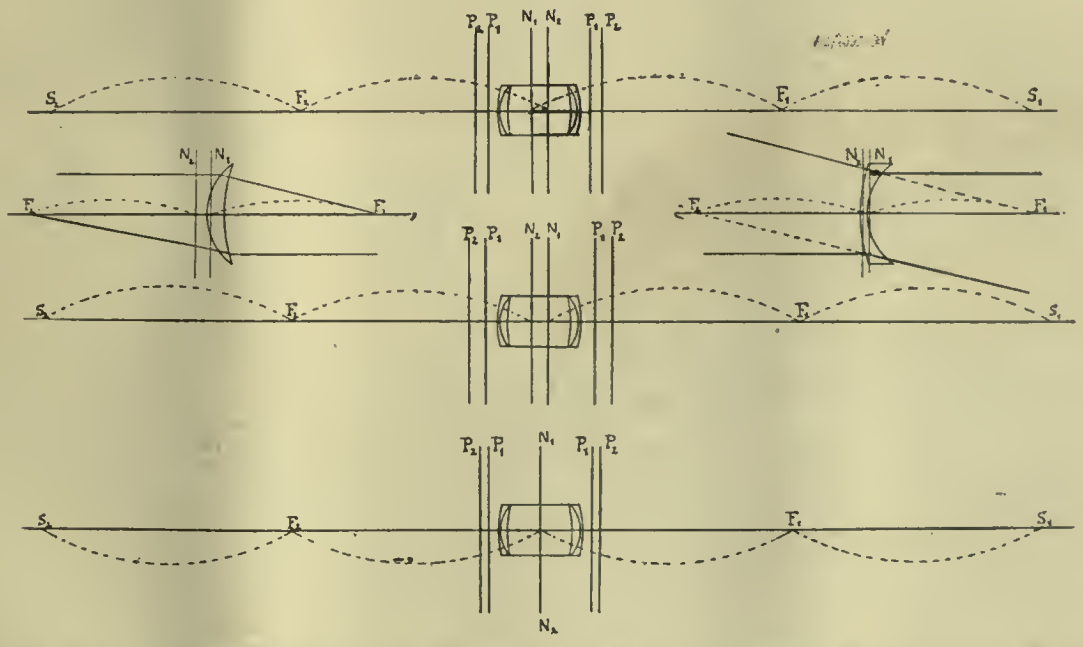
1. The focus of the positive system and the position of its nodal points or plane.
2. The focus of the negative system and the position of its nodal points.
3. The position of the nodal points of the entire system for a given separation of the above.
4. The intensity of the system for a given extension of camera.
5. The angle of view.
6. The plate that can be covered.

1. *The Focus of the Positive System.*—A great number of methods have been described from time to time, and none perhaps is simpler than choosing a known object sufficiently distant so that the rays may be considered parallel, and measuring the size of the image given, and comparing the size of the image with that given by a lens whose focus is known. The foci will then be proportional to the sizes of the images. If one has no lens of known focus to make such a comparison by, a very ready means is to obtain an image from a pinhole of a diameter calculated to give the best definition for an accurately measured extension of camera chosen. In practice I have found it useful to take an image given by a pinhole ten inches exactly from the plate as a gauge for all other measurements. The system ascribed to Grubb of measuring the focus by shifting the image, a distant object from one side of the plate to the other over a measured distance, and drawing lines by the side of the base on a clean sheet of paper, is also very readily done for systems in which the nodal point is contained in the mount; but this is hardly applicable for tele-photographic systems.

Another method very frequently used is simple in language but rather tedious in operation, namely, by obtaining an image exactly the same size as the object, and taking one quarter the distance between the plane of the object and the plane of the image (Fig. 1. This method has been considerably discounted of late, but really without good cause, inasmuch as the small error involved would be quite as small as compared with that by the Grubb method, and it is possible that there may be no error at all. The focus determined may be slightly too long, slightly too short, or it may be absolutely exact; this will depend upon the forms, thicknesses, and separation of the elements composing the system, whereby the nodal points may cross one another to a slight extent, in which case the focus would be slightly too short; they may be separated a little, giving as a result the focus a little longer than it really is; or they might very feasibly absolutely coincide, in which case the focus so determined would be exact.

Another method that I have recently employed is one that may interest you, and therefore I mention it because it is particularly applicable to the determination of the focus of tele-photographic systems. This method is dependent upon the earth's rotation, using the sun as a fixed object. A pinhole, or a lens of known focus, may be fixed upon the camera front by the side of a tele-photographic lens for the given extension at which the lens of known focus is in register (or in the case of the pinhole, if that be used, at any extension whatever). The tele-photographic lens for the chosen extension is then focussed upon the sun on the same plate. Simultaneous instantaneous exposures by both lenses are then made. If the pinhole is employed, it is exposed simultaneously with the exposure of the tele-photographic lens, and allowed to impinge upon the plate during the time the experiment is conducted. A convenient interval of time is allowed to elapse, when a second set of instantaneous exposures of the sun is made by the tele-photographic lens and the lens of known focus. In the case of the pinhole, which has been exposed during the whole period, the aperture is simultaneously closed. On development, the comparison of the distance travelled will give the proportion of the known focus to that of the lens which it is required to determine. I may mention here that the image given by a lens of 10″ focus will travel about an inch in twenty minutes. The experiment is preferably performed at equal intervals before and after the sun crosses the meridian. The image should also be at equal distances from—*i.e.*, similarly disposed about—the axis of the camera, this latter point being more important than the former.

Fig. I.



It is evident that the focus of a lens could be determined from the movement of the sun on the plate for a given interval of time without reference to another lens, but it would involve a knowledge of the declination of the sun (to be found in the Nautical Almanac) and would lead to a somewhat tedious calculation.

I shall mention one other system of finding the equivalent focus that may be readily conducted in an ordinary room on a winter's evening; this method too will lead up to the determination of the focus of a negative lens. It is dependent upon the different sizes of an image of a known object for differences of the conjugates: (1) Focus upon an object of known size and measure the size of the image given; (2) remove

the object of known size to a different distance, either nearer or farther from the lens, and measure the size of the image *then* given; also the distance traversed by the screen to the new position of focus. From these two sets of measurements the focus is then determined. Calling o the size of the object, i and i' the images given in the two cases, then $\frac{i}{o}=\frac{v}{f}-1$, $\frac{i'}{o}=1+\frac{v'}{f}$, v and v' being the distances from the nodal point from which the focus is measured to the screen and f the focus for parallel rays which we wish to determine, in other words, the equivalent focus of the lens. By subtracting one equation, from the other the uncertainty about the elements v and v' is eliminated, as their difference only is taken into account, and the focus, f, which we wish to obtain, is determined, $f=\frac{v'-v}{i'-i}\times o$.

The method that is ascribed to Dr. Schroeder of obtaining image and object of equal size, registering the position of the back, then focussing the lens upon parallel rays, and again registering the position of the back and measuring the distance between these two marks, will give very accurately the focal length of the system, and is a particular case of the general method just described, but involves more labour.

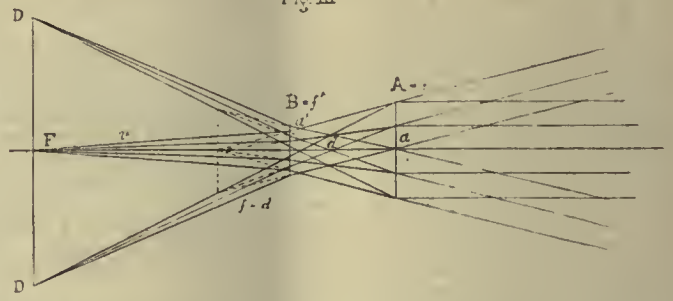
2. *The Focus of the Negative System.*—The only methods that have been described in this respect have been, firstly, the very rough-and-ready one of finding (by trial error) a positive system of known focus exactly equal to that of the negative, in other words placing two lenses in contact, so that no focus whatever is formed; and, secondly, by combining a more powerful positive with a negative, deducing from the difference of the focus of positive alone, and the focus of the positive combined with the negative, the focus of the negative lens system.

I propose to describe a method in which there are no elements of uncertainty, and this can be performed with the tele-photographic system in an ordinary room to determine the focus of its negative lens. First, focus upon an object, preferably an illuminated scale with definite markings, with the camera at a considerable extension. A piece of clear glass is placed in the plane of the image, and the size of the image read off by a micrometer. When this is noted, the second observation is to measure accurately the distance from the plane of the focus to some distinct point in the negative lens mount. Next rack the camera in a considerable amount, the more the better, and refocus the tele-photographic lens with the focussing screen in its new position, and a second time read off: first, the size of the image now given, using the micrometer; second, the distance from the plane upon which the image is now formed, and the definite mark upon the negative lens mount. The third operation consists in removing the negative lens entirely and focussing the positive element alone, and taking the measurement of its image with the micrometer. From these measurements one determines the focus of the negative lens. Calling o the measurement of the object given by the positive lens alone, v and v' the back foci as above, and i and i' the measurements of the image at these back foci respectively, the same formula as given before now obtains:—

$$f\text{ (the focus of the negative)}=\frac{v'-v}{i'-i}\times o.$$

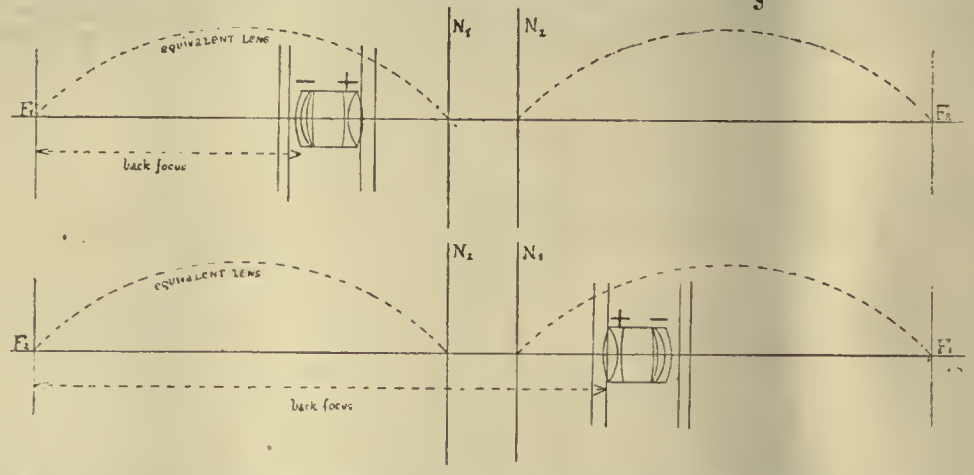
3. *The Position of the Nodal Points of the entire System for a given Separation.*—These, as I have already said, are determined by the foci of the positive and negative lenses employed in the system and the separation for the time being. For a given separation they are temporarily as fixed as in every lens system, whether positive, negative, or a combination of both. You have here (fig. 2) a diagram showing the

Fig. III



manner in which the nodal points, and planes passing through them, are thrown in front of the lens, and, in order to impress upon you the fact that they are fixed for the time being, I have a combination of a positive and negative lens, in which you will see how very widely the back foci of the system differ when the positive or negative lens is turned towards the object, but at the same time you will notice that the size of the image is identical in both cases; in other words, *the equivalent focus remains unchanged.* It is evident to you that, by turning the negative lens towards the object, the back focus is measured from the nodal plane a long way *inside* the camera, and to utilise a lens so constructed a very much longer camera would be necessary to obtain the same size of image as that given by an *ordinary* lens of the same back focus; in fact, it reverses the advantages of the tele-photographic system when used as it is intended to be used.

Fig. II



The methods of comparative sizes of a distant object between the tele-photographic lens and that of one of known focus, or the method in focussing upon the sun, are either of them applicable to determine the focus for any given extension of camera. I may mention here that perhaps the readiest method of obtaining the focus of a tele-photographic lens for a given extension has reference to the magnification of the complete system as compared with the positive alone. It is performed by dividing the back focus (*i.e.*, the measurement from the negative lens to the screen) by the focus of the negative lens and adding one. If the positive lens, then, have a certain known focus, the temporary focus for the extension taken will be given by the magnification produced by the tele-photographic system. If the magnification is n times, the corresponding focus of the lens will be n times that of the positive alone, and so on. It may be of interest to mention that with very long extensions of camera an approximate focus is arrived at by multiplying the camera extension by the focus of the positive divided by that of the negative.

It will be observed from this that with *short* extension there is an advantage on the score of portability, with greater corresponding magnification, than occurs at the "limit." Compare tele-photographic detective lens.

T. R. Dallmeyer, F.R.A.S.

(To be continued.)

ON THE PHOTOGRAPHY OF THE LUMINOUS RAYS OF THE SHORTEST WAVE-LENGTHS.*

The Photographic Spectrum Apparatus.

Its optical part consists of a double prism of 60°, with a square aperture of 30 mm., and of two plano-convex quartz lenses of 150 mm. focal distance (D, 589) and 26 mm. diameter.

The optician, Herr B. Halle, to whose kindness I am indebted for these lenses, has used the greatest care in the selection of the material and in its elaboration. How greatly this circumstance favoured the sharpness of the proofs I did not learn until I compared proofs taken with another pair of lenses of a different origin.

The two halves of the prism are joined together with a very thin layer of glycerine.

The mechanical part of the apparatus consists of a strong tripod fitted with levelling screws, which supports on a strong pillar a disc of 18 cm. in diameter, capable of revolving on its centre, upon which are fixed the collimator, the support of the prism, and the camera, so as to be capable of adjustment. The slide of the slit has cast-steel cheeks and a micrometer screw, the drum of which allows of readings down to 0·002 mm. It is connected with the collimator by means of a very accurately executed draw tube, with which also the plate is focussed. That this is effected with the collimator, and not also with the camera, is because the entire camera is built of glass, and is not adapted for drawing out. The support of the prism has adjustments necessary for levelling the prism (the Gauss eyepiece), and for adjustment to the minimum of deflection. A piece of velvet is suspended over the prism to exclude extraneous light.

The camera is the only peculiar feature in the apparatus. Except the case, it is built of mirror glass, and—with the exception of a small metal screw clamp, serving to secure the track of the case—there is in the entire camera not a single screw joint. The case can revolve on the medium line of the photographic plate, so that the plate can take any desired angle with the axis of the lens between 20° and 32°. The lens is secured directly to the glass body of the camera. Two openings, which the case, in consequence of its mobility, forms with the body of the camera, are closed with velvet. A glass junction, which I would here have used in preference, was impracticable. The oblique position of the plate can be read off on a roughly graduated arc. The body of the camera is of a parallel-epipedal shape, and is supported by an arm of strong mirror glass, prolonged at right angles on its long side. The prolongation of the arm effects the connexion of the camera with the rotatory disc of the apparatus, for which purpose the latter bears two powerful clamps.

The case is not distinguished in form and arrangement from the ordinary wooden cases. It has a slide and a cover like these, and it can also be displaced for the reception of spectra placed below each other in the direction of the spectral lines according to a scale applied laterally, so that a plate, with a sufficiently short slit aperture, may serve for a great number of proofs. The internal surfaces of the camera and of the cases, as the glass of which they are made is transparent, have a thin lining of a dead black colour. The outside is coated with black paper and shellac varnish. The size of the plates is 30 by 65 mm.

I have used glass for the camera in preference to wood, because, notwithstanding the requisite—and perhaps little trustworthy—paper coating, it is not greatly susceptible to the changes of atmospheric heat and moisture, and because wooden cases for such small plates can scarcely be made more accurately than those of glass. During use extending for months, the glass camera has never given occasion for dissatisfaction.

Setting up the Spectral Apparatus and the Auxiliary Plant.]

The source of light must be adjusted with the aid of a telescope. In order to keep the telescope and the collimator as much as possible coaxial during the duration of the entire experiment, a foundation was required as little sensitive as possible to atmospheric influences. For this purpose also I selected glass. A quadrilateral disc of mirror glass, with sides of 1 metre in length and 10 mm. in thickness, was fixed upon a very stable wooden foundation in such a manner that it was supported only in some few points. The position of the supports was selected so that the changes to which the wooden foundation was liable could be conveyed to the direction of the apparatus only in a very reduced proportion.

The apparatus directly concerned in obtaining the proofs was set up on the glass plate as follows, and, where practicable, it was specially secured against lateral displacement:—

Opposite to the spectroscope, and co-axially with the collimator, stood the reading telescope; between both, the spark support; and, close before the slit, a second stand with a slit-shaped screen of adjustable length. Between the spark stand and the screen there was placed, for a portion of the proofs, a condenser, of which more below. The screen came into use if the aperture of the slit was to be opened to the rays only for a part of its length. It could also be displaced along the slit by means of rack work in the support, so that the slit could be opened at any point to the length desired, and, if necessary, also in an uninterrupted succession at the transitions. The screen, as well as the sparks, required the reading telescope for accurate adjustment. This will be more intelligible if I add that the aperture of the slit length moved within very narrow limits, and often did not exceed the modest measure of 0·2 mm., and that, on the other hand, the sparks and the screen were generally at the distance of some centimetres.

The Source of Light.

The primary current was supplied by a chromic acid battery of four large immersion elements. Besides the inductorium (formerly used) of 25 cm. spark length, and the Leyden jars, there were also used this time a smaller inductorium for sparks of only 8 cm. in length. In some cases the inductorium was exchanged for an induction machine (four pairs of discs of 62 and 70 cm. diameter) connected with a Riess's jar battery (nine Leyden jars with an external coating of 1¼ metres).

As electrodes, there were again used, temporarily, cadminm and zinc: afterwards, permanently, aluminium, and finally, Ag, As, Au, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mo, Na, Ni, Pb, Pd, Pt, Sb, Si, Sn, Tl, W, all in the state of wire or short rods (Ca, K. Na, W), or crystals (Si), which were held in clamps of copper or platinum.

The Photographic Process.

This time also, when the utmost sharpness of design was needful, plates of my own preparation were used. But in general the photographs were obtained upon plates by Herrn E. Zettnow. In all cases I preferred them to my own plates, on account of their great sensitiveness and intensity, except where the utmost sharpness of the spectral lines was essential. Some spectra were taken upon Schleussner plates. The Schleussner plate works also clear, and is very sensitive, but its negatives betrayed the above-mentioned defect of all commercial plates—they were wanting in the intensity required for taking spectra. The developer and the fixing agent consisted as formerly, of pyro-soda and sodium thiosulphate.

The number of the negatives thus obtained is relatively large. The author's diary gives a conscientious account of the conditions under which each proof was taken. Every plate, even if a failure, is given in the order of time and with a progressive number, and the negative bases have the same number.

The Photographic Proof.

The commencement of my proofs fulfilled my expectations only to a very modest extent. My apparatus, indeed, as it was to be expected from the size of its aperture, was found very light-proof, but the two most refrangible rays of cadmium, Nos. 25 and 26, contrary to my anticipation, had gained little in intensity. It was not much better with the most refrangible lines of zinc, Nos. 27, 28, and 29. They certainly appeared earlier than previously, but their intensity still decreased decidedly with their wave-length. Hence it seemed as if the suspected action of the atmosphere might chiefly be reduced to a specific property of the lines concerned. But even this, as it appeared in the course of my subsequent researches, was in part correct; the main difficulty in my earlier proofs of the most refrangible rays lay in the imperviousness of the air to light. This resulted clearly from the proof of the aluminium spectrum which next followed. All the main lines appeared in a few minutes, and in greater intensity than heretofore. The most refrangible—the double line, No. 32—acted now always first, in contradistinction to former results, and its components were of equal strength, a circumstance which I emphasise merely because it acquired especial importance for certain subsequent proofs. Next to it there appeared the least refracted line, No. 30, and only some time after the intermediate line, No. 31, the least refracted component always first. On brief exposure, the more strongly refracted component did not appear at all, and even on prolonged exposure it remained far behind all the other lines.

This behaviour of the aluminium spectrum, with the new apparatus, ensued whether the proof was taken with or without a condenser, and with plates of high or low sensitiveness. In contrast to earlier observations, the lines, after an exposure of three minutes, displayed an intensity and distinctness quite sufficient for the purpose of measurement.

On more prolonged exposure, the more effective lines acquired the greatest intensity which the gelatine plate admits of. But, very remarkably, the action of light in this reagent is confined to these rays, whilst the less deflected portion of the ultra-violet is distinguished by an exactly

* Continued from page 753.

opposite phenomenon—the access of new lines, and their growth to a continuous band of the deepest blackness. Owing to this circumstance, the proofs have a peculiar appearance; they produce the impression as if the activity of their most refrangible half were still checked by some hindrance. We are compelled to this conclusion by the great intensity of lines No. 32, with which the effective band of the aluminium spark in the ultra-violet suddenly ends, and whereby, at the same time, the assumption of its prolongation towards the more refrangible side, where hitherto no action of light has been observed, receives a certain justification. It was this consideration which led my work from the path of reproductivity, on which it had hitherto mainly moved, towards new facts.

VICTOR SCHUMANN.

(To be continued.)

PRACTICAL REMARKS ON THE WORKING OF GELATINO-CHLORIDE PRINTING PAPER.

IN a previous article I referred to a few necessary precautions against damp when bringing gelatino-chloride printing paper into contact with a gelatine negative that was in any way liable to have absorbed moisture through being stowed away in a damp situation, and also referred to the suitability of this class of paper for printing negatives that were judged too weak or thin for yielding satisfactory results on albumenised paper.

As a rule, the chief error made when dealing with prints printed from thin negatives will be found in overwashing and overtoning them. In the case of gelatino-chloride, the toning in no way offers serious trouble when systematically gone about. For all round work perhaps there is no better toning bath to employ than the good old acetate bath, that has so steadily stood the test of time, and been such a good friend to professional and amateur alike. Here it is for the benefit of any who have never tried it, and the formula is of special value in respect of its being applicable for gelatino-chloride as well as albumen and plain silver paper alike, and is always ready at hand. When to be used in the case of gelatino-chloride, all that is necessary is to add a few crystals of sulpho cyanide of ammonium to a slightly weakened bath.

In 40 ounces of water dissolve 1 ounce acetate of soda, then break and add a 15 grain tube of chloride of gold. And this puts me in mind of about as funny a bit of photographic experience as ever fell to my lot. A few months ago, when asked by a novice about the toning of these prints, and having given him, as I thought, full particulars, I was buttonholed one day by him and submitted to a good all-round wigging, much after the following style:—"I say, Armstrong, what's the use of your humbugging a fellow in that way? I tried that toning formula of yours and found it no use. Can't get the prints to tone at all. It would be far better for you professional chaps to keep your information up your sleeve and refuse to give advice at all, rather than set a poor fellow all wrong!" This naturally made me curious to ascertain where the error had crept in, and so I asked him to bring along the stuff, as he termed it, for examination. Would the photographic public believe it, but the tube of gold had been inserted into the bottle without having been broken. All the satisfaction I got was, "Well, how was I to know to break the tube, thought it was a capsule. The instructions I read said just to add a 15-grain tube of gold, and I did it." Could ignorance go further?

And so I now, when giving this formula, always take care to add the word "break."

As I have said, this acetate bath is always ready for any class of paper, and when going to tone gelatino-chloride all that is necessary is to add one volume of water to three of stock solution, and then a few crystals of sulphocyanide of ammonium, and in a few minutes all is ready. A few words of advice to those having no experience in the way of working these admirable papers at this point may be of service. Before beginning to tone, have a full set of dishes, scrupulously clean, and ranged in order as follows: First, a dish not much larger than the size of print it is intended to tone (for I advise all beginners to tone one print at a time). Into this small dish place a reasonable quantity of toning bath made up as directed. On the right-hand side of this dish have a larger vessel, into which has been placed a hypo bath of one volume of a saturated solution of hypo to three of water, and let this be well filtered through a cambric handkerchief, and freshly made up. On the right hand side of the hypo have another large dish containing clean cold water, and on the right hand of this, again, a dish containing an alum bath, one volume of a saturated solution, free from all grit or sediment, to eight volumes of clean cold water; and, finally, a good-size dish, or basin, or tub, to wash the prints in. With such preparations made, the toning of any number of gelatino-chloride prints may proceed with the utmost certainty of success. The moment the print is taken from the frame, it is placed, with the left hand, into the small dish containing the toning bath, and quickly immersed, and turned face up and down. With a freshly made up bath the toning will proceed somewhat rapidly, and a little practice will be of value. The surface of the print will soon appear to assume a somewhat bluish tint, but the colour must not be judged by looking down upon the print; it must be held up to the window or light, and examined by looking through it. The moment a beginner does this, he will be struck with the marked difference between the surface colour as seen by looking down upon, as against the colour apparent by looking through it, and it is this looking through, or by, transmitted light that must guide the beginner in striking the proper tone.

As I have said, one of the common errors a beginner is most liable to make is the dealing with over-thin negatives and over-toning the prints from same. Therefore, any one commencing the use of this kind of paper should strive to get a good all-round printing negative, and one that will show deep shadows, and middle tints, and high lights when being toned and examined by transmitted light. With such a print from such a negative, contrasts and the colour of the deep shadows will easily guide an operator. As a rule, the deep shadows ought to have a little of what I call the rosy brown in them, whilst the middle tints and high lights will show a somewhat greyish appearance. The moment the deep shadows begin to lose this rosy appearance there must be no hesitation. The print must be passed from the left to the right hand, and quickly submerged in the hypo fixing bath. The colour will soon change, but after a few minutes the print will clear up nicely, and the fixing go on level for about fifteen minutes. Then with the right hand run the print quickly through the water bath on the right of the hypo dish. The washing at this stage should not be protracted; a mere rinse is all that is wanted, and then the print is placed for a good long time—twenty or thirty minutes—in the alum bath, and finally washed in several changes of water or running water for a couple of hours or so. Such is the routine, working always from left to right, the left hand alone touching the toning bath, and only one print at a time being dealt with, and this just as the print comes from the frame. The right hand must be carefully trained to refrain from touching the prints at any stage until it comes to the fixing bath.

I have said the prints are dealt with as soon as they are taken from the frames. Experience has taught me that the toning of gelatino-chloride paper is best not deferred for any great length of time after being taken from the negatives. When such is practised there is a distinct loss of brilliancy, and I know in this my experience tallies with that of other workers. Should the toning bath, after having treated a goodly number of prints, begin to tone too slowly, all that is necessary is to add a small quantity of the acetate bath from the stock solution and just an odd crystal or two of the sulphocyanide of ammonia. In a few minutes it will go on again with renewed vigour. The bath will be at about its best after a few prints have been passed through. In cases where a considerable number of prints have to be dealt with, it will be found convenient to have several toning dishes, say, three or four, into each of which one print at a time is placed; this permits of a good large batch being manipulated in a somewhat less period of time.

T. N. ARMSTRONG.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY'S EXHIBITION.

THE North Middlesex is among the few Societies holding periodical exhibitions which can afford as it were to dispense with the assistance of outside photographers at its annual displays of members' work. That it is able year after year to bring together collections of photographs of high artistic and technical excellence without extraneous help, says much for the *esprit de corps* of the Society as a whole, as well as for the enthusiasm of its officers and individual members. This year's display is not one whit behind its immediate predecessor in point of average merit, although possibly any advance that may have been made on last year is at the best not easily discernible. Summing up the Exhibition as a whole, we should be disposed to say that while in landscape work a high degree of excellence was obtained, portraiture shows little, if any, advance.

In the last regard, the best thing shown was perhaps *A Girl's Head*, by Mr. C. Beadle, a pleasing, unaffected study which we noticed at the Pall Mall Exhibition. Mr. J. W. Marchant showed a capital study in platinotype, called *Evening*, the only thing wrong about it being its title, inasmuch as it might have represented mid-day as successfully as evening. It was a view across a river to some tree-studded meadows. The Judges awarded a certificate to Mr. Ernest Spencer for *Zingara*, a happily posed lady in characteristic garb, with her hands well placed behind her head.

The picture was in red tone, and was very successful. Mr. J. W. Marchant won a certificate with a delicate view, *The Footbridge*, crossing a stream, trees and bushes being utilised to make a harmonious piece of composition. The same gentleman showed an equally good view of a gentleman fly-fishing. Mr. A. J. Golding's river view, *Twilight*, was among the exhibits. To Mr. J. H. Avery went a certificate for *Reedy Waters*, a study of a commonplace reedy river and meadow, handled with the happiest effect. Mr. Ernest Spencer showed a portrait of General Booth, and Mr. Golding obtained a certificate for *Departing Day*, a pretty view across waters and meadows, as well as for a far larger view of sheep, *On the Marshes*.

A great many commonplace groups and portraits were hung. The awards for lantern slides went to Messrs. S. E. Wall and W. Taylor, and the first-named gentleman also showed some admirable landscapes. Of considerable utilitarian interest was a series by Mr. C. O. Gregory, illustrating the interior of a stationery manufactory. We are always glad to welcome the application of photography to this and similar uses.

The Judges were Colonel Gale and Mr. Cembrano. On the whole, while the North Middlesex gave an excellent display, we should scarcely be inclined to say that much of an advance had been made. But then the Society sets itself a high standard. The Exhibition was open for two nights instead of one, as formerly.

Our Editorial Table.

Messrs. Talbot & Eamer have sent for inspection their two hand cameras, the Talmer and Economic. They are both of the magazine

class, adapted for twelve pictures on glass plates, or twenty-four on cut celluloid films, in sheaths. The changing is effected by means of a soft leather bag, which, when not in use, folds neatly down over the recess in which the plates are stacked. The Talmer is fitted with one of Taylor & Hobson's rapid rectilinear lenses, the name being a sufficient guarantee for the excellence of this portion. The shutter has a rapidity varying from a fiftieth of a second to two seconds, although an exposure of any duration can also be given. It does not move with a gradual sliding motion, but with great velocity until the lens is uncovered, when it makes a halt for the period determined upon, after which it closes suddenly. The changing of the exposed plate automatically sets the shutter for the next; hence there is no danger of a plate being twice exposed. The number of plates exposed is shown by an indicator. The one shown to us has a fixed focus, but we observe from the price list of the firm that they are also made with adjustable focus and scale. Although small and compact, the Talmer has an unusually large finder. In the Economic, which is constructed on a simple system, the body is telescopic, adjusted by a rack and pinion, and is supplied either with or without a lens. It has a Thornton-Pickard time and instantaneous shutter. It is made in three sizes, and there is also a stereoscopic variety catalogued. The cuts give a good representation of each of the cameras mentioned.

"Una" Powder.

This powder, manufactured by G. Wright & Co., Hopwood, Lancashire, will prove to be the most formidable rival that gold, as a toning agent, has yet had to encounter; for, while all the tones obtainable by gold can also be got (on gelatine printing-out papers) by Una, this latter is immensely cheaper (a shilling bottle sufficing for a thousand quarter-plate prints), while it tones and fixes simultaneously with ease and certainty. It is claimed that the image is as permanent as if gold were employed, and, judging from such tests as we have applied, we think this claim may be substantiated. The method of using it is as follows:—

Dissolve two drachms of hyposulphite of soda in about seven ounces of water, and add thirty grains of Una. When the latter is dissolved, immerse the prints (without previous washing) face downwards, and keep moving for five to seven minutes. By this time they will have assumed an orange-brown to chocolate-brown tone, when they should be removed from the bath and the surface of the prints either sponged with a soft sponge charged with water, or the finger passed over the film, to remove any deposit that may be adhering, and then washed thoroughly for half an hour (at first in many changes of water). When dried, they will become a rich purple in tone, and can be afterwards glazed or matted if required. It is almost impossible to fail in getting the most beautiful results, but it is necessary to print rather heavily. If the print is too warm when dry, it can be easily retoned by again entering into the toning bath. It is better to let the water run a few minutes before making the solutions.

News and Notes.

Leeds Camera Club.—December 7, Paper, '*Beginners' Errors*, by Mr. C. C. Vevers.

The Photographic Club.—December 6, *Home-made Dry Plates*, by Mr. R. Child-Bayley.

West London Photographic Society.—December 5, Technical Social Meeting; *Lantern Slides*, by Mr. J. A. Hodges.

The address of the Hon. Secretary of the Glossopdale Photographic Society is now—F. W. Sharpe, Swan Inn, High-street, Glossop.

In the Open Class (G) of the Leytonstone Exhibition bronze medals were awarded to Messrs. R. S. Webster, J. H. Anderson, and L. C. Bensett.

Newcastle-on-Tyne & Northern Counties Photographic Association.—December 5, Lantern manipulation, with exhibition of novelties and demonstration, by John Watson. 19, Conversational Meeting.

Received.—Christmas number of *Detroit Free Press*, *The Gentlewoman*, *The Young Gentlewoman*, and *Figaro Illustré*. Also, *Photo-wastes, and How to Make the Best of Them*, from Robert Pringle & Co., London, with catalogues from F. W. Hart, Stoke Newington-road, N.; William Hume, Edinburgh; and Ross & Co., 111, New Bond-street, W.

Central Photographic Club.—The first "one-man" Exhibition is now open at the Club-rooms, Coleman's Hotel, Henrietta-street, Covent Garden. Mr. Thomas Fall's (Baker-street) pictures, which include some very fine dog studies, can be seen on production of visiting cards. The discussion on *Films versus Glass*, to be opened by Mr. H. M. Smith, has been postponed till December 15. Friday next (December 1) will, therefore, be an Open Night.

Liverpool Amateur Photographic Association.—Engagements for December:—December 6, Smoking Concert. Members willing to assist please communicate with the President. 12, Closing day Annual Competition. 14, Annual Meeting, Election of Officers, &c. Exhibition of Competition Prints and Slides. Mr. H. Simpson will exhibit and explain some ingenious and novel Improvements in the Working of the Lantern. 21, Lantern Lecture, *A Trip to Chicago*, by Mr. W. Harvey.

Mr. A. L. Henderson, who is at present residing at the Grand Hotel, Belvedere, Davos-Platz, Switzerland, writes as follows:—"When this reaches you, you may require artificial illumination to decipher these lines. Not so here. At this moment the light from the reflecting snow is dazzling. I arrived here three weeks since, and I have taken upwards of sixty negatives, all representing Davos in summer. Now the ground is thickly covered with snow, and we will see nothing green for several months. I am going to repeat the views in snow. The climate is something wonderful, so dry and cold. Consumptives sit out in the gardens day and night, the thermometer standing as low as 18° Fahr., many without bonnets or over-clothing. Plates of *medium rapidity* work with drop shutter *f*-64. We have many amateurs here. A magnificent dark room is attached to the hotel about 18 × 18 feet, water laid on, and heating apparatus so nicely arranged that my negatives dry in about thirty minutes. The hotel is thoroughly English; out of 200 visitors only about three per cent. of foreigners, so I have no difficulty on the score of language. I had no idea that Switzerland was so enjoyable in winter. I intend to remain all through the season. I will have pleasure in delivering a lantern lecture on my return, probably at the London and Provincial Photographic Association. I merely pen these few lines that, should occasion allow, you may intimate to your readers that, during the fearfully foggy English winter, lovely sunshine and magnificent views and photographic weather may be reached in about thirty hours from London. I will be pleased to describe some of my experiences at a near future." We shall be glad to hear again from Mr. Henderson, whose presence among the photographers in that quarter must prove quite inspiring.

Photographers' Benevolent Association.—Meeting of Committee at the rooms of the Photographic Society of Great Britain, 5A, Pall Mall East, on November 15, Mr. A. Mackie in the chair.—First application was one that had been received by one of the subscribers, and handed over to the Benevolent by

him. As the applicant had made two previous appeals to the Association, and both times been refused as unsuitable for assistance, the Secretary was instructed that nothing could be done. The second application was from a retoucher, who had been disabled for many months by a street accident, and whose case was partly considered on October 30. Secretary had already advanced, under instructions, 2*l.* Applicant now asked for 1*l.* 15*s.* to pay off his debts and sufficient money to live upon for five weeks, at the end of which time he would receive money from his friends to enable him to go out to South Africa. A loan of 1*l.* 15*s.* immediately, and 17*s.* 6*d.* for five weeks was granted. The third application, a collier, out of work through the coal strike, asked for means to obtain a whole-plate camera, as he was an amateur and could obtain enough work to keep him from starvation if he was able to photograph whole-plate groups. The Secretary was instructed that, as there was so much want amongst photographers, the Association could not assist amateurs to enter the ranks. Messrs. Charles Faulkner and Arthur Priestly, and Miss Edith M. Hardy were accepted as members. Donations were acknowledged with thanks from Sandell Exhibition, 9*l.* 14*s.* 3*d.*; Photographic Society of Great Britain, first instalment of benefit, 3*l.* 10*s.* 1*d.*; Hackney Society, collection, 1*l.* 13*s.* 6*d.*; Central Club, collection, 1*l.*; Photography Prize Competitions, balance, 18*s.* The Secretary reported that two applicants to whom loans had been made had commenced to repay them by small instalments.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 4	Camera Club	Charing Cross-road, W.C.
„ 4	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
„ 4	Peterborough	Museum, Minster Precincts.
„ 4	Richmond	Greyhound Hotel.
„ 4	South London	Hanover Hall, Hanover-park, S.E.
„ 4	Stereoscopic Club	Brooklands Hotel, Brooklands.
„ 5	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 5	Bolton Photo. Society	10, Rushton-street, Bolton.
„ 5	Brixton and Clapham	376, Coldharbour-lane, Brixton.
„ 5	Exeter	City Chambers, Gandy-st., Exeter.
„ 5	Hackney	206, Mare-street, Hackney.
„ 5	Herefordshire	Mansion House, Hereford.
„ 5	Keighley and District	Mechanics' Institute, North-street.
„ 5	Lewes	Fitzroy Library, High-st., Lewes.
„ 5	North London	Canonbury Tower, Islington, N.
„ 5	Oxford Photo. Society	Society's Rooms, 136, High-street.
„ 5	Paisley	9, Gauze-street, Paisley.
„ 5	Rochester	Mathematical School, Rochester.
„ 5	Rotherham	5, Frederick-street, Rotherham.
„ 5	Sheffield Photo. Society	Masonic Hall, Surrey-street.
„ 5	York	Victoria Hall, Goodramgate, York.
„ 6	Edinburgh Photo. Society	38, Castle-street, Edinburgh.
„ 6	Leytonstone	The Assembly Rooms, High-road.
„ 6	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 6	Southport	The Studio, 15, Cambridge-arcade.
„ 6	Southsea	3, King's-road, Southsea.
„ 6	Wallasey (Annual)	Egremont Institute, Egremont.
„ 7	Birmingham Photo. Society	Club Room, Colonnade Hotel.
„ 7	Camera Club	Charing Cross-road, W.C.
„ 7	Dundee and East of Scotland	Lamb's Hotel, Dundee.
„ 7	Glasgow Photo. Association	Philoso. Soc. Rooms, 207, Bath-st.
„ 7	Glossop Dale	
„ 7	Hull	71, Prospect-street, Hull.
„ 7	Leeds Photo. Society	Mechanics' Institute, Leeds.
„ 7	London and Provincial	Champion Hotel, 15, Aldersgate-st.
„ 7	Oldham	The Lyceum, Union-st., Oldham.
„ 7	Tunbridge Wells	Mechanics' Inst., Tunbridge Wells.
„ 8	Bristol and West of England	Rooms, 28, Berkeley-sq., Bristol.
„ 8	Cardiff	
„ 8	Central Photographic Club	Coleman's Hotel, Henrietta-st., W.C.
„ 8	Croydon Microscopical	Public Hall, George-street, Croydon
„ 8	Halifax Camera Club	
„ 8	Holborn	
„ 8	Ireland	Rooms, 15, Dawson-street, Dublin.
„ 8	Maidstone	"The Palace," Maidstone.
„ 8	West London	Chiswick School of Art, Chiswick.
„ 9	Hull	71 Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

November 28,—Technical Meeting,—Mr. Horace Wilmer in the chair.

The Assistant Secretary showed and explained the Thornton-Pickard Company's new tripod stand for tourists' cameras.

Manganese Printing.

Mr. R. Child-Bayley read a paper on this subject, which consisted of a synopsised account of Messrs. Lumière's experiments in printing with the salts of manganese. Briefly, the process consists of floating gelatinised paper on a solution of manganic lactate. When dry the sensitive surface is of a brown colour. Exposure is made behind a positive in the printing frame, the action of light being to bleach the paper and to form a faint positive image. The manganese salt is considerably less sensitive to light than albumen paper. Development is effected by a variety of organic compounds, the nature of which governs the colour of the image. No manganese is left in the developed print. If under-printed, the whites of the picture become discoloured. Mr. Child-Bayley followed the reading of the paper with a demonstration of the process, developing several exposed prints with aniline sulphate, acidified with hydrochloric acid, orthotoluidine sulphate, and para-amidophenol sulphate, blue, green, and brown pictures being obtainable. A large number of organic compounds may be used for development. The developing action cannot be stopped, but the stronger the developing solution the more vigorous are the prints. The addition of strong ammonia to the developing solution reddens the tone of the print.

A New Platinum Paper.

Mr. Leon Warnerke introduced Dr. Hesekiel to the meeting, and stated that he had just brought out a new platinum paper which gave black or brown images by printing out. While ordinary paper required a certain class of negative to give the best result—that is, very intense or very weak negatives—this paper would give good results from both. It was prepared on a special paper having a pyramidal kind of grain, produced by pressure, the effect of which was to give a great deal more intense blacks and whites. The paper would not deteriorate by moisture, and would thus keep longer than ordinary platinum paper. If the negative was a dense one, it was advisable to use the paper dry; if weak, the paper could be slightly damped by steaming. If under-printed, the image could be developed up with ferrous oxalate. Development gave a blue image. The prints are washed in solution of hydrochloric acid in the usual way.

A large number of specimens of prints on the new paper were on view, and Dr. Hesekiel and Mr. Warnerke received votes of thanks.

Messrs. Perken, Son, & Rayment's representative showed the firm's new three-wick oil lamp, which, on account of central and side air channels, gave a whiter and more powerful light than an ordinary oil lamp having four wicks, and therefore considerably more flame surface. Comparative discs were shown with the two lanterns, and slides projected, the advantage being much in favour of the new lamp.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

November 23,—Mr. R. Beckett in the chair.

The Carbon Process.

A demonstration of the carbon process, on behalf of Messrs. Elliott & Son, was given by Mr. Birt Acres, assisted in the practical department by Mr. Skelton. Mr. Acres said the process was a permanent and beautiful one, but, unfortunately, in its earlier days it had been hampered by patents. There were certain apparent difficulties that frightened the beginner. Any child could do albumen printing, as something was seen at once, whereas in exposing tissue no image was seen, and, if it were not carefully attended to, one would go on seeing nothing. Mr. Acres mentioned that Mr. Swan discovered the process by accident when using bichromated gelatine to produce an insoluble image for process work. It occurred to him to make the gelatine easier to handle by putting pigment with it. When it was transferred he found that he had got a carbon print. At a previous meeting of the Association the question of getting too soft results had been raised. This was one of the points that could be easily remedied in two ways, namely, by using an exceedingly weak bichromate solution, say, one-tenth of the ordinary strength, and the other way was by printing in direct sunlight, as the sun's rays would penetrate more deeply into the print to produce a more vigorous image. Results too soft for enlargement depended a good deal upon the kind of tissue used. The sepia gave a soft result, but blue or black gave more vigorous results. One of the strong points in favour of the process was the certainty of getting a good colour, which was not at all dependent upon the opacity of the negative. Having briefly given the *rationale* of the carbon process, and explained single and double transfer, Mr. Acres introduced Mr. Skelton as having worked with Mr. J. W. Swan, and the practical demonstration of the single transfer process was proceeded with. Mr. Acres said the tissue was of about the same sensitiveness as albumen paper. The preliminary soaking in water was most important; the tissue would first curl inwards and then outwards, when the print should be placed in contact with the support. It should not be allowed to absorb too much water. It should be well squeegeed down to prevent air bells; water left in would produce black spots. Development took on this occasion) in hot water two or three minutes, and the prints were then placed in cold water. Alum (said Mr. Acres) was used for fixing purposes. There was an advantage in making a print to develop at a future time, as, on account of the continuating action of light, a print exposed one day could be developed the next, gaining in intensity the meanwhile. Of course, properly exposed prints should always be developed right away; but, if the light was bad, it was an advantage to be able to put the print away for a short time. Answering a question, he said no aniline dyes were used in the pigment. He pointed out that exposure could be modified by using the developing water at different temperatures. Local development and restraining were also practicable by using hot water to get out high lights or save the shadows; thus there was a considerable amount of dodging by the process. For the double transfer process, the use of opal wherever possible was recommended, as by using it a much finer matt surface was obtainable than with a flexible support. The opal should be ground on one side, talced, and collodionised.

In answer to Mr. Barker, who asked whether the colour of the tissue affected the continuating action of light,

Mr. Skelton said perhaps there was a little preference in favour of the iron colours; anything which increased the solubility of the tissue increased the continuating action.

Proceeding, Mr. Acres explained the use of the safe edge, saying that it was immaterial whether it were placed on the film or glass side of the negative. After touching upon various points in connexion with the double transfer process (which Mr. Skelton was demonstrating), Mr. Acres explained that, in printing from a hard negative for transparencies, a tissue that gave a soft result should be used; if the negative were much too soft, a tissue that gave a vigorous result should be used. Again, a defect in the original negative could be worked on in the transparency before making the enlargement. The use of the actinometer in exposure was then explained, Mr. Acres concluding by re-

marking that with the single ransfer process much sharper images could be obtained than with the double, and it was, therefore, better to make a reversed negative to start with than to use double transfer.

The various processes of development, squeegeeing in contact with temporary supports, prepared opal, &c., strengthening flat images by means of water heightened in temperature, were shown by Mr. Skelton, a number of developed prints being passed round. Also there were on view in the room many carbon enlargements by Messrs. Elliott & Son.

By means of his lantern Mr. Acres then showed a varied collection of slides, illustrating the qualities of transparencies desirable for projection and reproduction purposes, the effects of intensification with permanganate, comparisons of carbon slides with gelatine, &c., and other points, and at the conclusion a vote of thanks was passed to him, and the meeting terminated.

MANCHESTER PHOTOGRAPHIC SOCIETY.

NOVEMBER 22.—The evening was devoted to a demonstration by Mr. S. Herbert Fry on *Paget Prize Lantern Slides*. He dealt with, principally, the characteristics of a good lantern slide, and he laid great stress on the importance of exposing correctly, and not, as some people try to do, by making the slide right in development. To secure uniformity of colour, it is no use making local applications. Of course, this is almost necessary in plates, but in lantern slides it cannot be done satisfactorily; when anything requires to be doctored, it must be done in the printing, and not by local application. Coming to the question of variation of colours, Mr. Fry had put through the lantern about a dozen slides all from one negative, but all of different exposures. Not one of the slides was of the same colour, all different, some being brick-red warm tones, purple-black, and others cold tones. Being all developed by the same solution, it proves what the lecturer said, that the gradation of colour is due to exposure, and not, as some say, development. One thing Mr. Fry impressed upon the meeting was that almost the same tone could be got either with the Paget slow or quick lantern plate; in fact, he seemed to think that even an expert could hardly tell the difference. This, of course, is a convenience when reducing in the camera, the rapid plate only taking about one-sixth of the time. Regarding developers for these slides, he thought the best were pyro and hydroquinone. Either of these, if mixed as per instructions of the Paget Company, would give splendid results. Coming to the new print-out lantern slide, he said these plates can be changed in the gaslight or dull daylight, and will not be damaged; they can either be partially printed, and then developed, and toned, and fixed, or printed right out, and toned, and fixed. Mr. Fry recommended the combined toning and fixing solution, the one he used being composed as follows:—

Hyposulphite of soda	1 pound.
Lead acetate	1 ounce.
Chalk	1 ,,
Water	80 ounces.

and to each 5 ounces of above solution he added 1 grain of gold. He calculated that each dozen plates would require about 1½ grains gold, that is, 7½ ounces of above solution. Regarding the printing of these slides, it is done in daylight, just the same way in which you do the printing-out paper. To obtain the best results in developing the slide, it must always be printed by daylight and not by gas.

Brixton and Clapham Camera Club.—November 21.—Mr. W. THOMAS read a paper on *Skies*, which, he said, could be produced in photography in one of two ways, either by photographing on separate plates for the landscape and sky respectively, or by securing the sky on the same plate as the landscape. He preferred the former method, one advantage being that it was easier to allow the correct exposure for the two portions of the picture. In exposing he uses a Tylar's shutter, and sets it for the landscape before stopping down the lens, exposing gradually for the foreground and quickly for the sky. Development should be carefully performed, since the sky must be not too dense. A large stock of negatives of skies should be kept, and the greatest care exercised in printing so that the lighting may be the same as for the landscape, the clouds occupying their correct position. Several specimen prints and negatives were submitted for inspection and generally admired. The methods of printing in clouds in prints, enlargements, and lantern slides were also fully explained, and several dodges described.

Central Photographic Club.—November 24.—A large and appreciative audience attended, causing the club-room to be filled to overflowing, to hear Mr. PAUL LANGE'S (Liverpool) lecture on *Norway*, which was accompanied by 130 lantern slides. The lecturer said most visitors attempted to see too much, but, owing to the enormous distances they travelled, they saw only the crust. To fully appreciate the beauties of that country, the traveller should arrange to cover only a limited portion of the country in the time at his disposal, travelling up the various valleys in the native conveyances. Personally he preferred "a carriage for two," the coachman sitting behind; but he could not understand a word the travellers might say. This method of driving was very enjoyable. The lecturer proved himself a good guide to the various fjords, valleys, and mountains which he himself visited, and his style was much appreciated. The technical and artistic excellence of the slides was a surprise to most of the audience. Some very fine sunrise and sunset effects in the German Ocean were shown, the colours on the screen approximating to those of nature, and were obtained by pure photography without the aid of pigments, by combining a number of lantern plates.

Croydon Microscopical and Natural History Club (Photographic Section).—November 22.—The twenty-fourth annual *soirée* of the Club took place in the Public Hall, when over 600 guests attended. In addition to the large collection of botanical, microscopical, and entomological objects of interest shown by the other sections of the Club, there was a fine display of work by the Photographic Section. Amongst those showing were Mr. Low-Sargeant, with several admirable enlargements; Mr. K. McKean, photographs of old lamps and pipes; Mr. Dodds, a series of Yorkshire views; Mr. Collyer and Mr. Rood, views of the excavations of the Roman encampment at Silchester; Mr. East, several fine views of Arundel Park; Mr. Epps, some charming little bits of Norway; Mr. Moss, Mr. Coldwells, &c. Particularly noticeable among the transparencies were Mr. Oakley's *Indian Palaces*, and a set of Norwegian studies by Mr. J. A. Carter.

Greenwich Photographic Society.—At the recent meeting of this Society, under the chairmanship of Mr. Charles Churchill, Mr. E. A. LEBLANC, on behalf of Messrs. Schwarz & Co., gave a most interesting demonstration of the use of their new developers and cartridges. A couple of Sandell films were successfully developed with metol, the extreme detail brought out by this energetic developer being much appreciated. Lantern slides, developed with glycin (which is apparently well adapted to this work), and bromide prints with amidol were also shown, the use of the "tone-fixing" cartridges being shown on untoned prints provided by the Hon. Secretary. Much interest was evinced also in the new fixing block produced by this firm, which, it would seem, is quite likely to supplant our old friend "unadulterated hypo." Mr. Leblanc received the cordial thanks of his somewhat small but appreciative audience. At the forthcoming meeting on December 6, Mr. S. Herbert Fry has arranged to visit us in connexion with the Paget Prize Plate Company's productions.

Hackney Photographic Society.—November 20th, Ladies' Night.—An entertainment was given by Mr. RENNIE, entitled *The Forth Bridge*, illustrated with lantern slides of a very instructive and scientific nature. The lecturer dwelt upon the subject from an engineering point of view, which was fully explained by the slides which were shown, illustrating the principles. The slides included the building of the bridge at various stages, launching of caissons, banquet, the Prince of Wales driving the last rivet, portraits of celebrities in connexion with same, &c. Many statistics were given in connexion with this gigantic bridge, which proved of great interest to several members. A further exhibition of members' slides was put through the lantern, and some excellent toned pictures were the result. The lantern was worked by the Hon. Secretary, Mr. W. Fenton-Jones. Members were specially asked to attend a meeting to be held on Tuesday, December 5, when a discussion upon the Society's outings will be brought forward.

Richmond Camera Club.—November 27, Mr. Cembrano in the chair.—Mr. C. H. DAVIS read a paper on *Films*, in which he drew attention to the advantages and disadvantages of celluloid as a substitute for glass, and gave his experience of the working of various makes of films. The subject was well discussed, and specimens of negatives and appliances were shown by the President and other members.

South London Photographic Society.—November 20, the President (Mr. F. W. Edwards) in the chair.—Thirteen new members were elected. Mr. A. LE BLANC gave a demonstration of developing, toning, and fixing with Dr. M. Andresen's cartridges. He first used a metol cartridge, dissolving it in about seven ounces of water. With this he developed an isochromatic plate, which had been previously exposed on a group of chrysanthemums. The gradation of the whites was perfectly rendered. For fixing, the demonstrator dissolved a bar of fixing salts in about forty ounces of water, which gave an acid fixing bath. The portability of the fixing bath was much admired. Lantern slides developed with cartridges were also shown. Development of paper prints with metol and amidol cartridges followed. The Hon. Secretary showed the Thornton-Pickard improved tripod. Samples of Barnet plates were distributed among the members for trial.

Woolwich Photographic Society.—November 23, Major Charles D. Davies in the chair.—The meeting was well attended. Some prints were handed up for inspection by Messrs. Dawson and Panting. During question-time, the old difficulty cropped up, *i.e.*, how to mount prints on gelatino-chloride papers. It would seem as though the Kent water is the cause of some of the trouble, leaving chalk deposits wherever the print is wetted. Further discussion, however, had to be deferred. The Chairman introduced Mr. ALBERT HILL, who then proceeded to give a practical demonstration on *Enlarging by Crescofylma*, in the course of which Mr. Hill said that the best results were obtained on films developed with hydroquinone or rodinal. Several films, both negative and positive, were removed from their original glass supports and steadily enlarged to about double the size, and then placed on their new support. The whole operation is remarkable for its simplicity.

Ashton-under-Lyne Photographic Society.—November 22.—Mr. WILLIAM MOSS gave a demonstration on *Microscopic Photography*. Dr. Hamilton, in introducing him to the meeting, said this was a new branch of photography, and, if it could be brought to perfection, it would be of immense service to the profession to which he belonged. Mr. Moss, in opening, explained the working of his camera, which he had had made specially for his own use. It combined long extension and ease of working with perfect rigidity. The lens tube was one made short, and it took the place of the ordinary tube on the microscope stand. The light used was the usual powerful paraffin lamp. Mr. Moss explained that the lenses were microscopic objectives, and were better if corrected for photographic purposes. They were three inches, one inch, and one-eighth inch focus, and with these the power of magnification ranged from three times to two hundred times. If a smaller enlargement were required, the ordinary photographic lens could be used. Exposures varied much, from two seconds to hours. A slide, representing a subject to which he had given much time and study, the tongue of the snail, was put in the microscope, and, after focussing on the ground glass, clear glass was substituted, and a compound focussing glass used to bring the object into perfect focus. The clearness of the image obtained by this method was evidently new to most of the audience, and was much appreciated.

Birmingham Photographic Society.—November 21, Mr. W. Jones in the chair.—The collection of slides, which were recently shown by invitation at

the Exhibition of the Photographic Society of Great Britain, were passed through the lantern. They were representative of the best slide work of the Society.

Cardiff Photographic Society.—The Eighth Annual Meeting was held at headquarters, Castle-arcade, on Friday, the President (Mr. C. F. Gooch, J.P.) in the chair.—The following officers were elected for the ensuing year.—*President:* Mr. S. W. Allen.—*Vice-Presidents:* Messrs. C. F. Gooch, J.P., Jonas Watson, J.P., Walter Iusole, P. Mansel Franklen, E. H. Bruton, Alex. Kellar, and H. Murrell.—*Hon. Treasurer:* Mr. G. H. Mills, jun.—*Hon. Secretaries:* Messrs. G. H. Bedford and T. H. Faulks.—*Council:* Messrs. W. H. Kitchin, F. Heitzman, W. Herbert, A. Freke, W. Foster, A. McKinnon, D. B. McCullum, W. Booth, W. J. Jenkins, Rev. A. T. Fryer, E. Hancock, jun., W. Cocks, and A. Montgomery.—The Secretaries made a report as to the prospective arrangements for the Winter Session, and it was decided to have a public exhibition of lantern slides on December 22.

Derby Photographic Society.—November 21, Mr. R. Keene presiding.—The election of officers resulted as follows:—*President:* Captain W. de W. Abney, R.E., C.B., F.R.S.—*Vice-President:* Mr. R. Keene.—*Committee:* Messrs. A. H. Bennett, C. Bourdin, C. B. Keene, T. Scotton, G. Walker, R. Woods.—*Treasurer:* Mr. A. B. Hamilton.—*Hon. Secretary:* Mr. T. A. Scotton, 9 Church-street, Derby.—Mr. S. H. Fry, of London, gave a lecture and demonstration on *Lantern-slide Making*. Mr. Fry very clearly explained the various methods of doing this—such as printing in contact with gaslight, printing out by daylight, partially printing out by daylight, and then converting the chloride of silver salts into bromide of silver and developing to the proper density by the ordinary methods, afterwards toning with gold in the usual way, and, lastly, by means of reduction in the camera. The demonstration throughout was excellent, and was watched with great interest by the large number of members present, and at its conclusion a general discussion took place.

Leeds Camera Club.—General Meeting, held Thursday last in the Club rooms, Mr. Irwin in the chair.—Forty-seven present. Lantern exhibition. Lantern manipulators, Dr. Thresh and Mr. Wigglesworth. Next meeting, December 7, paper, *Beginners' Errors*, by Mr. Vevers.

Leeds Photographic Society.—November 20, Members' Lantern Night.—A large number of slides representing summer outings were thrown upon the screen contributed by the following gentlemen:—Messrs. Atkinsons Reffits, Butterworth, Rodwell, Walker Denham, Burrell, Denison, Hampshire, Armstrong, Washington Teasdale, and Dr. Jacob. Criticisms were invited, and questions asked regarding the developers used, much useful information being elicited. Metol in the hands of Mr. Walker produced excellent results; exposure about one-half. Many very fine slides were shown, and a pleasing and interesting evening was spent. The Chairman (Mr. J. H. Walker, President) announced that, on December 7, Mr. Godfrey Bingley would give his lecture on his summer rambles with slide illustrations.

Liverpool Amateur Photographic Association.—November 23.—Mr. S. HERBERT FRY gave a practical demonstration on *The Paget Company's New Printing-out Paper*, the great advantage claimed being that it was only necessary to partially print out, the full image being developed by after-treatment. The process is very simple, it consists of taking the under-printed print, and immersing, without previous washing, in a ten per cent. solution of bromide potassium. The prints should remain in this bath for at least two minutes, and then well washed in running water for five minutes, then developed with hydroquinone, the formula for which is supplied by the Company, after which they should be again washed for ten minutes, and then toned and fixed in the ordinary way. The print-out opals and lantern slides can be treated in the same way as the paper. The opinion of most of the members present was that the partial development was most useful, especially in the case of opals, where great difficulty is experienced in examining them during printing. Some excellent prints were passed round to the audience, who found it a difficult matter to say whether they were partially printed out or not.

Midland Camera Club.—November 24, Dr. Hall Edwards in the chair.—The following are the officers for the ensuing year:—*President:* Mr. J. Hall Edwards, L.R.C.P.—*Vice-Presidents:* Prof. Allen, M.A., M.B., Messrs. H. R. Leech, M.R.C.S., J.P., S. G. Mason.—*Council:* Mrs. Welford, Messrs. F. H. Mason, F. Iles, T. H. Cox, A. H. Slade, J. W. Beanfort, T. Fletcher, A. J. Leeson.—*Librarian:* Mr. T. H. Cox.—*Hon. Secretaries:* Messrs. C. J. Fowler and R. J. Bailey. The PRESIDENT read a paper on *Dr. Hill Norris's Dry Collodion Lantern Slides*, remarking that Dr. Hill Norris was the inventor of the first dry plate, which he introduced thirty years ago. Lanternists are agreed that the finest results are to be obtained with collodion. One advantage claimed for the plate is the great saving of time as compared with gelatine. The lecturer exposed a plate, developed, fixed, washed slightly, dried, and placed it in the lantern, the whole time occupied being less than four minutes. It was stated that many amateurs fail to obtain density, the reason for which, the lecturer thought, was the low temperature of the baths used, recommending a temperature of at least 60° Fahr., and as high as 90° Fahr. may be used with advantage. Another point specially emphasised was that a bright light is necessary to obtain the highest results. The following extracts from a letter received from Dr. Hill Norris proved most interesting and useful:—"A few seem to have a difficulty in securing sufficient density. This, I think, is, in the main, attributable to over-exposure, or the use of the developer at too low a temperature; in other cases it may be the result of not continuing the developmental action sufficiently long. Again, when cyanide is used as the fixing agent, the plate may be allowed to remain in it long enough to attack the picture; in this respect hypo is safer, because, unlike cyanide, it is not a solvent of metallic silver (very strong cyanide will remove the image altogether). There is, however, another cause of feebleness of image, which is more fundamental, and not so likely to be observed by the occasional worker—I allude to the influence of the negatives. A brief exposure with a strong light is not the same thing as a prolonged exposure with a weak light; in other words, a strong, intense light acting for a brief period produces a far greater developmental effect on the silver bromide than a weak light acting for an equivalent length of time. With weak negatives, whether used for reduction or contact, the intensity of the light should be proportionate to the weakness of the negative—*i.e.*, the weaker the negative, the intenser the light should be. Pluck and vigour lie on the side of very slight under-exposure, softness and tameness on the side of over-exposure, perfection in correct exposure; but perfection in a slide implies also a perfect negative, and you, the photographers of the present and future, will be called on to decide whether this will be made on a gelatine or on a collodion plate." A number of collodion slides were passed through the lantern, some of which had been lent by Dr. Hill Norris.

Kilmarnock Amateur Photographic Society.—The Ordinary Meeting was held on November 15.—The President (Mr. FERGUSON) gave a highly successful demonstration on *The Making of Lantern Slides*. Mr. Ferguson uses hydroquinone at its normal strength for development. He has made a collection of over 200 slides illustrative of incidents and places in the life of Burns, Scotland's poet. Those who are competent to judge say that there is not a finer collection extant. It was agreed that in future the meetings be held on the third Friday of the month. Mr. Millar Banker is to give the next demonstration in the Oddfellows' Buildings, John Finnie-street, on Friday, December 15, at 7.30 p.m., subject, *Gelatino-chloride Paper (including the Paget Prize Paper) for Development*. A very interesting and instructive programme has been drawn up for this session, embracing such subjects as printing on Alpha paper, carbon and platinotype processes, enlarging, preparation of blocks for newspaper work, &c. The subscription is five shillings per annum. Secretary, Mr. William Paterson, 50, St. Andrew's-street.

FORTHCOMING EXHIBITIONS.

1893.	
December.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18–Jan. 22, 1894	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

CELLULOID FILMS.

To the EDITOR.

SIR,—As you invite correspondence on the drying of films, will you permit me to relate my experience of them? In the first week of May, I exposed in Belgium a spool of thirty, put in for me the week before by the Eastman Company. The light was splendid, and I found on developing one upon my return that the exposure had been correct. The remainder I cut up, and laying them one on top of the other, put them away in a cardboard plate box in a dry place. Circumstances prevented me from developing any more until last month. I then found that they had endeavoured to roll themselves up, but for lack of space for free movement had got no farther than forming a ridge down the centre and a curl at the edges. A preliminary soaking did not mend matters, and I had to proceed with the development under great difficulties, as it was impossible to keep the film flooded. Using my fingers for the purpose, portions of the film flaked off. Having in this way spoiled one or two pictures, I saw that it was useless to proceed, for neither during twelve hours' washing nor by several hours' immersion in glycerine and water was the cockling in the least reduced.

I then rolled them one by one round a cylindrical box—a most tedious and troublesome operation, as they were most refractory in bending in the opposite direction—and put them away for a fortnight. This device was successful in removing the curl; but, though I used tepid solutions, they then refused to develop in the shadows. With eikonogen and pyro-soda hardly any image appeared, whilst with pyro-ammonia they became silvered all over.

To remove this I tried various expedients, such as chlorinetted lime, cyanide of potash, and perchloride of iron, rubbing the film the while with a plug of cotton wool, but all without the least success. Finally, I used, in the same way, a very weak solution of hypo, with ferridcyanide of potash. This entirely removed the silvering, and left a negative of good printing quality wherever development had taken place. Perhaps this hint may be useful to those of your correspondents who have lately been complaining of the same trouble.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1753. Vol. XL.—DECEMBER 8, 1893.

THE PETZVAL PORTRAIT COMBINATION.

The increasing dulness of the weather suggests the employment of lenses of a type of the greatest rapidity possible. One of the greatest masterpieces of Professor Petzval is the portrait lens *par excellence*, and, as it is apt to be overlooked in the rush after something new, we purpose telling our more recent readers something concerning it.

Why is it *the* portrait lens? Simply because it gives sharp definition with an aperture greater than any other that has yet been produced. While we do not desire to introduce invidious distinctions between it and any other class of lens of the so-called "rapid" type, the latter cannot for a moment stand against the old Petzval portrait combination in respect of intensity of illumination and consequent rapidity of action. With the exceedingly sensitive plates now in use, and in bright summer weather, the special properties of the portrait combination are not in such request as when the brightness of the light diminishes. For obtaining portraits of children, or other fractious subjects, in dull weather the portrait lens is a necessity, seeing that most of them will, on an average, impress an image in one-fourth of the time required for a lens of the modern cemented class.

When working at full aperture, and in virtue of such a large aperture compared with its focus, while the principal plane on which the focus has been made is rendered with extreme sharpness, it cannot, of course, represent objects in the background with equal definition; but this is an advantage in an artistic point of view, as those possessed of any taste like to see everything subordinated to the figure which forms the portrait. The small angular or numerical apertures of the lenses in such common use at the present day have to answer for many sins of this nature.

The form of the Petzval portrait lens is essentially different from that of any other. Its front element is practically a plano-convex achromatic, the back being an achromatised biconvex of much longer focus than the front, and incapable of forming an image possessing sharpness on account of the excess of negative spherical aberration, a property which can only be obtained by the union of a positive and negative lens. This back lens lengthens out the oblique rays which fall upon it to a greater extent than it does the more axial ones, and thus flattens the field, while it also shortens the focus of the objective, and gives increased intensity.

We have said that the front lens is practically plano-convex. We have, however, objectives of this class in which the flatter surface is slightly convex, a peculiarity of all the extra-quick lenses issued many years ago by Voigtlander, as well as some by Andrew Ross. Many fine objectives by modern makers are absolutely flat; but in the great majority of cases the front lens has the flatter side slightly concave. The back lens, we have said, is biconvex, with an excess of negative aberration. Just here let us pause to again explain what we have many times previously explained, that a lens possessing negative aberration has its centre and its margin of different foci. The margin does not refract the rays so much as does the centre; in short, it possesses less magnifying power, whereas in a lens possessing *positive* sphericals the opposite condition prevails, for in it the margin refracts the light in a greater degree than does the centre.

In the olden times, when a lens of the greatest angular aperture was required, both front and back lenses were cemented. The front was composed of three elements, a double flint concave cemented between two crowns, the external form being double convex, although one side was comparatively flat as compared with the other. This was also the characteristic of the back lens, which differed from the former in that, owing to the depth of curvature of the flint-glass lens, the negative aberration was excessive. From a somewhat intimate acquaintance with this ultra-rapid form of lens, we have no hesitation in saying that it must prove inferior to that form composed of two elements only, flint and crown, much as now employed, in which the refinement of adjustment is effected by separating the lenses, more or less, by a ring. The precise amount of this separation forms a powerful factor in the determination of the flatness of field and marginal definition. The back lens is usually constructed of a concavo-convex flint lens and a crossed or unequally double crown lens, the curves being such as to leave an air space between when these were brought into contact at the margins. As a rule, the deeper the meniscus air space between them, the more pronounced will be the negative aberration. Andrew Ross, in his early lenses, recognised this, and turned the flattest side of the crossed crown lens towards the flint. This enabled him to obtain the required negative aberration with comparatively shallow curves. The tube, too, was shorter than usual, and as a consequence the covering power was unusually great, a whole-plate lens covering a 12×10 plate with ease. In the well-known stereoscopic portrait lenses of the late J. H. Dallmeyer, the crown of the back lens was not crossed, but of equal curvature. The great covering power of this lens is well known. Some back lenses of the late Dr. Monckhoven in our possession are characterised by the same peculiarity. These were made as portions of objectives for printing out by means of the solar camera.

Many years ago Voigtlander, as already mentioned, introduced a triple back lens, the surfaces of which were cemented. His object seemed to have been the securing of all the light possible by reducing the reflecting surfaces. We tried its efficacy as regards this property by substituting for the triple back lens a double one of the same focus, but uncemented in consequence of the inner curves being dissimilar; and the decision arrived at was that the double, separated lens was the better of the two. The maker must have arrived at the same conclusion, for it is more than thirty-five years since their manufacture was discontinued.

For lantern projections the Petzval lens will always hold its

own. This also applies to the production of enlargements, more especially when artificial light is employed and duration of exposure is a matter of consequence. The special form best adapted for both of these purposes is that which was introduced for *cartes-de-visite* in which flatness of field and marginal, as well as central, definition with full aperture were *desiderata*.

OBTAINING VIGOUR IN CARBON PRINTS.

Reference was made last week to some discussion on the above subject at a Society meeting as to the trouble one of its members had in getting a good image from a good negative, and another member saying he had to give up the process for the same reason. We are not going to enter into the question of what is a "good negative," which may mean anything or nothing, according to the use to which the negative is applied. One that may be worthless for one process may be the most suitable for another. In the case in question the trouble complained of was lack of vigour in the prints.

Since the carbon process was first introduced, now nearly thirty years ago, the general character of negatives has undergone a marked change. Those of the present day are of a far less vigorous type than those of former times—that is, there is now a shorter range of tones between the highest lights and the deepest shadows than there used to be when the collodion process was employed. But that is not all. Modern negatives are, as a rule, more or less veiled in the shadows, whereas in those of twenty years or more ago the deepest shadows were represented by perfectly clear glass. Now, it so happens that the effect obtained with bichromated gelatine by printing through a perfectly transparent medium is different from that obtained with a veiled one, however slight the veiling may be. It is for this reason that in all the photo-mechanical processes, based upon bichromated gelatine, collodion negatives are still employed almost exclusively.

Notwithstanding that the general type of negatives has undergone such a great change of late years, very little modification in the working of the carbon process has been made to meet it, as has been the case in most other processes. It is surprising that those who are supposed to be conversant with the subject have said so little in connexion with this point. It would be useless to suggest that negatives, like the vigorous ones of old, should be specially taken for printing from in carbon; therefore it will be of more value to point out the best way to obtain good results from such as those now in vogue. It may here be mentioned, in passing, that it is quite possible to obtain brilliant impressions in carbon from what may, even at the present time, be classed as feeble negatives, so feeble, indeed, that they will not yield good results on ordinary albumen paper, by adopting a suitable modification in the procedure.

It is well known to every experienced carbon printer that, the more highly sensitised a given tissue is, the softer or flatter will be the prints it will yield; whereas, with a weakly sensitised one, the contrasts will be stronger, and, if too weakly sensitised, the prints will have a decided tendency to hardness or bareness in the lights. Tissue that is used shortly after it is sensitised prints, all things being equal, with less contrast than one that has acquired a certain degree of insolubility—or perhaps it would, in this instance, be more correct to say, has lost some of its original solubility by keeping. Hence a great advantage, when extra-feeble negatives have to be dealt with, will be gained by keeping the tissue until it is on the verge of insolubility, even if extra hot water is necessary for its development. Prints made by printing in a subdued light possess, from a given negative, stronger contrasts than those printed in a bright one. Again, impressions that have only been partially printed by the light, and completed by the so-called "continuating action," possess a greater vigour than those printed direct out by light. Furthermore, greater contrasts are also obtained by printing deeply and then developing with water at a high temperature. There is yet another point to be mentioned, namely, that tissue which is sensitised in the making gives, as a rule, softer prints than one that is sensitised afterwards.

From the above it will be seen that the experienced carbon printer has ample opportunity of adapting and does adapt the process to every class of negative that can possibly be classed as a "good negative," and to many that do not come under that classification. To obtain the maximum degree of vigour from very feeble negatives, the tissue should be lightly sensitised. The strength of the bichromate bath and the time of immersion must, of course, be governed by the temperature, and whether the superfluous solution be removed by squeegeeing or not. If it is to be, a two per cent. solution will be weak enough. The tissue should then be kept for several days, or until it has lost a considerable degree of its solubility, before it is used. The printing should be conducted in the shade, until the impression is but about half done, then it should be put away for the continuating action to render it dark enough, or, preferably, rather overdo it. Then the print will require tolerably hot water for its development, which will add still further to its vigour when completed.

In here pointing out how the greatest vigour is to be obtained from a given negative, we have supposed an extreme case indeed such a one as we were challenged upon a little while ago, namely, to obtain a brilliant print in carbon from an abnormally feeble negative with veiled shadows that it was impossible to get even a passable print from on albumenised paper. But, in quoting it, the method is indicated as to how the process may be modified, in the hands of a thoughtful worker, to suit almost every possible requirement.

Photography and Astronomy.—In his Presidential address to the Astronomy, Mathematics, and Physics Section, at a recent meeting of the Australasian Association for the Advancement of Science, Mr. H. C. Russell gave a most interesting *résumé* of the connexion between photography and astronomy. We cannot do better than quote *verbatim* from the opening sentences of his address. He said: "The observer must stand aside while photography takes his place, and works with a power of which he is not capable, and I feel sure that in a very few years the observer will be displaced altogether, while his duty will be done by a new sensitive being—a being not subject to east winds, to temper, and to bias, but one above all these weaknesses, calm and unruffled, with all the world shut out, and living only to catch the fleeting rays of light and tell their story."

A New Weighing Apparatus.—A balance without beam has recently been described by M. Antoine de Saporta, which can easily be constructed by any of our readers though possessed of little mechanical dexterity. It consists in the utilisation of an ordinary hydrometer, placed in either simple distilled water or some lighter or heavier fluid. The method is simple, and, for quantities not weighing more than twenty or thirty grains, is capable of considerable delicacy of indication. All that is necessary is to make a short tube of paper or cardboard, and attach to the upper end of the hydrometer (which can be bought for a shilling or two), and then attach a fine

cardboard or stiff paper disc to this tube. An hydrometer with a fine stem is better for the purpose than one of thicker bore. To use it, the instrument is first placed, with its disc attached, in a jar of water, and an observation made as to the number on the scale indicating the floating point. Then a weight, say twenty grains, is placed on what we may term the scale pan, and a fresh reading taken. The rest is obvious; it is only needful to observe how many of the scale degrees, whatever their appellation — be they specific gravity, Beaumé, or other—are included between the two points already observed, and, calculating the proportion they bear to the twenty grains employed, to read at a glance the weight of any object (less than that number) placed upon the pan and causing the greater or less immersion of the hydrometer to give a different reading for each weight. To ensure the utmost exactitude, a process of experiment with a series of different weights, and observing and recording the level at each, would be necessary; but, by assuming that the extent of the immersion of the tube is in direct proportion to the weight, no great error would be made.

The Value of Photography in Exact Science.—It is not alone in astronomy that our science has made itself a power, scarcely a subject in the range of the physical sciences but is indebted more or less largely to photography and its power of recording exactly, and entirely free from bias, as Mr. Russell observes, phenomena of a most complicated character, occupying periods of time of extraordinarily short duration. Those of our readers who would wish to have some idea a little beyond what is termed "popular" knowledge cannot do better than read in the number of *Nature* for last week a report of a lecture delivered before the Physics Section of the American Association for the Advancement of Science, the title being "Phenomena of Time; Infinitesimal." We would, however, point more especially to one portion of the address where he shows what photography has done in the past compared with its present record. It cannot be doubted that, in this particular branch of science, as in astronomy also, the work, executed under laborious conditions and surrounded by difficulties that the present workers in scientific photography have no conception of, is greatly undervalued by almost all modern writers on this particular topic. Let us repeat Professor E. L. Nichols' words in this connexion: "We are apt, at the present day, to look to the introduction of the dry plate as the step necessary to the application of photography to the study of fleeting phenomena; but certainly" (he is here speaking of the work of Feddersen, done in 1862) "the results obtained by this early investigator, who used the ordinary wet-collodion process of his time, are not inferior, in definition or in detail, to any which have been published in recent years. Feddersen's researches are, indeed, worthy of all admiration." We will not quote more of his words, but, in asking our readers to dip into, if not read, this paper, we assure them they may possibly be astonished to see what photography can do as an aid in rigid scientific investigation.

THE PRACTICAL TESTING OF PHOTOGRAPHIC OBJECTIVES.

[Photographic Congress.]

Though it is of great interest to the optician to obtain an exact knowledge of all the properties and faults of any photographic system by numerical calculation, it is generally sufficient for the photographer, whether professional or amateur, to form a rougher idea of the capability of any photographic objective. The following is intended to aid the amateur to determine by comparison, without any particular apparatus, the capabilities of lenses, and it may be mentioned at once that this examination is just as exact (and much more comprehensible with regard to its results) as the measurements obtained by the use of the so-called testing apparatus.

For all examinations of photographic lenses the maxim must be laid down, that only lenses of exactly the same character may be compared together, and that, above all, their constants must be decided. We take it for granted that the amateur knows the simple methods employed for ascertaining the focal length and the working aperture, and thereby the intensity of the instrument. We therefore have only the following questions to decide:—

1. Which instrument with a given aperture not too small for instantaneous photography, gives the largest area of sharpness?
2. Which instrument gives the most even illumination of the field within this area of sharp definition?
3. Which instrument gives negatives with the greatest absence of fog?
4. Which instrument gives with the largest stop the largest area of sharpness?

All other questions which may be proposed in comparing objectives are useless; for instance, it is often said that this or that instrument possesses a greater depth of definition than another. We know, however, that this depends solely on the strength of lighting—at least, in so far as concerns the centre of the field.

Our first question must therefore be settled, because upon the utilisation of the sharpness with the largest aperture depends the applicability of the instrument for instantaneous work. The test is very simple. Supposing two lenses are to be compared, one with the greatest illuminating power of *f*-8, the other of *f*-7·3, we should commence our work by stopping down the lens of *f*-7·3 to *f*-8, in order to equalise the conditions under which both lenses work. If a suitable stop were not supplied with the lens, it could be easily made of blackened cardboard or tin. We now screw the lens to the fixed apparatus, which must be reliable as to keeping the surface of the screen and of the sensitive plate vertical to the axis of the lens. We then focus a distant object perfectly sharp, for which purpose it is best to use an achromatic magnifying glass placed upon the centre of the focussing screen. The best object for this purpose is a so-called test screen (a flat wall about ten feet square would do), which is completely covered with a net of lines, printed pages, geometrical designs, silhouettes, &c. The objective must not be too near this screen, the distance must be at least fifty times that of the focal length. Care must be taken that the apparatus is so placed that the axis of the lens is directed as perpendicular as possible to the surface of the test-screen. Should the focussing not result in an absolute sharpness at the middle of the field with the stop employed, it is necessary, by introducing other stops, to find out the largest aperture which will give perfect sharpness, and to insert a corresponding stop in the other objective. When in this way we have focussed the centre with the greatest possible accuracy, we proceed with the exposure. For this purpose it is best to use a plate of very fine grain, such as a transparency plate, and to expose for as short a time as will suffice. This done, we fix the other objective without changing the position of the camera, and take a second photograph with the same length of exposure and relative aperture. It is important that both exposures are of exactly equal duration, and that the plates are developed together in the same tray. From the plates so obtained various things can be ascertained by examining them on a retouching desk with a magnifying glass, starting from the centre, and marking those points where sharpness is just appreciably beginning to fall off. That objective which gives the larger part of the image in sharp definition is the more perfect one, because the object was photographed under the same angle in both cases. But a further examination of the plates gives us at once an answer to our second question, viz., which of the two objectives gives the more even illumination of the field. It is easy to notice, especially if the exposure was a comparatively short one, that the density of both negatives decreases from the centre to the edges of the plates. The more rapid this decrease is the less suitable is the lens for instantaneous work.

If we now repeat this comparison test of the two objectives with a very small stop, say of *f*-40, we can form an idea of the capability of the lenses for all such cases in which it becomes necessary to employ a small stop, whether to obtain depth of definition, to improve the definition at the edges of the field, or to prolong the exposure.

It will frequently be found that the proportionate advantage of one instrument over the other in the first trial proves to be the reverse in the second. So it may happen that an objective which with a full aperture shows poor definition at the edge of the plate and which for this reason would be declared to be inferior to the other, may, if worked with a small aperture, prove vastly superior to its rival. In estimating the values of the competitive lenses it is therefore necessary to consider for which special purpose they are intended to be used. For instantaneous photography the preference will always be given to the lens which, with a full aperture, gives the largest area of good definition; while that lens is the best for landscape photography which with a rather small stop gives sufficient sharpness over a wide angle, with a fairly even illumination of the picture.

An important test which is rarely resorted to, though it can be carried out with very little trouble, is the one referred to by question 3, viz., the examination as to the absence of fog, that is, the brilliancy of the picture produced by the lens.

There is formed in each lens by the repeated reflections from its polished surfaces, a certain amount of false light, which under certain circumstances may cause more or less fogging of the plate and a conspicuous flatness of the picture. The test as to this property of the lens is very simple. Fix on to the centre of the focussing screen a piece of tinfoil or black paper of about the size of a pea, focus the objective sharply upon the horizon, and then step out with the camera into the sunshine. The lens must then be directed towards the sun, so that its image falls exactly upon the tinfoil or paper spot. Now move the camera a little to and fro, and you will observe a number of luminous circles of various diameters, arranged in a straight line, which change their size and position according to the motion of the apparatus. These luminous circles are nothing else than conical pencils of rays of false light thrown by the lens upon the flat surface of the screen, and their size gives a clue as to the amount and harmfulness of the false light peculiar to the lens. If the size of the stop used for this purpose is taken as a unit, that objective must be declared superior in this matter of which the largest luminous circle is in proportion to this unit of the greatest diameter. Besides this, that objective is generally the superior one of which the number of the visible luminous circles is the smallest and the increase of the diameters the quickest.

The ordinary photographic lenses of the aplanatic type generally show three or four, sometimes even six such luminous circles, if the operator covers his head with a focussing cloth in order to shut out as far as possible all extraneous light. Experience has shown that under unfavourable conditions the objective gives also a distinct spot of light, if the smallest of the luminous circles is of about six times the diameter of the stop. The objective of which the smallest luminous circle is about ten or fifteen times the diameter of the stop would be considered a very good one, and such lenses give very clear negatives.

The necessity for ascertaining by personal tests the values of the many types of objectives has lately become a very urgent one. The great variety of new types of objectives lately introduced by English and German opticians makes it very difficult for the photographer to determine which he will select. The modern anastigmats and the somewhat similar Concentric lens of Schroeder have raised the standard of perfection which may be reasonably required of an ordinary photographic system, to a very considerable extent, and it would therefore be useless to compare such instruments with older ones, such as aplanatic and symmetrical lenses at all; they are very much superior to them. But it is not so easy to decide the question as to which of all these new systems should be preferred. In Germany it is chiefly Zeiss and Goerz who claim to have produced the most perfect objective. Until lately the palm has been given to the Zeiss anastigmat *f*-6·3 as the undeniably best objective extant for instantaneous photographs; this position it has now, in our opinion, lost, as it is much surpassed by the new double anastigmat of Goerz, and in all cases where the illuminating power of this instrument is sufficient (*f*-7·7) it may deservedly be called the best of all existing objectives.

Quite recently, however, the firm of Zeiss have endeavoured to produce an objective, in the form of their new anastigmat *f*-8, to be equal in value to that of Goerz. It is perhaps not yet decided in how far the makers have succeeded. Certain it is that the new anastigmat of Zeiss *f*-8 is superior to the former Zeiss objectives, and only careful comparative tests will reveal whether it is equal or superior to Goerz's instrument. In any case, this much can be said that photographic optics have in the last five years made advances which before that period perhaps nobody would ever have imagined. A further essential improvement is, one might say, scarcely necessary. All the new instruments allow with an aperture of *f*-8, which is sufficient for nearly all purposes of instantaneous photography, the reproduction of a sharply defined picture with its greatest dimensions at least equal to the focal length of the lens. The old aplanats, however, remain very much behind this; they cover, according to circumstances, a plate of hardly two-fifths of their focal length with absolute sharpness.

DR. AD. MIETHE.

CONTINENTAL NOTES AND NEWS.

A Remedy for Discoloured Albumen Paper.—The *Photographic Courier* says that when albumen paper has been kept for a long time, or, for any other reason, has acquired a yellow tint, the defect may be obviated in the following way:—Print slightly less deeply than usual, wash and tone, but commence fixation with such a mixture of hypo and red prussiate of potash (as is used for reducing negatives; this will remove the yellowness. Conclude fixation in the ordinary way. Query: Would this be applicable to gelatino-chloride papers?

Developing Aristotypes.—Feebly printed proofs may be developed, says the *Dilettante di Fotografia*, in the following solution:—

Metol	2 grammes.
Neutral oxalate of potash	10 „
Citric acid	2 „
Water	235 cc.

After washing, fix and tone as usual.

Death of Dr. A. Steinheil.—We have to announce the death, on the 4th ult., of Dr. Adolph Steinheil, a member of the well-known firm of opticians in Munich. He assumed the direction of the house in 1862, thus succeeding his father. Astronomical optics engaged his particular attention, while he will ever be associated in photographic history with the aplanats and antiplanats bearing his name.

New Method of Toning Gelatino-Chloride Prints.—In *Science Illustré* M. Bulher proposes the following plan, which is said to give tones resembling those of crayon pictures. The printed picture is first of all immersed in a litre of water acidulated with two or three drops of acetic acid. After washing in several changes of water it is toned. The toning bath (used at 30° C.) is made up as follows:—

A.

Distilled water	1000 grammes.
Gold chloride	2 „

After the gold is dissolved—

Strontium chloride	200 grammes

is added, and the solution heated to ebullition.

B.

Distilled water	1000 grammes.
Ammonium sulphocyanide	200 to 250 „

This is added little by little to A, the combined solution being agitated, allowed to cool, and filtered, 40 cc. of distilled water being added. The stock solution is preserved in well-stoppered bottles. The bath is made up of—

Water	1000 cc.
Stock solution as above	50 to 70 „

The toning is finished when the half-tones by transmitted light look of a greenish colour. After washing, the prints are fixed in hypo, again well washed, and then immersed in a filtered solution consisting of—

Distilled water	1000 cc.
Ammonia alum	50 „
Ammonia liquor	50 to 75 drops.

It is left in this for a quarter of an hour, and finally washed.

Aluminium Powder.—The following mixture is recommended for the aluminium flashlight:—

Powdered aluminium	21·7 parts by weight.
Antimony sulphide	13·8 „ „ „
Chlorate of potash	64·5 „ „ „

The three substances should be powdered separately, and the admixture made by shaking well in, say, a paper bag. Grinding the mixture with chlorate of potash is said to cause a violent explosion. The above burns in about $\frac{1}{17}$th of a second. A mixture burning less rapidly is composed of—

Powdered aluminium	30 parts.
Chlorate of potash	70 „

This burns in the fifth of a second.

International Exhibition at Milan.—An International Photographic Exhibition will be held at Milan from May to October, 1894. A list of patrons, consisting of the most renowned photographic scientists, has been organized. The offices of the Committee are at Via Principe Umberto, 30, Milan, where entry forms and all other particulars can be obtained.

Herr Valenta on Thiosinamine.—Herr Valenta has experimented with thiosinamine as a fixing agent. He finds that silver chloride dissolves in a 1 : 10 solution of thiosinamine as easily as in hyposulphite, silver bromide dissolves less readily, and iodide scarcely at all. The new solvent, therefore, can only be employed for chloride papers.

Boric Acid in the Combined Toning and Fixing Bath.—Herr Gaedicke, having experimented with eighty-four different kinds of toning and fixing baths, recommends one containing boric acid. The addition of a lead salt is necessary. The following is the formula:—

Distilled water	1000 cc.
Hypo	200 grammes.
Boric acid	30 „
Nitrate of lead solution 1 : 15	15 „
Ammonium sulphocyanide	20 „
Gold chloride solution 1 : 20	60 cc.

The paper, if acid, should be washed in water to which a trace of ammonia or sodium carbonate has been added. After washing, place in above solution. The tone is of a reddish colour, but it dries darker.

Treatment of Gelatine Prints in Hot Weather.—If in hot weather the gelatine has a tendency to leave the support, *Der Amateur Photograph* recommends a preliminary immersion of the prints for five minutes in—

Potash alum	5 grammes.
Water	100 „

Wash, and tone in—

Aluminium sulphocyanide	15 cc.
Water	100 „
Gold chloride solution 1 : 10	10 „

Fixation and washing as usual. The aluminium sulphocyanide is a liquid.

PRACTICAL HINTS ON WORKING THE ILFORD PRINTING-OUT PAPER IN INDIA.*

I HAVE chosen the above subject for my contribution this year, which will, no doubt, prove a benefit to the many readers of this valuable annual who work the paper in this country, where the climate has a great deal to do with the manipulation of the same.

I have used several tubes of the paper and worked it throughout the year, in the hot and cold seasons and the monsoons—with the result that I found it worked excellently through the two latter seasons, but it became troublesome in the former, especially in the months of April and May, and up to the middle of June.

I was one of the first to try the paper out here, having secured a sample tube that was sent out to a dealer in Bombay about eighteen months ago. I did not meet with much success at first, but I was so taken up with the tone and general appearance of the print that I determined to give it a fair trial. I did not use the alum bath at first, which, no doubt, accounted for the film being injured, which happened while I was manipulating it. When another consignment arrived, I sent for a tube. It was just as the monsoons were finishing, and from the course I now adopt in using it (detailed further on) I may safely say that the tone which I obtain is better than any I have as yet seen—even to the sample prints that are being sent out by the makers, and one would naturally think that they were the best that could be obtained. I have now adopted this paper, and abandoned the albumenised paper altogether. The following is the process I adopt:—

In cutting up the paper care must be taken not to let your fingers touch the sensitive side, as it is sure to leave a mark, which is very conspicuous when the print is finished. I cut the paper to the sizes I require for the day's printing, and keep the pieces in a large tube, the one that the six sheets are packed in. After they are printed, I put them into another similar tube, and so they remain till they are required for toning, &c. I think the above is a very good way to store the paper, besides making use of the old tubes, which saves the necessity of getting specially constructed boxes. I print in the shade, and I get a very soft picture. The printing does not take long, as the paper is much more sensitive than the ready-sensitised albumenised paper that can be procured in the market. I generally wait till I have printed three or more sheets, and then tone altogether. It may happen that they are printed a week or more before I am able to tone them, but it does not make any difference, as I find the keeping qualities of the paper are excellent, especially in a climate like India. It will be found necessary to print a little darker than what is required for the finished print, as the loss is not much during the toning and fixing operations. This can only be found out by practice under negatives of various densities.

In dry weather, when the paper will be perfectly dry, the image will be of a purple colour; whereas in damp weather it will be of a reddish brown. A purple-coloured print must be carried further than a print with a reddish brown aspect, as the former loses depth greatly in the subsequent operations. The prints are first washed in eight changes of cold water, by transferring them from one dish to another, which generally occupies from fifteen to twenty minutes. By the time you have passed them through the sixth washing, the milkiness in the water will have disappeared. (Do not be tempted to add salt or carbonate of soda to the last washing water, as I consider there is no advantage gained by it.) They are then put in an alum bath of the following strength:—

Alum	3 ounces,
Water	30 „

and kept there for five to ten minutes, when they are taken out and washed in five or six changes of water, after which they are ready for being toned.

In the months of April, May, and June, it is absolutely necessary to use ice. I have tried to do without it, but I find I cannot, for, with every possible care bestowed upon them, the film is sure to be scratched or injured in some way by the time they are finished. I do not find ice necessary during the other parts of the year, as the alum is sufficient to harden the film. The alum bath should never be omitted, as it renders the film less liable to injury. The following is the strength of my toning bath:—

Sulphocyanide of ammonium	100 grains.
Chloride of gold (Johnson's)	10 „
Water	60 ounces.

The most convenient way in which to measure the gold is to dissolve a 15 grain tube in 15 drachms of water, thus keeping the strength of 1 grain of gold to 1 drachm of water. The above bath is stronger than the one recommended by the makers, but I have found it necessary to increase it, on account of my always using the alum. In the event of the latter not being used, the bath will be found too strong, and will require diluting. The prints tone in this bath in from six to ten minutes. The action of the bath is rather peculiar. As soon as the prints have been immersed they turn to an orange colour, losing their vigour considerably; they soon recover strength, and darken as the toning proceeds, passing through various shades of red and brown till they become purple. On the surface they will appear to be perfectly toned, but the tone must be judged by transmitted light. Continue the toning until the brown shade has disappeared, except from the deepest shadows. On the surface they will appear to be considerably overtoned, but this alters in the fixing. Do not over-tone them, or they will have a very slaty appearance. The prints do not look so bright when dry as they do when wet, and this we generally find in all cases, the dry print always looking much colder. For warm-toned pictures the prints must be withdrawn from the toning bath at an early stage, the colour being judged by looking through them.

I never add gold to an exhausted bath, but prefer making an entirely new one, as I find that by so doing, and allowing it to stand for forty-eight hours, I obtain far better results. Above all things, never be tempted to warm your toning bath, but use it about the same temperature as the washing water.

* Received too late for the ALMANAC.

As regards the fixing, the following is the strength of the bath I generally use:—

Hyposulphite of soda	6 ounces.
Water	40 ,,

Keep the prints in the bath from fifteen to twenty minutes, after which they will be ready for being washed, which must be thorough, but not prolonged.

The prints must be kept on the move through all the various baths, or unequal toning or fixing is sure to result, which would spoil the picture in time.

I first wash the prints in several changes of water, and then keep them for two hours in a running stream, changing their position every five or ten minutes; they are then hung up to dry over lengths of string stretched from one end of the room to the other.

The trimming and mounting is done in the usual way. For a mountant I always use starch (Glenfield), with the exception of the enamelled prints, when I use a very thin glue. Starch, in my opinion, is about the best mountant a photographer could use. I mount the prints dry. After they have been trimmed they are laid face downwards on a piece of glass, and the mountant is put on them. The print is placed in proper position on the mount, a piece of cloth is laid over it, and a roller squeegee passed over the whole. I remove the cloth, and with a piece of soft muslin or sponge, which has been previously moistened with water, I gently rub the face of the print, which is then put aside to dry. Be sure not to rub the print with a piece of cloth after you have placed it on the mount, but use a roller squeegee, or you will injure the surface.

The enamelling is done the same as recommended by the makers. I have enamelled a few, but for ordinary purposes I prefer the surface as it is when they are finished in the ordinary way.

The paper is made in three colours, namely, pink, white, and mauve. I prefer the white, as it is suitable for anything, and, in my opinion, looks better.

In detailing the several processes in the foregoing, I have endeavoured to be as concise and clear as possible, so as to make it readily understood by all, and, in conclusion, I must place on record my firm belief, judging from the results of my own experience, "that the Ilford P.O.P. will be the standard of the future." JOHN T. FRY.

PRINTING FROM GELATINE NEGATIVES, INTENSIFICATION, COPYING, AND HALATION.*

GELATINE negatives may be printed from without being varnished. This has been frequently mentioned, and I quite agree with it if you only want a few copies, and the negative is of no farther value; but, to print in silver with any negative required for future use, no greater mistake can be made. Sooner or later the results are disastrous and utter ruin to the negative. Gelatine is so affected by moisture, and the silver paper may be apparently dry, but the backs of the frames, the blotting or backing which is frequently in many months of the year not always bone dry, the temperature not always at summer heat, renders it imperative, if you wish to preserve any negative, that it should be protected. In my own practice I always, when the negative is thoroughly dry, coat it with plain collodion. This resists the damp to an enormous extent, and is very effectual. They may then be used without much fear of future loss, but where many copies are required it is necessary to varnish on the gelatine film, and then very little chances of loss of negative. I wrote some months since in THE BRITISH JOURNAL OF PHOTOGRAPHY, stating I had made what I believed to be a very valuable discovery, and offered to remove the silver stains from any unvarnished negative sent me. This had the result of my receiving over one thousand negatives from all parts. With few exceptions I succeeded, but in some instances the silver had eaten through the film in holes. To remove this you may as well try and remove the small-pox marks from a man's face. If you have occasion to print immediately from a negative of any value, cover it with a piece of talc; and I may say this is a very excellent plan even if the negative has been varnished if numbers are required. I have some of Elliott's and Silvester's stereoscopic groups, taken over thirty years ago, covered in this way, and the plates are very little the worse for wear. Prevention is better than cure.

INTENSIFICATION.

Gelatine negatives in a great many instances require intensification. I know of no better than the following:—1st, A saturated solution of bichlorlde of mercury, well wash, and then take your No. 1 hydroquinone developer—say, hydroquinone, 320 grains; sulphite of soda, 4 ounces; bromide of potassium, 80 grains; citric acid, 120 grains; water, 40 ounces. Take 1 ounce of this stock solution to 4 of water, and you will get a negative vastly improved, and of a beautiful brown tone that will give excellent results.

HALATION AND COPYING.

Collodion, for which I have a very great weakness, and its result, nothing can excel. In the early days of photography I made a large number of negatives of copies of paintings and engravings (in, I think, 1853 or 1854). Wet collodion is very extensively used, and nothing can equal it for copying, &c. One difficulty I found in copying, and for interiors especially, was to get sufficient density without intensification; this I succeeded in overcoming by coating the plate with an old blood-red collodion which would without the slightest difficulty bring many a tear from the eye. Then, as soon as set, reverse the position of the plate, and coat with a newly iodised collodion; the results were all that was required. I have many negatives taken twenty-five years ago of Westminster Abbey interiors, and, on comparing these with those of the present day, the results, as far as halation is concerned, are vastly superior; one difficulty only I found, the film had a very great tendency to split on drying. This I got over by pouring on a solution of gum arabic and water. If the results in other hands equal mine, the reader won't grumble at the moments he has spent on the hints given.

HORATIO NELSON KING.

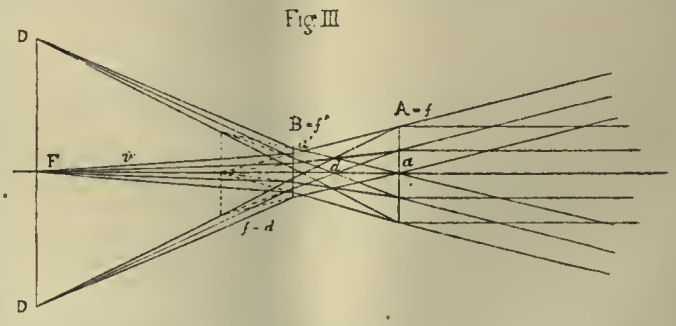
* Received too late for the ALMANAC.

TELE-PHOTOGRAPHY.*

4. *The Intensity of the System for a given Extension of Camera.*—You are all aware that the intensity of a lens is dependent upon the ratio existing between the available or working aperture of a lens and its focus. We have seen that the focus of a tele-photographic system for a given extension of camera may be taken either as an absolute measurement, or the focus may be considered in the sense of the magnification obtained as against that of the positive lens forming part of the system. The intensity, then, may be arrived at by reference to either of these two considerations. In the first place, if the absolute measurement of the focus be written down, the intensity is arrived at by dividing it into the diameter of the aperture employed in the positive lens, or the diameter of any diaphragm that is employed in the positive lens when making the exposure. The second method is perhaps the simpler, for, in this case, whatever intensity be employed in the positive lens, it is only necessary to divide that fraction by the magnification, and you have forthwith the intensity of the tele-photographic system.

5, 6. *The Angle of View and Plate covered.*—These are dependent upon the foci and diameters of both positive and negative elements contained in the system. Referring to fig. 3, the diameter of the circle beyond which no light can pass being called D, apertures of the

Fig III



positive and negative elements, a and a' and the foci f and f' respectively, the formula for obtaining the diameter is as follows:—

$$D=(v+f')\left\{\frac{avf+a'f(v+r')}{f'[v(f-f')+ff']}\right\}$$

and the angular diameter of the field of view is—

$$=\tan^{-1}\frac{v(a'f+af')+a'ff'}{f[v(f-f'(+ff']}$$

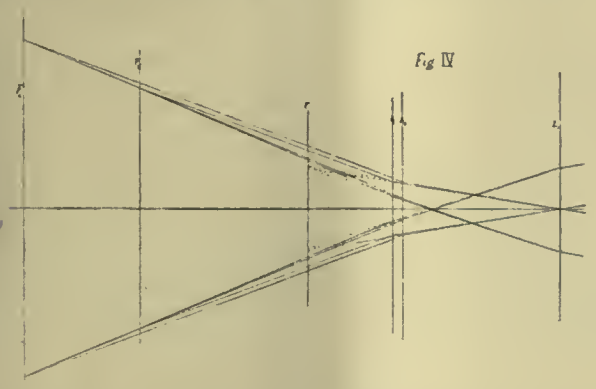
$$=\tan^{-1}\frac{a'f+af}{f(f-f')} \text{ approximately.}$$

The first of these formulæ only requires a knowledge of arithmetic

Concluded from page 768.

to readily determine the diameter of the circle covered, and the second is similarly interpreted by a reference to a table of natural tangents to obtain the angular measurement. It will be observed that, although the angle is nearly a constant, this does not imply that for various extensions of camera the angle included upon one of the same plate will be the same. This, of course, is not the case, and is in itself a very valuable feature of the instrument, in that it is not infrequently found that a portion only of some subject composes pictorially, and that its surroundings, if included, may mar the effect. By the use of this lens, a camera extension may be chosen to include only just so much as may be desired, and allowing this to occupy the whole plate (see fig. 4).

We have now examined all the elements necessary for the exact determination of the capabilities of any tele-photographic system. It



is evident to you that any positive lens, no matter whether of the portrait, rapid rectilinear, or slower types of lenses, can be converted into a tele-photographic system.

If the focus of a negative lens be chosen one-half that of the positive, you know in the limit that for any extension of camera the tele-photographic lens will give double the magnification of any positive of the same camera extension. If the negative lens be a third of the focus of the positive, the size of image will be three times that of the extension of camera chosen, and so on.

Hence, in making a choice of a suitable negative lens to combine with any positive lens, attention must be paid to the object to which the lens will be put. Weaker negatives will, of course, not give so much magnification as stronger ones, but score on the points of greater rapidity and greater covering power.

It is evident that, to avoid too much loss in intensity where high magnification is required, a rapid portrait lens of high intensity is best selected for the positive element. Such a positive element will naturally also score on the question of rapidity equally if a weak negative be employed with it; but any one who would propose to convert a slow lens into a tele-photographic system must bear in mind the necessity of choosing a weak negative to employ with it, or the rapidity of the entire instrument will become too much reduced to be of any value in any but timed exposures.

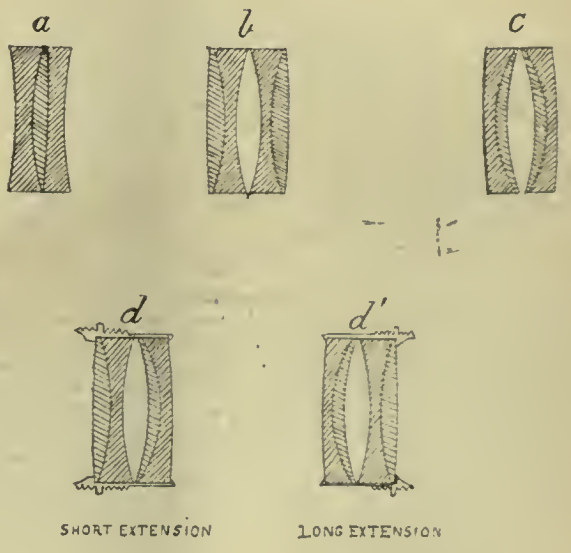
For instantaneous work I recommend a negative of half the focus of the positive, and that the positive should have an aperture of at least *f*-4. With this weaker magnification it is hardly necessary to employ the special form of portrait lens invented by my late father, although it is preferable, and, as I have before stated, if a high magnification is given, that adjustment for the correction of spherical aberration contained in it becomes essential.

For slower lenses I do not recommend a higher magnification than that suggested for instantaneous work, namely, with a negative one-half the focus of the positive. Such a lens may perform rapid work in bright light if the positive has an intensity *f*-8, provided too long an extension of camera be not chosen. When slower types of lenses are employed as positive elements, similar magnification can, of course, be obtained, but at the sacrifice of rapidity. In a word, a rapid positive lens must be chosen to construct a rapid tele-photographic system; but, if only moderate intensity obtains in the positive system, moderate magnification only can be expected consistent with adequate rapidity.

I will now call your attention to the most recent form of negative system that I have adopted. You will probably remember that the original form which I show you consisted of a single cemented positive and a single cemented negative. This I discarded within a few months of bringing it out, on account of the difficulty in overcoming very violent chromatic error in other than central pencils; also from the fact that a single system constructed on these lines does not enable one to correct the errors of spherical aberration for other than one definite camera extension; and, furthermore, it was impossible to eliminate the very violent pincushion distortion. The next step was to employ as a positive element a system corrected throughout its field, and to construct a negative which should enable the entire tele-photographic system to be properly corrected throughout the field, with the means of correcting the aberrations of spherical and chromatic order, and reducing distortion to a minimum. The form adopted consisted of a symmetrical form with exterior convexities as opposed to the single triple cemented form with exterior concavities (see *a* and *b*, fig. 5). Later on I adopted another symmetrical form for use with lenses of low initial intensity, still maintaining the exterior convexities (see *c*, fig. 5). This form I found useful in reducing the astigmatic error contained in the older types of cemented doublets, and from its form enabling weaker negative lenses to be made larger in diameter than was formerly possible, tending to greater quality of illumination and greater covering power.

On the occasion of a lecture I gave in March of this year at the Society of Arts, I described a form of unsymmetrical negative, and explained that it had an advantage over a symmetrical form, in that, by using it with one surface of the combination towards the positive lens or reversing it, I was enabled to obtain two *planes* for the reception of the image, one somewhat near the lens and the other at a considerable distance from it, in each of which there was perfect flatness of field (see *d*, fig. 5). You will observe the manner in which the lenses are mounted, and the right position in which to use them is

Fig V



conveyed by the manner of mounting. The projecting cell projects inside the camera for a small extension of camera, when the positive lens is more separated from the negative, and the cell is reversed and projects into the lens mount for a greater extension of camera, when positive and negative lenses are nearer together, thus assisting portability.

Now, with any fixed system, there is only one plane or definite camera extension in which there is a perfectly flat field. For an extension shorter than this the field is curved towards the lens, and for a greater extension the field is curved in a reverse direction. Now, by the form which you see figured at *d*, there are two such planes of perfect flatness, as already stated; and, furthermore, by the unsymmetrical form adopted, the eccentrical pencil is admirably corrected for both positions. In the case of the shorter extension, with the two concave contacts towards the lens, the pencils leaving the positive lens become lengthened, as it were, and give a flat field at a suitable distance for producing instantaneous work. If the negative were kept in the same position for a considerable extension of camera, the field would have a large amount of reversed curvature of field and a badly corrected eccentrical pencil. By reversing the negative element in the cell, the field becomes perfectly flat, and the eccentrical pencil perfectly corrected; in this case, as you will observe, the two convex contacts being presented towards the rays

leaving the positive element assisting in correcting the residual astigmatic error of the positive system. It has been in the effort of producing greater rapidity in tele-photographic systems, when it is only possible to employ moderate camera extension, that decided me to develop this form of negative to its present state of utility. When tele-photographic lenses were first employed, the general desire was high magnification only, and in that case I found the symmetrical form answer its purpose adequately, as it was constructed with a definite object in view, and not so much for varied applications.

I have to add now a few words on the necessity of avoiding tremor when photographing with lenses of this type. You have observed that the nodal point from which the focus is measured lies outside of the lens mount, so that, in giving any movement to the camera, one is producing a magnified error of tremor upon the ground glass in a similar manner to that in which the long end of a lever will move a greater distance than the shorter arm of an equal amount of angular deflection.

Another matter to which I wish to direct your attention is the necessity of very accurate focussing. This is performed with the rack and pinion, which separates the two elements, and it will be noticed that a very slight movement here will bring about a very rapid alteration in the focus. With the necessity for very accurate registration of the focus in view, I have recently turned my attention to constructing what I believe are two new focus-finders, which I will briefly describe.

In fig. 6 a mirror, *m*, is placed outside the top of the camera, parallel (preferably) to the plane of the plate where the image is

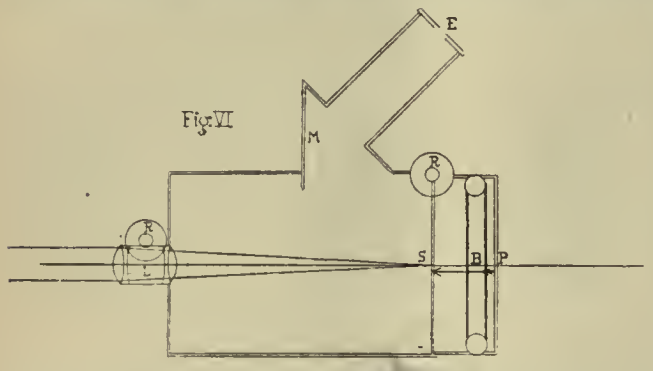


Fig VI

eventually received. At a convenient angle to the mirror a removable tube, or other enclosed dark chamber, is attached. If the mirror be perpendicular, the angle will be forty-five degrees. On looking down the tube, the image is seen upon a whitened screen, and this is actuated by a lever to remove it out of the way when exposure takes place. Behind this screen is a blind shutter. In removing the screen by the lever, the shutter, with the plate just behind it, brings the register of the latter into focus, and releases the shutter at the same time. I have to thank Mr. Newman, of Messrs. Newman & Guardia, for the accurate and intelligent manner in which he has carried out the mechanical portion of the work in this piece of apparatus, as well as in the mechanical details of the second form, which I will now describe. The principle of its construction rests on the fact, that the photographic lens, which forms the image upon the screen or sensitive plate, is itself also the object-glass of a telescope, through which the object photographed is also seen. You will observe in fig. 7 that a mirror is placed at an angle of forty-five degrees behind the back lens of the photographic ob-

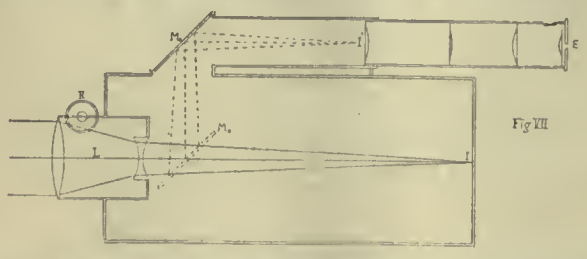


Fig VII

jective. This mirror is properly enclosed, so that no light shall reach the sensitive plate. A second mirror, parallel to this, is placed on the top of the camera, and behind the second mirror is fixed a tube carrying an ordinary terrestrial eyepiece. The whole being arranged so that no light enters the camera. For any individual observer the instrument is made to perform absolute registration of focus, once and for all, in the following manner: The mirror behind the lens is temporarily removed, and some known object is focussed upon the screen. The mirror is then placed into position, and the terrestrial eyepiece is then adjusted, so that the same object is sharply defined. The terrestrial eyepiece must be then fixed, or its position registered for the individual observer. It will then be found that, whatever object is in focus (made by the rack and pinion on the lens mount) seen through the telescope eyepiece will be absolutely in focus upon the screen or sensitive plate. I have discussed one or two methods of removing the mirror behind the lens to expose the plate with Mr. Newman, and we decided upon the form I show you as being very convenient. The spring which turns the mirror out of the way releases a small roller-blind shutter at the same instant. I first proposed to make this mirror revolve upon a diagonal axis, but do not think the same amount of light would be received upon the plate.

I half promised our friends, Mr. Winter and the Honorary Secretary, to bring you some results in tele-photography from the Norfolk Broads, but I regret to say that my main object was to try for living subjects, and the instrument was not ready in time. I took comparison proofs of an ordinary technical subject with moderate power negative attached to an ordinary rapid rectilinear lens. Mr. Hepworth has been kind enough to make lantern slides for me, and I have also to thank Mr. Rice for other comparison slides which he has taken for me, using in every case the same extension of camera. These I will now place upon the screen, but, before concluding, must thank you for the patient hearing you have given to a subject the importance of which I dare to hope is acknowledged by every photographer.

T. R. Dallmeyer, F.R.A.S.

EDINBURGH PHOTOGRAPHIC SOCIETY'S EXHIBITION.

Our Edinburgh correspondent writes: With the advent of winter this Society has again its exhibition and medalling of the best work of the members during the past year. The examples shown are about equal in number to those exhibited in previous years, but, it must be stated, far superior in quality, especially so in the feeling of artistic as opposed to mere photographic excellence. It is a pity that, in an art-loving and practising centre such as Edinburgh, with quite free admission, there should be such a paucity of visitors. During my visit, in the best part of a brilliantly fine, if cold, day, the entire number of visitors were seven ladies and one young man, a presman, whose only mission was to find if there was to be any formal closing, which he desired to report. He was absolutely guileless of any knowledge of pictures or photography, but he could write so many words a minute.

One of the questions put by him was, "What do the various Classes II. to V. embrace" (I. was not visible)? a question also put by one of the ladies. Explanations in the room there were none, catalogues ditto, names, *noms-de-plume*, and non-competitives were there, titles occasionally, but anything giving any idea explanatory of such facts as one would wish to know and remember were generally absent.

In all the most important subjects the seer was left to guesswork. Now, in a painters' Exhibition the *habitué* soon gets to know, without a catalogue, the style, the mannerisms, the hand work of the artist if seen for several times; this is also visible with some photographers, where even the accessories and properties tell what the *nom-de-plume* is meant to hide, and doubtless to many more skilled than I they tell who their producers are, as handwriting often does without opening the letter. Is not this a mistake? Should there not be in every such Exhibition the fullest publicity given to all that may interest visitors? How often has a cleverly devised, or even a hastily well-chosen, title immortalised a subject, as well in prose or verse as in representative art, and the time seems now come when we may class all efforts at representation of what *is*, as art fine or otherwise, just as there are grades in poetry and prose, &c. Of course, with all imaginative subjects of depiction a different code of reasoning must be adopted.

I looked in vain for lantern slides, or any proofs on glass, although there is excellent accommodation for their display, without in the slightest degree deteriorating the lighting of the other pictures in the rather-difficult-to-light Exhibition room. They would, I presume, be too precious to be displayed to vulgar eyes without the necessary lantern, but yet they might have been removed for judgment or something else on the day of my visit. Examination of the slide itself, as well as its effect when projected on the screen, has a distinct educational effect—one of the principal purposes of an Exhibition.

Looking at the show as a whole, there is, undoubtedly, marked progress, especially in the picture-making department. It is true that painter, draughtsman, and etcher have had hundreds of years' start of the photographer in attempting to depicture external nature, and so have led, trained, or warped our ideas of how such things should be represented; but they have also, by example, shown what to do by their successes, and what to avoid by their mistakes, which are many. It may,

indeed, be said that the analytic art critic has done more, educationally, than the artist himself, so progress to the utmost perfection must not be looked for yet a while. The true artist being so by nature will show himself, no matter the medium through which he chooses to display his skill.

The decisions as to the most meritorious exhibits were announced on the closing evening of the Exhibition :—

I. Lantern Slides.—There being none of outstanding merit, the silver medal was withheld, and two bronze ones were awarded, one to H. J. Blanc, A.R.S.A., and one to William Mitchell.

II. Pictures taken during the Saturday Rambles.—The silver medal to James Roddick, bronze to T. Barclay, Secretary.

III. *Genre* Pictures.—Withheld in the mean time.

IV. Best General Work during the Season.—Silver medal to J. B. Johnstone, and a bronze each to Dr. Drinkwater (President) and G. L. M'Gibbon.

V. Enlargements.—Silver medal to James Patrick, bronze medal to R. S. Webster.

All the slides on exhibition were shown during the evening.

THE SPEED OF PLATES: A CRITICISM AND A REPLY.

[Paper read on Thursday, November 23, at the Camera Club. Communicated by the Author.]

A good many attempts have been made at various times to measure and set out numerically the speed of a photographic dry plate. Some have been more, some less, scientific; some have been based on a study of the nature of a plate and the action of light upon it, and others have been purely arbitrary. They all, however, seem to suffer from one defect, viz., that no one has ever yet given a sound definition of the "speed of a plate," and, consequently, in these methods of speed determination the quantity found and investigated depends not only upon the nature of the plate, but upon the method of investigation; and the "speed" is explicitly or implicitly defined to be some quantity that has cropped up in the course of the investigation rather than a constant of the plate itself.

This being so, it seems to be worth while to try whether some sound definition cannot be given of the term "speed of a plate," and whether this quantity can be expressed in definite numerical terms.

The most natural definition of "speed" that can be given would run something like the following :—

One plate may be said to be twice as fast as another when, the two being exposed under the same conditions, the slower plate requires twice the exposure of the faster, in order that, when the negatives are complete, they may be identical.

The first objection to this definition is the tacit assumption that it is possible to make two exactly similar negatives on two different plates. It is certain that this cannot always be done. To take an extreme case, it is absurd to suppose that, if a slow plate, thickly coated and rich in silver, so exposed as to give a round and sparkling negative, be taken for one, and a thin foggy plate, poor in silver, for the other, a negative as rich, and round, and sparkling can be produced on it as on the slow plate. Our definition, therefore, fails from the nature of things at the outset. And this leads us to consider whether the quality "speed" is really a property of the plate alone. In a certain sense no doubt it is, for it is clearly impossible to expose a slow plate with a rapid shutter in a dull light and get results, although, if a quick plate be substituted, a good negative may be obtained under otherwise identical circumstances.

The fact is, that the quantity we are accustomed to think of as speed is a highly complex quantity, and depends on the nature and make of the plate, the circumstances under which it is to be used, and the treatment to which it is to be subjected; more even than this, too, it depends on the result which it is desired to obtain; in fact, paradoxical as it may sound, the speed of a plate depends on its future history as well as on its past. For a long time since, a terrific wordy war has raged over the question whether the "speed of a plate" is dependent on the development or not, although possibly Messrs. Hurter & Driffield, whose position has been attacked, would never have affirmed that it was not. But now it may probably be said that they have withdrawn from the position that they did take up, viz., that the ratio of gradation in a negative cannot be affected by development.

The only rational definition of "speed" that depends solely on the nature of the plate, and not on any hypotheis that can be given, having been shown to fail, the question arises, What can be done to give the photographer some idea as to the relative exposures required by different plates? It is required to choose some property of a plate that can be expressed numerically which will give the user some rough idea as to whether, if Plate A requires five seconds under given circumstances to give a good resulting negative, Plate B will require seven, or ten, or thirty. It is impossible, as has already been shown, to give more than a rough idea, and this will appear still more plainly in what follows. Let us first consider the result that it is required to obtain, viz., the finished positive print or transparency.

Now, it has been held by the combatants in this discussion, and especially by Messrs. Hurter & Driffield, that the scale or gradation of the finished result is required to be the same as that of the scene portrayed. When this desideratum is attained, the print, they say, is photographically true, and the result is perfect. Surely this is contrary to all our knowledge up to the present time. Except for special purposes, such a print would be flat, stale, and unprofitable. It must be remembered that in working on paper or canvas we are not working between anything like such wide limits of darkness and light as occur in nature, but between the relatively narrow limits of black and white. Yet in these limits it is required to give the impression of darkness and light. How is this done? Ask any artist, and he will say that in working on canvas he consciously exaggerates his contrasts. A bit of yellow paint, dull and without lustre of itself, shines and glistens with the lustre of a gold ring when cleverly backed with a heavy shadow. How does Turner gain the effect of glorious glowing sunshine in his pictures? Not by the intrinsic luminosity of his colours, but by his skill in contrasting them. The mind is susceptible to the effect of contrast, and has been trained to appreciate it and translate it, till the mental effect is identical, or at least of the same order, with the mental effect of the light and shade of the scene itself. How does the photographer obtain this effect? By making his prints slightly harder than they would be if they were in an exactly proportional scale; by intentionally, though perhaps unconsciously, exaggerating his contrasts. In fact, by utilising that portion of the scale wrongly termed by Hurter & Driffield the "period of under-exposure."

Let us now examine the effect on a plate of a series of graduated exposures. A large number of measurements of the transparencies of plates exposed in a graduated manner in Spurge's sensitometer, and in other ways, have been published by Captain Abney, and Messrs. Hurter & Driffield, and others, any one of which will do for our present purpose.

We will take a plate exposed by Abney, and measured both by him and the writer. It is one that has been frequently spoken of at the Camera Club, and is typical of all the others. We will plot two curves from the measurements of this plate. In one, the logarithms of the exposures are set off horizontally as abscissæ, and the corresponding transparencies are measured vertically as ordinates. This is the method of plotting used by Abney in his method of speed determination. In the other, Hurter & Driffield's method is used, and the difference is that the *logarithms* of the transparencies, or "densities" as they are termed by those authors, are plotted vertically as ordinates.

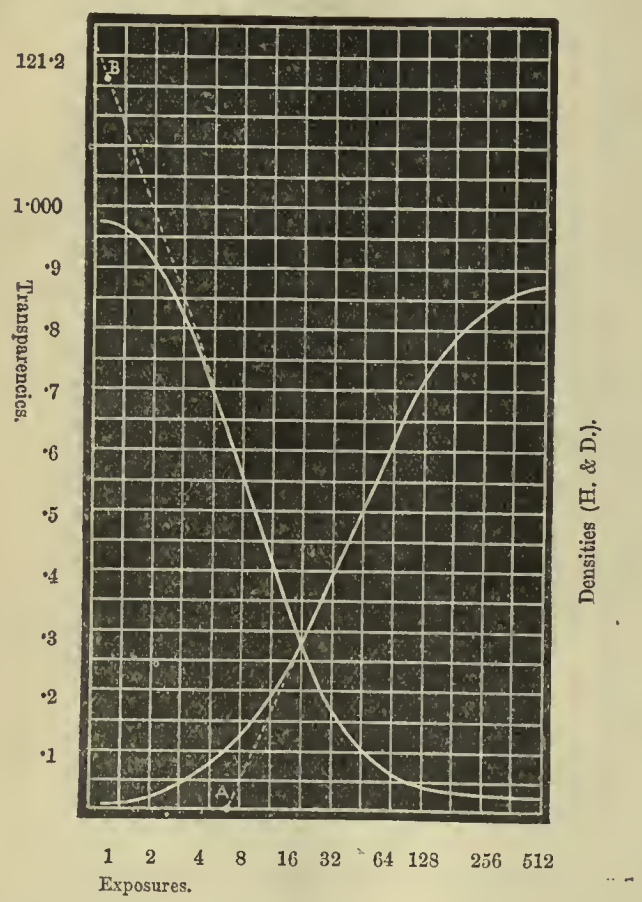
Let us compare the methods of speed determination of these two authors. It will be seen from fig. 1 that the speed of the plate is given by the points marked A and B in the diagram, according to Hurter & Driffield and Abney's methods.

According to the former, the *slowness* of the plate is proportional to 6·5, about, in some arbitrary units; according to the latter it is proportional to about 1 in some *other* arbitrary units. There is no reason at first sight why these should not both be true. That point will be considered later. The thing to be noticed, however, in this diagram is the part of the curve from which the number representing the slowness of the plate is deduced. By Abney's method it is deduced from the part lying between the exposures 2 and 32 in the arbitrary units we are considering. By Hurter & Driffield's method it is deduced from the part of the curve lying between the exposures 20 and 101. We will lay no stress on the fact that, in this particular case, as in fact in all, the figure is deduced from a more extended set of exposures by Abney's methods than by Hurter & Driffield's. But it is most important to notice that, by Abney's method, the figure roughly representing the speed is deduced from a set of exposures that give densities on the negative that are practically useful to the photographer, while, by Hurter & Driffield's method, it is deduced from a part of the curve in which the transparencies are of hardly any printing value. Abney's figure is deduced from a negative with transparencies ranging from 94 per cent. to 16½ per cent., while Hurter & Driffield's is deduced from a negative with transparencies ranging from 26½ per cent. to 4½ per cent. Surely no further illustration is needed of the comparative futility of Hurter & Driffield's method, for which they have claimed so much.

Again, let us look a little more closely into the printing values of the two types of negative. In the case of the negative used by Abney, the speed of the plate is deduced from a series of exposures, such that

the resulting transparency of any part of the negative relative to another part, that is to say, the printing value of that part of the negative, is inversely proportional to the exposure of that part. This

Fig. 1.



is Hurter & Driffield's criterion for a perfect negative. (See *Photo-Chemical Investigations*, p. 1.)

But, in the case of the negative given by the series of exposures utilised by Hurter & Driffield, it is quite easy to show, by an algebraical transformation of their approximate equation, that the printing value is inversely proportional to some power of the exposure; so that, while Abney's avowedly empirical formula gives approximately the required perfect negative, as defined by Hurter & Driffield, their own formula, which is put forward as an approximation to a formula not empiric, does nothing of the sort. In fact, their formula and whole method of speed determination is based on a misconception.* The quantity found no doubt does roughly represent the speed of the plate in a certain way, when exposed and treated in a particular manner; but it is of no use, because this particular manner is one in which no ordinary photographer would think of treating a plate,

* The printing value of a negative depends on the differences of the transparencies of the various parts, so that we may fairly take $\frac{dT}{dI}$, the differential of the transparency, for its measure. Since the curve of a plate, as plotted by Abney, or by Hurter & Driffield, always contains a point of inflexion, for parts near this point we may substitute the equation of a straight line for that of the curve, and this is what Hurter & Driffield have done to get their approximate equation. The equation of the straight line, in the case of Abney's curve, is

$$T = A - B \log I,$$

where A and B are constants, whence $\frac{dT}{dI} = -\frac{B}{I}$, and the printing value is inversely proportional to the exposure. But the equation of Hurter & Driffield's line is

$$\log T = \frac{B^1 \log I - A^1}{B^1 - 1}$$

whence $\frac{dT}{dI} = \frac{T}{I} B^1 = \kappa I$, where κ is some constant, and this expression in no way coincides with the required criterion.

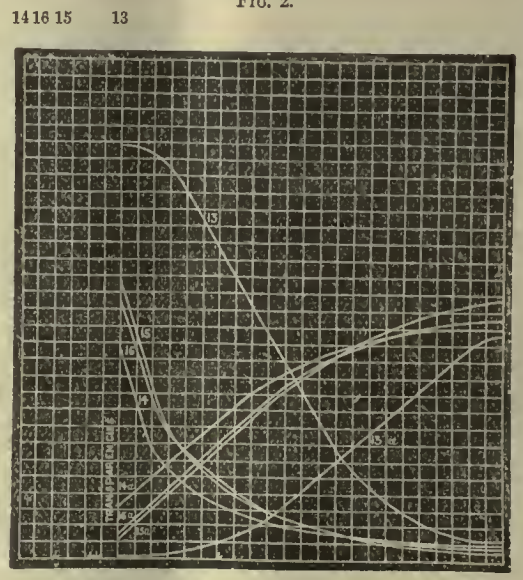
whereas Abney's method gives a quantity which does not pretend to give more than a rough idea of the speed under normal treatment. From the nature of things it can do no more than this. And its value consists in the fact that the series of transparencies from which it is derived is just that series that the average photographer utilises in his ordinary work.

It remains for us now to see what relation there is between the speeds derived by means of Abney's method, and by Hurter & Driffield's. It may easily happen that the relative speed of two plates will come out the same when determined by either method, but it may equally easily happen that this is far from being the case. In fact, a glance at fig. 1 will show that it is only the case when the range of the two plates is about the same—that is to say, when the range in which the printing values are nearly inversely proportional to the exposures is the same in both.

The best method of examining this point will be to take several plates and plot their curves according to the two methods, on the same scale, and then examine the results. In order to be absolutely impartial, we will take two plates referred to in Abney's paper at the Camera Club Conference, four plates measured by the writer, and three measured by Hurter & Driffield. The two plates referred to in Abney's paper are a wet plate and a "lantern" plate. *A priori*, if the lantern plate is a good one, we should expect it to give a negative approximating in gradation to that on the wet plate, since this "wet-plate" quality is usually desired in lantern plates; that is to say, the scales and ranges of the two plates would be expected to be similar, and the relative speed, as has already been pointed out, should be nearly the same when measured by either method. It is hard to apply Hurter & Driffield's method in this case, since the plates have not been measured through a long enough range; but, so far as can be judged, it appears, on plotting the requisite curves, that the relative speeds of the two are nearly identical, and the lantern plate comes out about 2·7 times as fast as the wet plate, by whichever method it is measured.

The four plates measured by the writer are numbered 13, 14, 15, 16 (*see* fig. 2.). No. 13 is a very slow plate, of well-known make; No. 14 one of the fastest plates in the market; Nos. 15 and 16 are re-

Fig. 2.



spectively a slow and a rapid plate, by the same makers, and are also well-known plates. These were all exposed for the same time in a Spurge's sensitometer, and developed in the same bath, a ferrous-oxalate developer being used, so that the experiments are strictly comparable. The relative speeds, as measured by the two methods, are given in the following table:—

	Plate.			
	13	14	15	16
Abney.....	1	3½	2½	3
Hurter & Driffield.....	1	9¾	5½	6

In this table the slowest plate is taken to have a speed of unity, and the others are compared with it. Thus, if an exposure of ten seconds is the least which will produce a negative with Plate No. 13, according to Captain Abney's method, three is the minimum exposure with Plate No. 14, and, according to Messrs. Hurter & Driffield, one only will be required.

It should be noted that, in the field, a slow plate is apt to appear much slower than it really is, since there is so great latitude of exposure with it. It has been said of plates of the same make as No. 13 that it is impossible by any reasonable exposure to over-expose them. Now, the writer has never compared Plates Nos. 13 and 14 in the field, but he has often used No. 13 and another plate very similar to No. 14, and of about the same speed, together, and it has been his habit to give No. 13 about five or six times the exposure of the faster one. Allowing for the tendency to fully expose a slow plate, it will be seen that, for practical purposes, Abney's number is probably nearer the mark than Hurter & Driffield's. This is not, however, convincing evidence, and must be taken for what it is worth. The curves of these plates are shown in fig. 2. The curves marked 13, &c., are plotted by Abney's method, those marked 13, *a*, &c., by Hurter & Driffield's. The numbers and arrows at the top of the plate show the position of the slowness points by Abney's method, those at the bottom the corresponding points by that of Hurter & Driffield.

The three plates measured by Messrs. Hurter & Driffield are Experiments 21 and 22 in their paper, and the chloro-bromide plate mentioned by Dr. Hurter in his criticism on Captain Abney's paper, made at the Camera Club, and reported in the Club *Journal* for July, 1893. Taking the speed of the chloro-bromide plate as unity, we get the following table of speeds:—

	Chloro-brom. Plate.	Expt. 21.	Expt. 22.
Abney	1	5·7	9·1
Hurter & Driffield	1	2	1·6

Here is a remarkable thing! Experiment 22 is a denser and apparently more fully exposed plate than Experiment 21 throughout the first few exposures of the series, and Abney's method brings it out the faster. Yet Hurter & Driffield's method inverts this order, although each of the whole series of densities in Experiment 22 is greater than the nearest corresponding density in Experiment 21.

One curious instance of a plate exposed and developed by Abney may be cited. This plate was cut in half after exposure, and the halves developed with different developers, viz., an eikonogen developer and one made up of ferrous citro-oxalate. On plotting Abney's measurements it is found that, while according to his method of estimating the speed the eikonogen-developed half was faster than the other in the ratio of 1·8 to 1, according to the other method the ratio became 1·25 to 1. This case, however, was affected by the same difficulty as was the case of the lantern plate and wet plate, since the measurements were not carried far enough, and did not include parts of sufficient opacity to draw the whole of the nearly straight portion of Hurter & Driffield's curve.

Sufficient has already been said to show that it is impossible to give in one term a number representing the sensitiveness of a photographic plate with any degree of accuracy, but that for rough purposes the method propounded by Abney supplies a number that more nearly represents this quantity, as required in the practice of most photographers, than that of Hurter & Driffield. It now remains to take up in detail some of the criticisms and strictures passed by Dr. Hurter at the Camera Club on this method, and see with what justice they were applied.

In the first place, Dr. Hurter proceeded to defend the assumption on which his larger formula was based. It has, however, been pointed out, by the writer and others, that this assumption depended on an experiment that was, to say the least, equivocal, and certainly not one on which to base so far-reaching a theory.* H. M. Elder.

(*To be continued.*)

* The experiment is described at p. 11 of Hurter & Driffield's *Photo-Chemical Investigations* in the following words:—"The co-efficient of absorption, κ has been assumed by us to have the same value both for the altered and the unaltered silver bromide. We have, however, experimentally ascertained that this is a fact. It can easily be proved photographically. If behind a plate, one portion of which has been already exposed so as to yield maximum density, the other portion having received no exposure at all, a very sensitive plate is placed, and if now a suitable exposure be given, it will, on development, be found that the shielded plate has uniform density all over." This is certainly an interesting observation, and, if true, at first sight seems to bear out the assumption based upon it by Hurter & Driffield. Still, it is open to many objections. In the first place it proves absolutely nothing about the light absorbed by the altered and unaltered silver bromide, for, assuming this to be opaque, no alteration in composition, or constitution, or colour, would affect the light transmitted by it, the co-efficient of reflection might alone be altered to compensate for the alteration in the co-efficient of absorption. Again, if it be not absolutely opaque, there is no reason to suppose that the transparency is necessarily altered by the effect of the light upon it. Even if it be altered, the alteration is certainly small, and, since the unexposed portion is necessarily exposed during the experiment, the difference in the effect of the light transmitted by the two halves may very easily be so small as to elude notice, even when careful measurements are made. In fact, the experiment can in no sense be called a crucial one.

FOURTEEN YEARS AGO.

Fourteen years ago a cart, drawn by a pair of bullocks, used to carry my photographic kit for outdoor work. The erection of the dark tent, within which I worked, occupied half an hour, and the providing of the water supply, the cleansing of plates, and the setting of other arrangements for collodion work took an hour more. For one success I had several failures, through chemical defects, plates drying with peculiar marks, films splitting and slipping, subjects moving, and once I remember working two days to get a satisfactory group of children. Only last month, as I was passing along the road, I stopped my carriage opposite a Hindu temple, and in a few seconds, with the clip of the shutter of my trusty Loman's hand camera, obtained a fine little picture of a group of idol cars, with worshippers in their various attitudes, from which I have since produced an enlargement. In 1879 my nearest neighbouring owner of a camera lived 200 miles away, and now, in this remote Hindu district of the island of Ceylon, there is a firm supplying photographic goods. The modern dry plate, which, through its simplicity and cleanness of working, gave the strong impetus to the popularisation of the photographic art, was only becoming talked about in 1878, and such an able artist as H. P. Robinson writes, in an 1880 Almanac, in his account of "A Cruise with Dry Plates," of commencing "last July" the use of these plates. "with the strict impartiality of a novice who knows nothing." Recently, I had to mount, in chronological order, a series of photographs, taken on collodion and gelatine, a comparison of which showed me the remarkable fact that, notwithstanding all the modern improvements, the old collodion possessed a marked superiority in the peculiar softness and brilliancy it rendered. I could not say whether it was due to any inherent qualities in the two vehicles, or to the necessity with collodion of developing at the time, which admitted of always correcting errors in development by fresh trials; but the old process shows a distinct superiority in the rendering of tones.

Photography had its field greatly widened in another direction during the last fourteen years. In 1880 "the mechanically accurate and practicable method of half-tone block-making" was being introduced to the notice of printers and publishers, and now almost every illustrated newspaper bears reproductions of photographs that enable those at a distance to realise events and scenes in a way never expected before photography came to the aid of the engraver. S. Kanagaratnampillai.

Jaffna, Ceylon.

HALATION: A COUNTERBLAST.*

It was early summer at Kennaquhairlo, and I found myself watching the scene an hour before sunset. The sun was descending in a cloudless sky, but some tall and fairly well-clad trees intervened. You all know the effect I witnessed; the leaves, twigs, branches, nay, the very trunks of the trees that attempted to block out old Helios were, or seemed to have been, quite obliterated by his overpowering beams, and this influence extended over so large an area as to give warrant to a belief that the sun was at least six times larger than we know him actually to be, as shown by measurement through our telescopes.

How, O ye naturalistics, must I represent the scene described? Am I to employ anti-halation plates and a diaphragm of the dimensions of a fractional part of a pinhole?

This, you will observe, lands me in a difficulty. If I represent Old Sol, as I know him scientifically to be, in relation to the trees, I set at defiance all truth as displayed to our unaided visual orbs, and if, on the contrary, I represent the scene just as I see it, I run counter to actuality, for we know that the trees are there, although the camera, which, of course, never can, and never does (?), lie, shows them to be absent, and very conspicuous by their absence.

Again, I transport myself to the interior of a cathedral, or, for that matter, to any church, and I find the large and well-lighted window in the end surrounded by a halo.

It is, I am told, the perfection of photography to photograph this interior without showing a trace of this halo, which, however, is part and parcel of the scene as witnessed from the interior. Suppose I succeed in doing so, would such scene, think you, be natural? I trow not.

* Received too late for the Almanac.

The famous trotting and running horses of Muybridge come handily in here to illustrate what, by this time, ought to rank as a truism, viz., that reality is not necessarily truth, for no eye ever saw the legs of these animals as depicted by him, although we know that he depicted nothing that was not there before his camera, and yet it is not truth according to the impressions conveyed to the brain by any sound pair of eyes.

If, then, as artists, we are to depose Muybridge's scientifically accurate limning of the quadrupedal limbs when in rapid motion in favour of those which are impressed on the retina, on what principle are we, by scientific means, to obliterate and leave unrecorded that halation which forms an effective item in a scene?

GEORGE MARKHAM, M.D.

THE KEEPING QUALITIES OF CELLULOID FILMS.*

THESE films are more and more appreciated in consequence of their great convenience as substitutes for glass plates, whether used flat on thick films or thin on the rollers. Being comparatively of recent introduction, it is difficult to express decided opinion as to their keeping qualities. It has transpired, however, here and there, that films kept some time before exposure do not give such satisfactory results as when used fresh. Emulsion on the glass plates is practically not affected by keeping when ordinary care is taken in storing. There is, however, the strong supposition that sensitive celluloid films lose their sensitiveness and become foggy with time. Observing that the packet, or rolls, of these films, by a very strong smell, betray constant elimination of the camphor and the solvent used (amyl acetate), naturally there is a suspicion that, if something has a deleterious effect on the sensitive gelatine surface, most likely it is these ingredients, so conspicuous by the smell, and situated in such intimate contact with the sensitive film. The object of my present communication is to invite persons interested in the matter to institute a series of mutual experiments in order to settle the question of the influence of the celluloid on the sensitive emulsion on the following lines:—Take an ordinary glass plate, apply with a squeegee and water in the middle of the plate a sheet (diamond-shaped) of celluloid, to be tested, having a surface equal to about one-fourth or one-fifth of the glass plate. Coat the whole plate with emulsion. Of twelve plates prepared in this manner, and carefully kept, one is to be exposed every month in the camera. When the image is developed, the central part of the negative will show the difference as compared with the rest if there is suspected action of the celluloid on the emulsion. If the negatives are dated, it will be easy to determine how soon the deterioration, if any, takes place. Different qualities of celluloid and of emulsion may produce the variation in the result, and for this reason it is desirable to have the experiences of different persons working independently.

L. WARNERKE.

News and Notes.

PHOTOGRAPHIC CLUB.—December 13, Members' Open Night; Exhibition of Members' Work.

WEST LONDON PHOTOGRAPHIC SOCIETY.—December 12, Lantern—Mr. J. A. Hodges on *Enlarging*.

WOOLWICH PHOTOGRAPHIC SOCIETY.—December 14, at St. John's Schools, Woolwich, *Isochromatic Photography*, by Mr. W. H. Barnes.

CENTRAL PHOTOGRAPHIC CLUB.—To-night, Friday, December 8, Mr. Brooker's Slides. 15, Mr. Howson will show the new Ilford matt paper.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—December 14, Lantern Slides of Mr. Burrow's negatives, *'Mongst Mines and Miners*.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—December 12, Ordinary Meeting. *The Distribution of the Image in Multiple Films*, by Mr. S. Herbert Fry; *Observations on the Lumière-Lippmann Colour Photographs*, by Mr. F. E. Ives.

HOLBORN CAMERA CLUB.—On Saturday last the Club held its fifth annual supper at Anderton's Hotel. Mr. D. R. Lowe presided over a representative gathering of the members, and the event proved to be one of the most successful gatherings of the sort.

WE are informed that several experimentalists are endeavouring to duplicate the results in colour photography obtained by M. Lumière on Lippmann's plan. We hope that the results will be shown at the meeting of the Photographic Society of Great Britain on December 12, when Mr. F. E. Ives is to make a communication on the subject.

* Received too late for the ALMANAC.

ASHTON-UNDER-LYNE PHOTOGRAPHIC SOCIETY.—December 14. This is the last day for receiving slides for the Society's competition. Demonstration and lecture on *The Chemistry of Photography*, by Mr. S. Sharp. Chairman, Mr. James Grierson. 20, Exhibition of Lantern Slides, and the awards given in the Society's Competition. Chairman; Dr. Hamilton.

MR. HORATIO NELSON KING has recently submitted to H.R.H. the Duke of Saxe-Coburg and Gotha, at Clarence House, his series of photographs of the private and state apartments of Clarence House. His Royal Highness congratulated him on the excellent series he had produced, and has since, by royal warrant, appointed Mr. King landscape and architectural photographer to his Royal Highness.

BRISTOL INTERNATIONAL EXHIBITION.—The following is a complete list of the jury at the forthcoming Bristol Exhibition, namely, Messrs. Bernard Altieri, Valentine Blanchard, S. P. Jackson, Payne Jennings, and the President of the Bristol and West of England Amateur Photographic Association, Mr. H. A. Hood Daniel. In response to a number of requests, the latest date for receiving exhibits has been extended to December 8.

WOOLWICH POLYTECHNIC PHOTOGRAPHIC SOCIETY.—The second annual Exhibition of photographs and photographic apparatus will be held by this Society, in the large hall, Woolwich Polytechnic, on Thursday, Friday, and Saturday, February 8. 9, and 10, 1894. The Judges will be Messrs. F. P. Cembrano, Basil Bradley, and Rev. F. C. Lambert. The following are the classes:—For members only: 1. Prints, 8 × 10 and over, any process; 2. Prints, 8½ × 6½ and under, by any process; 3. Lantern slides, best set of six. Open: 4. Prints, any subject, any process, open to all; 5. Lantern slides, set of six (amateurs only). The Hon. Secretary is Mr. W. Dawes, 145, Chesnut-road, Plumstead, Woolwich, of whom particulars and entry forms can be obtained.

CROYDON CAMERA CLUB.—December 8, Special Meeting to try slides for Lantern Display on 13. 13, Second Lantern Display at Braithwaite Hall. *South Africa and the Cape;* musical interlude (see bills); *Good-bye to Old Croydon*, by Messrs. Corden and J. Smith. 20, *Various Methods of Slide-making*, by Mr. John H. Gear. January 3, 1894, *How to Use a Lens*, by Mr. G. R. White. 17, Third Lantern Display at Braithwaite Hall, by Mr. John A. Hodges and by members of the Club. Council Meetings, December 6 and 27, and January 10 and 24. Tickets for Lantern Display on December 13, sixpence each, or 5*s*. per dozen. A few reserved seats, 1*s*. Members are asked to make the display known to their friends and acquaintances. Those who can show window bills are requested to apply to the Secretaries.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—Meeting of the Committee, November 30, 1893, in the rooms of the Photographic Society of Great Britain, Mr. A. Mackie in the chair. First application was from an assistant out of employment, who asked for 3*l*. as a loan for temporary relief. Satisfactory testimonials had been received; but, as he had been nine months out of employment, the Committee thought there was little prospect of the grant asked for being a permanent benefit. An immediate grant of 10*s*. was made, and the Secretary instructed to ask for further particulars. Second application was from a member of the Association, an assistant, who asked for 30*l*., to enable him to start in business for himself. The Committee decided that this was not a form of loan that they could grant. The Secretary reported that three of the applicants who had been helped during the summer had commenced to repay the loans by small instalments, and that another, to whom a camera was supplied a month ago, had reported that he was succeeding very well, and, on receipt of payment for work which would be finished shortly, he hoped to repay the whole loan of between 4*l*. and 5*l*. Messrs. M. Howell, H. L. Morel, George Carter, and Roland C. Whiting were accepted as subscribers. Donations were acknowledged from Messrs. Marion & Co., 3*l*. 3*s*.; George Mansfield, 2*l*. 2*s*.; Captain Abney, 1*l*.; Mawson & Swan, 1*l*. 1*s*.; Jonathan Fallowfield, 1*l*. 1*s*.; Watson & Sons, 1*l*. 1*s*.; F. W. Verel & Co. 10*s*. 6*d*.; Richard Keene, 10*s*. 6*d*.; George Nelson, Dale, & Co., 1*l*. 1*s*.; H. G. Yatman, 10*s*.

Our Editorial Table.

AMERICAN ANNUALS.

THE INTERNATIONAL ANNUAL OF ANTHONY'S PHOTOGRAPHIC BULLETIN.

London: W. E. Peck & Co.

THE AMERICAN ANNUAL OF PHOTOGRAPHY AND PHOTOGRAPHIC TIMES ALMANAC.

London: J. Fallowfield.

WE observe that the former of these welcome Annuals has this year increased its dimensions to those of the latter, and in style and type both are now similar. Both have quite a number of illustrations, the respective frontispieces being, in the case of the former, a pretty studio portrait, by Dana, of Pittsburg, printed on American "Aristo" paper; while that of the latter is a reproduction from a stuffed parrot, printed in three colours, by the Coloritype Company. There are, in both, the usual reference tables, and contributed articles on miscellaneous photographic topics; and, above all, both are printed in large easily readable type. Their prices are two shillings each in paper covers.

Ilford Matt Printing-out Paper.

The Ilford Britannia Works Company have brought out a printing-out paper with a matt surface, which we think much of. Although it is quite devoid of gloss, yet it gives prints which are brilliant, and have no appearance of being sunk in, which is a characteristic of all matt surfaces obtained by being sensitised by flotation on a silver bath. It prints quickly, and can be toned on any toning bath. We predict a large demand for it.

Christia.

This is a new ruby material for dark-room illumination, introduced by Messrs. Thomas Christy & Co., 25, Lime-street, E.C. It is very soft and pliant, and folds without cracking. It is a safe colour, and seems to be just the kind of thing one would like to have with him when out on a tour.

Mr. William Tylar, of Birmingham, has sent us a sample of a gummed textile fabric he has prepared as a substitute for the black paper strips in general use for binding lantern slides. The great advantage of this fabric is that, unlike paper binding, it will not tear.

RECENT PATENTS

APPLICATIONS FOR PATENTS.

No. 22,733.—"Improvements in the Manufacture of Positive Printing Papers, Opals, and the like, for Photographic Purposes." C. E. Pettitt.—*Dated November* 27, 1893.

No. 22,942.—"Improvement in Application of Photography to the Production of Printing Surfaces." A. Hesekiel.—*Dated November* 29, 1893.

No. 23,149.—"An Improvement in Metal Double Dark Slides for Photographic Cameras, to be opened Book-wise for Exposure inside the Camera." L. S. Zachariasen.—*Dated December* 2, 1893.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 11 ...	Camera Club	Charing Cross-road, W.C.
,, 11 ...	Darlington	Trevelyan Hotel, Darlington.
,, 11 ...	Dundee Amateur	Asso. Studio, Nethergate, Dundee.
,, 11 ...	Lantern Society	20, Hanover-square.
,, 11 ...	Norfolk and Norwich	Bell Hotel, Norwich.
,, 11 ...	North Middlesex	Jubilee House, Hornsey-road, N.
,, 11 ...	Putney	Boys' Gymnasium, Charlwood-road.
,, 11 ...	Richmond	Greyhound Hotel, Richmond.
,, 12 ...	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 12 ...	Derby	Smith's Restaurant, Victoria-st.
,, 12 ...	Great Britain	50, Great Russell-st. Bloomsbury.
,, 12 ...	Hackney	206, Mare-street, Hackney.
,, 12 ...	Manchester Amateur	Lecture Hall, Athenæum.
,, 12 ...	Newcastle-on-Tyne & N. Counties	Central Exchange Art Gallery.
,, 12 ...	Paisley	9, Ganze-street, Paisley.
,, 12 ...	Stockton (Annual)	Mason's Court, High-street.
,, 13 ...	Ipswich	Art Gallery, Ipswich.
,, 13 ...	Leicester and Leicestershire	Mayor's Parlour, Old Town Hall.
,, 13 ...	Leytonstone	The Assembly Rooms, High-road.
,, 13 ...	Munster	School of Art, Nelson-place, Cork.
,, 13 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 13 ...	Southport	The Studio, 15, Cambridge-arcade.
,, 13 ...	Stockport	Mechanics' Institute, Stockport.
,, 14 ...	Birkenhead Photo. Asso.	Y.M.C.A., Grange-rd., Birkenhead.
,, 14 ...	Camera Club	Charing Cross-road, W.C.
,, 14 ...	Cheltenham	
,, 14 ...	Glossop Dale	
,, 14 ...	Hull	71, Prospect-street, Hull.
,, 14 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st
,, 14 ...	Manchester Photo. Society	36, George-street, Manchester.
,, 14 ...	North Kent	Gravesend.
,, 14 ...	Oldham	The Lyceum, Union-street, Oldham.
,, 15 ...	Cardiff	
,, 15 ...	Central Photographic Club	Coleman's Hotel, Henrietta-st., W.C
,, 15 ...	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 15 ...	Holborn	
,, 15 ...	Leamington	Trinity Church Room, Morton-st.
,, 15 ...	Maidstone	"The Palace," Maidstone.
,, 16 ...	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

November 30,—Mr. P. Everitt in the chair.

Mr. C. W. Canfield (U.S.A.) was present as a visitor. Receipt of a presentation copy of The British Journal Photographic Almanac for 1894 was acknowledged.

Mr. W. T. Wilkinson passed round a gelatino-chloride print developed according to the Paget Company's formula.

Compared with a printed-out picture, Mr. Debenham thought the developed showed better gradation.

Mr. J. E. Hodd showed a lantern slide made on a chloride plate. The image was rather dense, and there was a whitish surface deposit. Ammonium carbonate had been used in the developer.

Mr. Debenham suggested that the density was due to too long development, and said that hydrochloric acid solution would probably remove the whitish deposit. The correctness of the latter view was substantiated by experiment.

Mr. Wilkinson showed comparative results on Sandell plates and orthochromatic plates, the latter used with a screen prepared with methyl orange dissolved in collodion coated on patent plate. Mr. Wilkinson also showed three prints from negatives taken with discriminating screens, to be used in the preparation of three-colour pictures.

The Carbon Process.

The discussion on this subject, adjourned from the last meeting, was resumed.

Mr. Debenham said, at the previous meeting Mr. Acres had said that the speed of tissue was about the same as that of albumenised paper. That did not apply to tissue generally. He had found that a tissue sensitised on a three-to five per cent. bath was from three to four times as rapid as albumen paper.

Mr. Skelton (of Messrs. Elliott & Son) said the statement applied to tissue sensitised from the beginning, not to that sensitised by immersion.

The Chairman asked why such tissue should be slower than floated tissue?

Mr. Skelton replied that it contained much less bichromate.

In reference to imparting a matt surface to the prints, the Chairman mentioned that the Autotype Company recommended celluloid for the purpose.

Mr. Hodd said that if the celluloid contained scratches they would appear in the finished print. He asked what was the cause of the reticulation of the film? He had found it with freshly sensitised tissue.

Mr. Skelton said it was caused if the film was too soluble. The less time the film was soaked in water the better. In reference to a remark that in some prints shown the safe edge had printed through, he said it was not the proper thing. It had been caused by accidental exposure to light. If the negative gave a hard result, the surface could be sunned down, but clear edges were always obtained in the ordinary way.

Answering Mr. Teape, he said alcohol in the sensitising bath was not now used for preventing reticulation. Ice, however, was used, but, if the water were cool enough, it was not necessary to use anything.

After other discussion the meeting adjourned.

Croydon Camera Club.—November 29.—Mr. Leblanc gave a demonstration and explanation of *Modern Developers* to a good attendance. A snap-shot on a Wratten plate was satisfactorily developed with metol, and a lively fire of questions ably answered.

Croydon Microscopical and Natural History Club (Photographic Section).—December 1, Mr. Low Sarjeant in the chair.—A good muster of members attended to witness an exposition of the carbon process, which was ably given by Messrs. Braham and Burton, of the Autotype Company. After a brief description of the principles of the process, the method of printing was very clearly explained, together with the use of the actinometer, of which several varieties were shown. Reference was made to the continuing action which took place after the print was removed from the printing frame, and means of utilising this action were detailed. The print, in the single-transfer process, could be finished on paper of any surface; but the double transfer could only be satisfactorily finished on a smooth paper. The practical working of the single and double-transfer processes was then shown in the production of paper prints, opals, and transparencies, the treatment being the same in each case, only the final support to which the tissue was transferred differing. The tissue, after a short soaking in water, was well squeegeed on to the final support in the single transfer, all the water removed, and, after being blotted, placed in the developing bath of hot water. In a few minutes the portions unacted on by light were dissolved away. The print was then placed in cold water containing a little alum, and, after a rinse in clean water, hung up to dry—a finished print. In the double transfer, a temporary support of waxed paper—or opal for matt effects—was first used. The print was then similarly treated, dried, soaked again, and squeegeed on to the final support, the waxed paper being peeled off when dry.

East London Photographic Society.—November 28, Mr. C. Tylee in the chair.—Mr. L. E. Bennett, of 43, Mitchell-street, Bartholomew-square, was elected Hon. Assistant Secretary. Mr. M. A. Wilkinson, in a few but effective words, drew the members' attention to the great distinction which the Society had, through one of their members, achieved at the Stanley Show; he referred to Mr. C. Tylee, who had been the winner of the medal for the best individual picture in the Society's competition.

Richmond Camera Club.—Members were compensated for recent disappointments by a very enjoyable Lantern Evening on Monday, the 4th inst. A "Roberts" hand camera, an established favourite with several members, with latest improvements, including Thornton-Pickard shutter, was shown. A few members' slides were then shown: Views of the river, by Mr. Childs; Lakeland, by Mr. Neville; the Rhine, by Mr. Gibson; Spain, by Mr. Purcell; and Switzerland, by Mr. Davis.

Birmingham Photographic Society.—November 28, Mr. J. J. Bulton in the chair.—Mr. Underwood gave a demonstration on the working of gelatino-chloride papers, carrying out all the manipulations before the meeting, from the time the print is taken from the frame till it is in position with a matt surface upon its mount, including toning with platinum as well as the various gold baths.

Halifax Camera Club.—November 29.—Mr. S. H. Fry gave a demonstration on *Paget Prize Print-out Papers and Lantern Plates.* The lecturer, in a

lucid and interesting way, dealt with the characteristics of a good lantern slide *firstly*, and laid great stress on the importance of exposing correctly, and not, as some people try to do, by making the slide right in development. Coming to the question of variation of colours, Mr. Fry requested Mr. Priestley, the manipulator of the lantern, to show about twenty slides, all from one negative, but all of different exposnres. Not one of the slides was of the same colour, all different, some being brick-red, warm tones, purple-black and other cold tones. Being all developed by the same solution, it proves what the lecturer said, that the gradation of colour is due to exposure, and not, as some say, development. One thing Mr. Fry impressed upon the meeting was, that almost the same tone could be got either with the Paget slow or quick lantern plate; in fact, he seemed to think that even an expert could hardly tell the difference. Mr. Fry then developed an under-printed print. The process is very simple; it consists of taking the print and immersing, without previous washing in a ten per cent. solution of bromide of potassium. The prints should remain in this bath for ten minutes, and then be well washed in running water for five minutes; then developed with hydroquinone, the formula for which is supplied by the Company, after which they should be again washed for ten minutes, and then toned and fixed in the ordinary way. The print-out opals can be treated in the same way as the paper. The opinion of most of the members present was that the partial development was most useful. Some excellent prints were shown to the audience, which were much admired.

Cape Town Photographic Club.—Annual Meeting, Mr. F. Ayres presiding.—The first business was the reading of the Council's report for the past year, which was as follows:—The Council had much pleasure in presenting their third annual report for the year just ended. The balance-sheet showed a balance brought forward of 18*s.* 9*d.*; receipts during the year, 40*l.* 19*s.*; total, 41*l.* 17*s.* 9*d.*; disbursements during the year, 41*l.* 12*s.* 7*d.*; leaving a balance in hand of 5*s.* 2*d.* The number of members at the beginning of the year was forty-five; there were thirty-two new members admitted during the year, six had removed and resigned, leaving the present number of members seventy-one. The monthly meetings had kept up their interest, and had been well attended, the average attendance of members and visitors being twenty-two. Besides the ordinary meetings, the Club had organized and carried through the following entertainments:—On February 2, a lantern entertainment at which over 200 slides made by Club members were exhibited. These slides were now being circulated amongst the English societies. On May 10, a limelight entertainment was given, entitled *Round and About Lucerne*, with descriptive lecture by Mr. Charles Steytler, a member of the Club, the slides being from his own negatives. On August 17, a *conversazione* was held, to which some 250 guests were invited, including members. Over 1000 exhibits were shown. The ontings of the Club had been always enjoyable but not so well attended as may have been expected. The places visited were Table Mountain, Cape Town, Rondebosch, Constantia and Houts Bay, Sea Point, the Kloof, &c. The following subjects were introduced during the session:—*Pinhole Photography*, by Mr. C. Ray Woods; *Bellows-making*, Mr. C. von Bonde; *Stereoscopic Photography*, Mr. A. J. Fuller; *Wet-plate Process*, Mr. E. W. Allis; *Print-out Papers*, Mr. R. T. Pett; *Enlarging by Cresco-fylma*, Mr. A. J. Fuller; *Print-out Opals*, Mr. A. J. Fuller; *Polarisation of Light*, Mr. C. Ray Woods. The CHAIRMAN said they all knew that the present flourishing condition of the Club was mainly due to the energy and exertions of their Secretary, and he had now the pleasure, on behalf of the members, of presenting him with an illuminated address, together with a "Chadwick" hand camera, which he believed the Secretary had a special affection for. The election of Officers then took place. *President:* Mr. David Gill.—*Vice-President:* Mr. T. W. Cairncross.—*Council:* Messrs. E. J. Steer, C. Ray Woods, F. Ayres, J. R. Wignall, G. N. Lindup, A. Gracie, R. T. Pett, D. C. Andrew.—*Secretary and Treasurer:* Mr. A. J. Fuller. Two new members were elected, and the evening closed with an exhibition of members' slides. The limelight lantern was manipulated by Mr. Wignall with a new Lawson saturator, just imported by him, which worked very satisfactorily.

FORTHCOMING EXHIBITIONS.

1893.	
December.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18–Jan. 22, 1894	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

GELATINO-CHLORIDE PAPER.

To the EDITOR.

SIR,—There is a flood of scribbling in your plethoric ALMANAC on the subject of gelatino-chloride paper. This is only what was to be expected from the immense growth in public favour of this class of paper. Of this scribbling there is a portion that is readable and instructive: more that is instructive, but, being simply a *resumé* of our own and other makers' formulæ and pamphlets, is unnecessary; whilst there is much more that is distinctly misleading, and apparently *ex parte*. Against this latter we desire most emphatically to protest.

First, it has been said that gelatino-chloride paper is much more expensive than albumen, but, in reckoning the cost of the latter, the writer of the article ingennously (ought we to say ingeniously?) omitted entirely the cost of labour, plant, and time, and also ignored the possibility of waste. To practical men we need not point out what a mistaken paradise the gentleman in question had created for himself. Another error that he made was to assume that gelatino-chloride paper consumed more than double the quantity of gold that albumen does. This is absolutely a false statement (unwitting, of course, on our friend's part, but nevertheless quite untrue).

Again, he writes of yellow prints and double tones as a necessary consequence of the use of the paper, and not as the result of careless or ignorant working. No one knows better than you, Mr. Editor, how far removed from truth such an accusation is.

Another gentleman writes that gelatino-chloride paper is much given to frilling, and, whilst we cannot answer for other makers' goods, we will say definitely that not one instance of such a thing has ever been brought to our notice during the year 1893, which he mentions, and we challenge the writer of the article to produce authentic evidence that such a case ever occurred.

History repeats itself, even in details, and we shall see the flowing tide of gelatino-chloride paper roll on unharmed by these puny efforts to stop its progress, just as the tide of gelatine plates flowed on in the past, unhindered by similar writers, who, from interested motives, or a desire to write something that should be a little out of the ordinary course, opposed or detracted from their advantages.

Gelatino-chloride papers necessitate a little unlearning of what the old-fashioned photographer knew in the past, a little use of common sense, and that is all: and this, we are glad to say, is usually met with. The photographic world, professional and amateur, will continue to use this paper as it has in the past, only to a greatly increasing extent. There was never any change in the photographic procedure which gained so ready and so firm a hold on the photographic public in such a short time, and such a hold could not have been gained unless the article had intrinsic merits of the highest class.

We apologise for taking up so much of your space, but think that the subject deserves the fullest consideration, and that misstatements, as we have indicated, should not go uncontradicted.—We are, yours, &c.,

THE BRITANNIA WORKS COMPANY, LTD.

Ilford, London, E., December 1, 1893.

BURSTING OF AN OXYGEN CYLINDER AT BRADFORD.

To the EDITOR.

SIR,—There is only one conclusion that can be come to in reference to Mr. G. R. Baker's remarks in your issue of the 1st instant relative to the reannealing of cylinders.

It is, either that they have been sent out by the makers unannealed, or that, after being tested to one and a half tons, and filled four times—as was according to the evidence the cylinder which burst—they require reannealing.

If the latter is the correct conclusion, it is a very alarming one, seeing the great number of cylinders that have been in use for years without, so far as can be learned, any reannealing, and it is to be hoped that the matter will not be allowed to drop until we have some authoritative statement on the subject. Professor Goodman's opinion on the question would be of value.—I am, yours, &c., R. G. M.

December 4, 1893.

To the EDITOR.

SIR,—I was glad to see so much correspondence in this week's BRITISH JOURNAL OF PHOTOGRAPHY respecting the recent cylinder explosion, and now that our fears are again aroused, we ought not to let the matter rest until the question of reliable tests of these cylinders are placed in the hands of disinterested parties. I urged the same thing several years ago (after the Glasgow accident) in your JOURNAL, but it was not supported, and the matter died away. I quite agree with Mr. W. I. Chadwick that we ought not to let this matter rest until these cylinders are under Government inspection and supervision, as in Germany. It is of vital importance, not only for the individual users, but from a public safety point of view, and the time has arrived when some action should be taken, to attain which I suggest that *all* Secretaries of the various photographic and lantern societies memorialise the Board of Trade to take the matter up. We shall never have safety without, as the so-called tests are not reliable, as was conclusively proved by the fatal cylinder being filled. I trust, Mr. Editor, that you will assist lanternists in this matter.—I am, yours, &c. J. R. GREATOREX.

Mytton Hall, Shrewsbury.

To the EDITOR.

SIR,—I was pleased to read Mr. Chadwick's remarks about the above, and I fully endorse his suggestions. I have been giving exhibitions for about twenty years, but, in consequence of this uncertainty in bottles, I have almost ceased exhibiting, with the exception of showing slides at our Society. Now, if Mr. Chadwick's suggestions were thoroughly ventilated, something might be done which would restore confidence.—I am, yours, &c., W. B. WOOD.

Urmston, December 2, 1893.

"FREE LANCE" AND HIS CRITICS.

To the EDITOR.

SIR,—May I be permitted to say a few words in reply to "Free Lance" in your last issue. I am glad he is so candid as to admit that he spoke unfeelingly of what he terms the absurdities on the walls at Pall Mall. I am invited to express my opinions upon "The Proud Turk." I must decline to do so, as I am not sufficiently acquainted with that picture to do it with justice or propriety. That reason, of course, cannot weigh much with him, but still I must give it for not appearing more courteous. I do not understand his criticism; his remarks are founded on different principles to those that govern my opinions. I certainly like his pose on the artistic standpoint, it is charmingly funny if not very dignified, and I should think that even "The Proud Turk" himself would smile at such a furious, feeble assault. The reasons given for denying all merit to this picture are so singular that they seem like a bad joke, yet I must traverse them in order to show their felicitous applicability.

"Free Lance" says, "The effect of light is neither moonshine, sunshine, nor haze." Is the gentleman serious here? Surely he must know there are other lights quite as legitimate to use as those he has named. Perhaps his twilights have been spent in such interesting company that they seemed all haze to him. According to my limited knowledge of the principles of art, violent contrasts are inimical to breadth and repose. While true lights are suppressed, gradations changed, and transparency destroyed by great artists in order to secure the necessary effects, I cannot understand a purely photographic standpoint; but as an artist photographer I am free to confess that I rather like underdone negatives. Some of them print rare effects with just a little cooking.

I must thank "Free Lance" for the information about the judging, although it is not quite news to me, having had a little experience in the matter myself. Having now to the best of my ability answered the gentleman, I hope he will pardon my liberty if I should ask one or two questions in return. Has he got and read the ALMANAC yet?—if not, let him do so as soon as possible, and study, ponder over, and digest it. He will become wiser, and next year he will be able to write an inteligible article on the Exhibition. Let him kindly read the "Plea for a Higher Criticism," by John A. Hodges; it is well-timed, sensible, and appropriate, and I hope it will tend to draw more attention to this important master. He recommends a painter as an art critic.

In conclusion, allow me to appeal to you, Mr. Editor, and all those who hold the profession in respect and have a glimpse of the coming light, to use the strongest endeavours to clearly classify the pictures which are now presented to our exhibitions. Broadly speaking, there are now three distinct classes. In the first, ordinary photography, of course, holds the principal position; in the second, photography controlled more or less and modified by the canons of art; while, in the third, photography becomes entirely subordinate to the requirements of art and disappears in the picture. This is inevitable, as in all true pictorial art materials and mechanism are so hidden that they are practically unseen. This will be the character of the best work of the future, and the sooner we recognise that fact the sooner we shall apply the correct rules of criticism to each of the classes already mentioned. Then each class of our art can have free play in its own sphere without encroaching upon the rights and prerogatives of the others, enabling them to work for the common good in the most efficient manner possible.—Yours, &c., A. R. E.

December 4, 1893.

CELLULOID FILMS.

To the EDITOR.

SIR,—We are not anxious to start a controversy as to the merits of our celluloid film over that of our competitors; the fact that they use our name to sell it under is evidence of their acknowledgment of our superiority; but we are most anxious that the photographing public should be thoroughly aware that there is more than one film now on the market.

Notwithstanding your able article of the 1st inst., we do not see that we can change the opinions we expressed in our letter to you. Some three months since, we had a small fire on our premises at Newark, N.J., that was distinctly traceable to a box of pipe-stems made by one of our competitors. They were of transparent material and practically solid film as used for negatives. It may be that, when in thin sheets with layers of gelatine between, the films are not so liable to ignition, but of that we have had no experience. This we know, that no material ever made by us has exploded or spontaneously ignited, that there has been no complaint against our film destroying the emulsion's sensitiveness since the mechanical difficulties of coating it have been overcome by the plate-makers.

We shall be very pleased to send, to any one desiring it, a small sample of celluloid of our own manufacture, that he may compare it with any plates he may buy or have on hand. We have found, as we showed you last week, that no film at present on the market besides celluloid will withstand heat, and that, when applied by means of a flat iron, that is as hot as possible without being so hot as to scorch paper, the imitation celluloid will crumble to yellow powder, while the genuine film is only damaged in the finish and loses its polish. Such an experiment is easy to make, care being taken only to keep a thin piece o paper between the iron and the celluloid and a pad of blotting-paper under all, to keep in the heat. It will often happen that sufficient acid will be given off to mark ordinary litmus paper, but, if it is desired to test for nitrous aid, the operater will need be more than a photographer and possessed of considerable expert knowledge of chemistry.

Thanking you in advance for your kind insertion of the above, we are, yours, &c., S. GUTTERMAN & Co.,

For the Celluloid Company, New York.

35 *and* 36, *Aldermanbury, London, E.C., December* 5, 1893.

ELECTRICAL HEATING.

To the EDITOR.

SIR,—In the letter from your correspondent "Palette," are some statements which need correction. The fact that the water heater referred to as mine is an "elaborate apparatus" has nothing at all to do with the cost of electrically heated bath heaters, which, except for the bedding of the conductors, can be made at a small cost to give quite as high a proportionate duty, for the power consumed, as can be obtained from gas; but the cost of the current for bath heating is at present much too heavy to admit of its being used in practice, although it may not be so when Mr. Preece's figures of the future are realised. Another mistake your correspondent makes is by bringing in figures as regards comparative cost which will not bear investigation. Mr. Preece, of the General Post Office, is made to state that "one pound of coal distilled into gas will give a light of seventeen candles for one hour." Neither Mr. Preece, nor the General Post Office, nor both combined, could distil "one pound of coal into gas." The statement as given is simple nonsense. It is not at all likely that Mr. Preece ever made such a silly assertion.—I am, yours, &c., THOS. FLETCHER, F.C.S.

Warrington, December 1, 1893.

PHOTOGRAPHIC PIRACY.

To the EDITOR.

SIR,—The following may be of interest:—(1) A smart young man came round our district with the photographs you mention, Luke Fildes's *Village Wedding*, &c., called upon business people, and disposed of a good many copies. He offered them to me at 5*s.* each, then 4*s.*, and finally my choice for 3*s.* 6*d.* A friend purchased two for 6*s.* His canvass of the district seemed very thorough. (2) A publisher called upon the stationers in the various small towns around, proposing to get up local albums; one stationer was prevailed upon to write one of our large publishing firms, asking permission to use one or two of their views; permission was at once granted, whereupon several others wrote, and "the cat being out," permission was promptly and properly refused. Eventually the local booklet was produced, but was so indifferent that I do not think it has interfered with the sale of legitimate photographs. (3) How the amateur is pirated: I was a guest recently at a wedding, and as time hung heavy until the light fantastic could be tripped, I proposed to photograph the party; this I did, and produced an excellent whole-plate negative (I did *not* pirate, there was no professional within ten miles). I offered to do one or two for the family, but declined to supply the party (about thirty). "Oh! hand the negative to a professional," said the bride's father, "I want a lot." So I sent the negative through to my dealer, had a dozen printed, nicely mounted on good cards, and handed them over, stating the dealer's price. Now I find that they are being forwarded to those interested, fifty per cent. profit added, and the guests are being allowed to believe that *I am selling them at that price.*

Resolved: That in future I devote myself to pure landscape.—I am, yours, &c., "FIXED."

November 28, 1893.

AMATEURS AND PROFESSIONALS.

To the EDITOR.

SIR,—Some time ago an article appeared in your paper referring to Amateur *versus* Professional, showing how the one might affect the other, &c. The following is an experience novel in itself, and, I think, worthy of an expression of opinion from you, Mr. Editor; and, perhaps, you might find space in the JOURNAL for the thoughts of a member of the profession. It is this:—

I am a photographer in Glasgow, and had occasion the other week to quote price for an outside group of fifty; and as it was pointed out to me that, in the event of a good picture, fifty copies, at least, would be required, I made up my mind instantly to have that order. I therefore offered to produce a 15 × 12 enamel in cut-out mount at 3*s.* 6*d.* each. Well, Sir, a meeting of those interested—viz., members of a choir—was held in due course, and my price, along with price from another photographer equally capable, was submitted; and I am told I received most votes, and just as the matter was about to be fixed, up jumps an amateur (a member of the choir) and offered to do the job for 3*s.* 3*d.* each. The Chairman thereupon suggested, as their friend and member the amateur

offered to do it at three pennies less, he ought to get it—and did get it accordingly. "Talk about the living wage!" Whew! This same amateur, I am told, holds a fair appointment on the staff of one of our *leading* evening papers.—I am, yours, &c., WHAT DO YOU THINK?

December 4, 1893.

HOW LENSES ACT.

To the EDITOR.

SIR,—Assuming that Mr. Hargrave has been correctly reported, I beg to offer a few remarks on his results.

1. Mr. Hargrave says that the distance, which he denotes by $a\,b$, is constant, with the same focal value of stop for all lenses. This, though approximately true, is not absolutely so, either for the same lens at different distances or for different lenses. If D_1 = distance from the lens in inches of the point sharply focussed, the stop, *f*-8, and the *diameter* of the disc of confusion $=\frac{1}{100}$", we have $\frac{1}{a\,b}=\left(1-\frac{f}{D_1}\right)\left(\frac{100}{8}-\frac{1}{f}\right)$ showing that $a\,b$ depends on D_1 and *f*.

2. If $\frac{f}{D_1}$ is small, $\frac{1}{a\,b}=\frac{100}{8}-\frac{1}{f}=12\frac{1}{2}-\frac{1}{f}$, and hence, approximately, $a\,b=\frac{1}{12\frac{1}{2}}$ for all such cases.

Perhaps Mr. Hargrave took the *radius* of the disc as $\frac{1}{100}$", but this is not the usual assumption.

3. To find D with the above value of $a\,b$, we have, as usual, $a\,b=\frac{f^2}{D-f}$, or $\frac{1}{a\,b}=\frac{D}{f^2}-\frac{1}{f}$,

$$\text{hence } \tfrac{100}{8}=\frac{D}{f^2} \text{ and } D=\tfrac{100}{8}\,.\,f^2.$$

This agrees with the usual formula—

$$D=100\,.\,\frac{d}{f}\,.\,f^2 \ (d=\text{diameter of stop}),$$

for the distance from the lens, beyond which everything is in focus at the same time as the extreme distance.—I am, yours, &c.,

CLIFFORD E. F. NASH.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

WM. GOODWIN.—Received; thanks.

J. F. HAMMOND.—Sorry we are unable to avail ourselves of your offer; thanks all the same.

NENN LAT.—The sunken, flat appearance of the print is probably caused by over-exposure.

J. S. asks: "Is it possible to restore platinotype paper which has been kept six months and gone wrong?"—No.

DORMOUSE.—Send us your name and address, in accordance with our rules, and we will endeavour to answer questions.

J. P. G.—There is no other brand of dry ferrotype plates than the one you name. Sorry we cannot help you in the matter.

"49."—It will be easy to arrive at a definite conclusion on the subject by shading one-half of the paper from the ruby light while the enlargement is exposing.

PYRO.—The working of the "tintype" process is similar to that of the wet-collodion process, only one is taken on blackened tin plate, whereas in the other glass plate is used.

ZENO.—1. Yes; if the gelatine be of a suitable character. 2. The paper can be sketched, and held secure, in the same apparatus as it is intended to be used for its ordinary purpose.

PLANTER.—1. We have heard of instances where gelatino-chloride papers have been taken to the tropics and brought home again, printed, and found to be in perfect condition. 2. Take the developer in cartridge form.

D. THOMASON.—We have not ascertained the price of Mr. Duchochois' book, nor have we heard of its being procurable in this country. Several hints on photographing by magnesium light will be found scattered throughout our recent volumes.

E. F. MULLER.—1. Undoubtedly excellent doublet lenses to cover half-plate can be obtained for 5*l.* 5*s.*, but you must make your own selection. It is not our practice to recommend one make in preference to another. 2. Write Mr. Alfred Watkins, Hereford.

S. R. B.—There is certainly nothing in the atmosphere or the light of Germany that will account for the asserted superiority of the photo-mechanical work produced there. Whatever excellence there may be is entirely due to the workers and not to climatic conditions.

T. O'BRIAN.—Thanks for your high opinion of our knowledge; but we must be excused from expressing any opinion on the validity of the patent for the shutter referred to, and also as to the validity of the patent you propose to take for another one. Better consult a respectable patent agent.

J. DORMER.—We have had no experience with the material in question, and know nothing whatever of its composition. It being a trade article, the makers, of course, do not publish of what it is compounded, so we can give no opinion as to whether it would act injuriously on bromide enlargements or not.

HUNTINGDON.—There is no reason to surmise that even the worst possible mounts to be found in the market would have any injurious action whatever on a carbon print. Certainly we have never seen or heard of an instance of such a thing. With regard to the alleged difficulty of the carbon process yielding good prints from good negatives, see article on another page.

B. A. MORRIS.—The difficulty in obtaining sufficient contrast in the negatives for photo-lithography is fully accounted for by the fact of extra-rapid plates being used. These are the very worst that could be employed for the work. Try either the plates made specially for the purpose, or adopt the collodion process.

FOG.—If the current is obtainable from the mains, by all means have it from that source; it will be far more economical than having your own installation for its generation. Most London portraitists, who went to considerable cost for engines and dynamos, have retired them since they have been able to obtain the current from the mains.

T. M. WILLIAMS asks how English prices for portraits compare with those on the Continent—whether they are taken at a less price than they are here?—We presume portraits are taken at a low price on the Continent, the same as they are here, but it is pretty clear that they cannot be taken for much less. So far as our own knowledge goes, cheaper portraits of fair quality are to be had here than abroad.

ROWSE asks if there is any process by which the features in a profile portrait are raised from the background, after the style of a cameo.—In reply: This effect cannot be produced by any photographic process, but is the result of artistic work on the portrait. About thirty years since, some exquisite cameo profiles in white wax were produced by Mr. Brewster, an Edinburgh artist, and at a more recent period a Parisian artist, whose name was unknown to us, produced pictures in relief, which were believed to have been done by pressing the print up from behind. The late J. Solomon, of Red Lion-square, was the agent for getting this work done, and specimens are still in existence, but the secret of making them was never divulged.

F. J. Q. asks: "Can you tell me of a Photographic Society convenient to Charing Cross, not too high in subscription—say, 1*l.* 1*s.* or 2*l.* 2*s.*—where one could see the photographic papers, American as well as English, hear the latest photographic news, and see demonstrations of new processes? Camera Club too expensive, and concerns itself mostly with high mathematics and art."—The Photographic Society of Great Britain, 50, Great Russell-street (subscription, 1*l.* 1*s.* per annum); the Photographic Club, Anderton's Hotel, Fleet-street (1*l.* 1*s.* yearly); the Central Photographic Club, Coleman's Hotel, Covent Garden, W.C. (1*l.* 1*s.*). Join all three, and you will get just about as much photographic pabulum as you can desire.

A. B. asks: "Can some one inform me how to clean an old oil-painting? It has got very dry-looking and indistinct. Can the cracks in paint be filled up?"

J. W. writes:—"Can you tell me the surest means of stripping collodion negatives when they are taken on plates prepared with French chalk—I mean stripping them for the purpose of placing them on another glass reversed?"—Two methods are open. One is to take a sheet of gelatine, such as that supplied by the dealers in lithographic materials, and soften it in water, and squeegee it on the negative and allow it to dry. The other is to place the negative on a levelling stand, and pour on a warm solution of gelatine, and allow that to dry. When the gelatine is dry, the negative can be taken from the glass and used as it is. If it be desired to mount the stripped negative on to another glass, a plate should be coated with gelatine, which should be allowed to thoroughly set. It is then immersed in cold water, and the stripped negative brought in contact with it while under water, then removed, gently squeegeed, and allowed to dry.

*** Several answers to correspondents and other communications unavoidably held over.

CONTENTS.

THE BRITISH
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No. 1754. Vol. XL.—DECEMBER 15, 1893.

OUR 1894 ALMANAC.

The British Journal Photographic Almanac for 1894 was published on December 1. The volume is the largest yet issued; it comprises 1336 pages, an increase of exactly a hundred pages on last year.

"Stereo-micrography" forms the subject of the editorial article, and among the contributors are Captain Abney, Professor W. K. Burton, Mr. Andrew Pringle, Dr. R. L. Maddox, Mr. R. H. Bow, C.E., Mr. Thomas Bolas, Mr. C. H. Bothamley, Mr. John Anderton, Mr. G. Watmough Webster, Mr. E. W. Foxlee, Mr. Thomas Bedding, Mr. John Howson, Mr. George Mason, Mr. Birt Acres, Mr. Redmond Barrett, Mr. Valentine Blanchard, Mr. William Brooks, Mr. James Martin, Rev. F. C. Lambert, Mr. W. J. Stillman, Mr. F. York, Mr. A. L. Henderson, and many others.

The frontispiece is a collotype portrait of Captain Abney by Messrs. Morgan & Kidd, and among many other illustrations will be found an example of Messrs. Waterlow's half-tone process, and illustrations showing comparative results on orthochromatic and ordinary plates by Mr. B. J. Edwards, and collotype reproductions of hand-camera work by Mr. H. C. Beck. The publishers inform us that 15,000 copies of the edition have already been disposed of.

THE WET-COLLODION PROCESS.

The fact of the wet-collodion process being now so extensively employed in various departments of photography, more especially in photo-mechanical and lantern-slide processes, and the further fact that we are in constant receipt of letters of inquiry relating to one or other phase of this subject, induces us to write a few articles relating to its chemistry and practice.

The collodion process was introduced through the medium of the *Chemist* in 1851 by Frederick Scott Archer and seems to have been originally intended by him to produce pellicular negatives—that is, the films after being developed were not primarily intended to remain on the glass plates, but to be removed therefrom and kept between the leaves of a folio when not in use in the printing frame. It was subsequently found by himself and others that the balance of advantages lay in the retention of the films on the glass plates on which they were formed, unless in such cases as necessitated a reversed print. Methods of stripping the film from the plate will be given subsequently. The process was introduced as a negative one, but it was soon discovered that by modifying the developer very fine direct positives could also be obtained in the camera, and it was this that led to the downfall of the Daguerreotype process; for, while collodion positives, when skilfully made, possessed equal, or almost equal, merits with even the finest Daguerreotypes, they could be produced with much greater simplicity, with less expense, and a shorter exposure in the camera, while their permanence is undoubted.

The collodion process is a very simple one, and when care is taken to keep the chemicals in good working order it is a very sensitive one, and one by which negatives of a singular degree of excellence may be obtained. Indeed, the productions by this process have long been held up as standards of excellence to which to attain by gelatine-workers.

The collodion is the first thing to claim attention. Its mechanical property of flowing with oil-like smoothness over a plate of glass—no matter how large—and forming a bright film of uniform thickness, which sets firm in a few seconds, indicated its great advantages as a vehicle for holding the haloid body which, when united with the silver solution, in which it had afterwards to be immersed, formed the sensitive surface.

Collodion, happily, is very easy of preparation, although it will prove more advantageous to purchase it ready-prepared from those who make a speciality of it. It is procurable in various kinds, some better adapted for positives, some for lantern slides, and some giving dense images for negatives and pen-and-ink line work. The quality of the soluble cotton of which the collodion is made has much to do with inducing the various properties named, although the iodising solution also forms an important factor in determining its suitability for special purposes. There is one among the innumerable iodisers that have been proposed which, after many trials of others, we determined upon adopting, and which makes what we would term a good all-round collodion, suitable for every purpose. This we will describe in a succeeding number.

Whether the photographer elects to make his own collodion or not, we should certainly recommend him to purchase his soluble cotton ready prepared, for, although there is no difficulty in making it, yet is there a certain amount of messiness with it, and this is the more objectionable when it is considered that the messiness arises from very strong acid mixtures. Besides, experienced makers are familiar with the properties induced by varying the specific gravity of the acids employed in conjunction with a variation of temperature, and such experience counts for very much. In what follows, we shall, however, and with a view to making these articles complete, give such directions as will enable any one to make his own pyroxiline without failure.

PHOTOGRAPHING ICE-CRYSTALS.

At a time when every photographer is on the *qui vive* for something new, it will not be unacceptable if we draw attention to a class of phenomena which, when successfully photographed, would make some exquisitively beautiful negative, interesting to every one, and especially so to scientific students. If any reader will refer to the first volume of that invaluable series of scientific works, *The International Scientific Series*, he will note that it is by the great physical investigator whose loss we have all so recently deplored—Professor Tyndall—and, turning over its pages, he will be struck with a set of illustrations depicting a few of the beautiful geometric forms which water when converted into snow so frequently assumes. These particular figures are from originals drawn by hand; but, if photography and the microscope were pressed into use, an endless variety of shapes could be reproduced with facility and fidelity, and a record as unique as beautiful obtained.

It is possible that there are many of our readers who have never seen a snow crystal: to all such we say, do not lose another opportunity of making acquaintance with some of the most beautiful objects to be seen in inanimate nature. We should here say that it is not in all snow showers that the crystals can be readily distinguished. Those downfalls in which large flakes descend in the semblance of feathers, though exhibiting traces of crystalline form, are useless for the purpose; but, when the air is very cold and less moist than usual, and the first snow makes its appearance as a coarse dust, we are certain to meet with the objects of our quest. Let a few of the small flakes fall upon a piece of dark-coloured cloth—nothing is better than holding out one's arm to receive the particles on the coat-sleeve—and then let them be closely examined. The tiny flakes will be found to consist of most beautifully shaped flat tablets of ice crystals all formed upon an hexagonal basis, but varying in a wonderful way, from a simple geometrical form to an intricate feather upon feather with six-rayed radiations.

It is not possible to describe them; they must be sought and admired, and of course in the cold, for it is scarcely needful to say their stability is as slight as their beauty is great when brought into a temperature above freezing. It will at once be said, How is the photographing to be carried out? Fortunately a reply can be given, for we read that a Russian professional photographer, Mr. A. Sigson, has already been in the field, and, in the *Journal of Russian Physico-Chemical Society* described his method of procedure. Naturally the first difficulty would be the placing of the crystals to be photographed in the field of the microscope, and this Mr. Sigson performs in a very ingenious manner. He makes an aperture in a piece of cardboard, and across it places a slight network of silk fibre, just as taken from the cocoon. This forms the "bed" for the crystals which are placed upon it, after being first collected on a piece of rough cloth. The apparatus used is a Zeiss microscope, fitted with an apochromatic lens, and connected with a long-focus camera. The card was placed as the stage of the microscope, illuminated in such a way that half the field was uniformly illuminated and the other half shaded off. Of course the stage of the microscope at least would need to be kept cold—no difficulty in Russia, but needing some little contriving in the proximity of dwelling-houses in this country. Mr. Sigson, however, had to make provision against failure through the heat of his breath melting the crystal; this he did by breaking through a pipe bent away from the microscope while he was adjusting the apparatus. The exposure needed for an enlargement of fifteen diameters was from two to five seconds only, his microscope being placed in an attic window at a strong inclination to the horizon.

It is quite evident that with one single crystal considerable variety of effect would be obtainable by varying the mode of illumination—light transmitted or reflected at various angles. We should like to suggest that, if a suitable power of objective were chosen, it would not be impossible to obtain stereoscopic photo-micrographs following the indications in our article referring to that subject in the pages of The British Journal Photographic Almanac [p. 597, *et seq.*]. It is true the crystals are mainly flat; but they possess some measurable thickness, and seen stereoscopically they would present an absolutely novel aspect such as no human eye had ever before seen. Such a mode of photographing them would give interesting and pretty pictures from clusters of partially formed or broken crystals, for, rendered in stereoscopic projection, every minute ray or particle would assist the charm though taken non-stereoscopically, and as a flat object, the absolute precision of a complete geometrical structure, though in fairylike forms, would be needful. In conclusion, we may say that, if any of our readers follow out the suggestion we have made, we trust that they will send us prints of their reproductions of what we confidently assert are some of the most fascinatingly beautiful objects to be found in inanimate nature.

THE IMPROVEMENT OF NEGATIVES.

There are many of our readers who take a sufficiently lively interest in the quality of their work to travel beyond the ordinary every-day routine, if by so doing there appears to be a chance of securing an adequate return; and in no direction, perhaps, is there a better opportunity of effecting this than in the modification and improvement of hand-camera negatives.

Such negatives as a class are only too frequently, from the very nature of the conditions under which they are taken, defective both in definition and gradation: in the first respect, either by reason of too great a strain having been put upon the capabilities of the lens, or in consequence of the movement of some of the objects depicted; and, in the second, from insufficiency of exposure. From one or all of these causes it may be said that the vast majority of hand-camera negatives suffer; and, such being the case, they cannot fail to raise feelings of regret in the mind of the ordinary careful worker who is capable of better things when the circumstances are more favourable.

But nothing is easier than to remedy this state of affairs by the expenditure of a moderate amount of trouble and some little skill. In applying the latter term, we do not refer to the trained technical skill of the artist or retoucher, though these, of course, will add greatly to the final effect attained, but simply to the exhibition of a little common sense and such manipulative dexterity as the most ordinarily gifted amongst us may possess.

Some years ago there appeared, at several of the Exhibitions, a series of instantaneous pictures of small size, but of such technical excellence, and, above all, perfect sharpness, although depicting objects in very rapid motion, that general attention was attracted to them; and, on inquiry, the information was elicited, although it was never distinctly acknowledged, that the result was due to a peculiar method of improvement

applied to the original negatives, or, more correctly speaking, to their reproduction in an improved form.

From the originals a series of slightly enlarged positives were first made, and, after these had been carefully worked up, in this case by a skilful artist, they were rephotographed on the original scale, with the result, as has been stated, that they attracted general attention. Only recently we were shown a number of hand-camera pictures which owed their remarkable quality to very similar treatment, and these were the sole work of an amateur who is utterly devoid of any trained manipulative skill with either brush or pencil.

It is needless to say that we should not consider such sophisticated work as eligible for exhibition in competition with pure photography. But that is not the present question. We are not advising this course of treatment to the army of exhibitors and medal-hunters, who, by the way, would be only too ready to "drop upon" any such cases of "faking," to use the vulgar term; but where, for his own satisfaction, the amateur desires to obtain the best possible results that are within his power, we hold that the end justifies the means, and no injustice is done to anybody.

At the present day every facility is afforded for the ready execution of this kind of work, the only materials required beyond those found in every amateur's regular stock being a few sheets of bromide paper, and some simple means of enlarging up to two, or, at most, three diameters. This is perhaps the most important point in connexion with the process, namely, the small degree of enlargement. What is required is just such an amplification as will permit of the easy touching in of details, without raising the necessity for work on an extensive scale. For the purpose, in fact, of quarter-plates, the degree of enlargement need not be more than two diameters; or, in other words, up to the whole plate, or, at the very outside, the ordinary $12\frac{1}{2} \times 10\frac{1}{2}$ size should not be exceeded.

So far as the process of enlargement itself is concerned, it is to be borne in mind that the expectation is not to obtain a perfect enlargement as such, but to obtain as good as possible a basis upon which to work with pencil, brush, crayon, scraper, or whatever means may be selected or may be most suitable. Under these circumstances, no very elaborate arrangement is necessary; indeed, the simpler it is, perhaps the better, and, to illustrate how exceedingly simple it may be, we cannot do better than describe the plan adopted by the amateur to whose work we have alluded.

The enlarging camera consisted of an empty box or packing-case, in conjunction with which was used a small quarter-plate sliding body portrait camera, carrying a five-inch focus single lens. The packing-case was fixed on end on a solid baseboard, with the lid at the back, and a hole cut in the centre of the bottom, through which the enlarging lens was pointed. The sides of the box were cut down until the lid, which was to carry the sensitive paper, was about ten inches from the aperture. A short shelf or bracket was placed outside the aperture upon which to stand the small camera, with its lens pointing into the box, a sleeve of black calico serving to shut out any extraneous light. The focussing glass was removed from its frame, which then became the negative-holder.

Before removing the focussing glass, however, a sheet of printed paper was pinned on to the lid of the larger box in the position to be occupied by the sensitive paper, and, a candle being shut up in the box, by its light the printed paper was focussed upon the ground glass, which was thus made to occupy the position in which the negative would be in correct focus, and, this point having been found, the camera was fixed in that position, as no necessity existed for varying it.

The enlargements were made by artificial light, a couple of duplex paraffin lamps being used, the light reflected from a screen of white cardboard. The sensitive paper was pinned in position before lighting up, the box closed, and the negative holder covered with an opaque cloth, until the lamps and screen were in position, when the exposure was made by simply lifting the cloth for the necessary time.

With this simple contrivance every requirement was perfectly fulfilled, and, given a more suitable lens for enlarging, the same arrangement would answer equally well as a permanent enlarging camera where no other exists.

The size of the enlarged positives was whole-plate, a smooth-surfaced paper being selected. The development was effected with hydroquinone, as giving a blacker tone and one more easily matched in the deep shadows with Indian ink, and in the lighter shades with crayon and lead pencil respectively, according to the depth required.

Speaking of this part of the business, it would seem that the services of an artist would be indispensable; but, as we have already stated, the "artist" in this case was entirely untrained, and, as he himself described it, "could not draw a man's hat to save his life." But the work required is not, after all, of a very difficult description. It consists chiefly in strengthening or filling in weak or defective outlines, adding to the depth of weak shadows, or, it may be, lightening those which are too heavy. The last proves the most difficult, the mere tracing in of outlines with pencil or crayon requiring little skill beyond that represented by carefulness. Deepening the shadows was done sometimes with washes of Indian ink, but preferably with black crayon, and the reverse was effected by the simple process of rubbing down with "ink-eraser," assisted with white chalk.

The methods adopted were certainly crude and primitive, but the result showed what could be effected even by one whose artistic capabilities do not extend beyond the exercise of a little common sense. In the hands of a trained, or even partially trained, artist the results obtainable would be proportionately better, and, when the "game is worth the candle," the labour is not ill-spent.

When the enlarged positive has been completed, it should be examined critically to see that none of the additions exhibit too strong contrast, either in depth of colour or sharpness. It is not quite easy to judge at first by the eye alone, and the photographer will often show up defects in this respect that have not previously been detected. However they are easily modified when recognised, and only cost another quarter-plate. Particular care must be given to the direction of the light used in rephotographing the enlargement, owing to the different surfaces displayed by the various media employed; but, if this be seen to, and proper harmony exist between the additions, the reproduced negative will not be distinguishable from one taken direct.

There are many instances where it is impossible to otherwise reproduce a defective negative in which this process will prove useful.

Portrait Clubs and Agents.—In an evening contemporary that devotes a column to "Notes and Queries," one of its correspondents says he joined a portrait club, and paid the amount (12*s.* 6*d.*) by weekly instalments of one shilling, completing the payments in

July, 1890. He now complains that he can get neither his portrait nor the money back, the photographers telling him that he must settle it with the agent, while the latter keeps putting him off. He wants to know how to act. Is this kind of thing at all common in portrait clubs? We have certainly heard of such cases before. It is this sort of thing that has tended, during the past few years, to lower the status of photography in the eyes of the public.

Popularising Art.—If one thing more than another conduces to popularise art among the masses, it is the bringing it before them in a recreative form. Just now, at one of the London Theatres of Varieties, a most attractive feature of the entertainment is a series of "Tableaux Vivants" depicting pictures by well-known artists. The works selected for the purpose are principally those with which the public have become so familiar through the photographs of them to be seen in the shop windows and in their own collections of "scrap' pictures. Seeing the favour with which these depictions of modern works of art are received, one cannot help surmising that, if lantern slides of the same subjects and of the same excellence were obtainable, they would command a ready sale, and would be extensively utilised in lantern entertainments. One reason why they are not in the market probably is, that on the Continent, where the larger proportion of these fine reproductions are made, the lantern has not obtained the same status and popularity that it has here. Amateur photography has mainly made the lantern what it is here, and amateur photography is not so much practised abroad as it is at home. "So much the better," remarks a professional friend.

Chromo-photography and Fugitive Pigments.—The specimen presentation prints of some of the illustrated papers, with their Christmas numbers, that are being shown at strongly lighted railway book stalls and in shop windows, again call prominently to mind, what we have before alluded to, that fugitive pigments are still frequently employed in the printing. In order to get effects that will please the general public, brilliant colours have to be introduced, and it so happens that those which are most suitable, on account of price and facility in working, are of an evanescent character when exposed to a strong light. Hence the marked change that some of these prints have undergone during the short time they have been exhibited. Just now a great deal of attention is being given to chromo-photography, in which transparent colours are necessary, and it is to be hoped that their permanency will receive consideration We are quite aware that it is much easier and less costly to make one or two of the tints required with fugitive pigments than with permanent ones. But that should not weigh with a new process, particularly when it is likely to prove of real commercial value.

Defective Colour Vision.—The annual report of the Marine Department, Board of Trade, on Examination in Colours for the year ended May 31, 1893, has just been issued. It shows that, although the number presenting themselves for examination for master and mates' certificates was less than last year, the number rejected for their inability to distinguish colours was greater. Pink, green, bottle-green, and drab seem to have been the most difficult for the candidates. With the cards, drab was in twenty-seven cases, out of the thirty-five persons rejected, mistaken for green, and seventeen mistook pink for green also. For some time past dissatisfaction has been expressed as to the system of testing, and in the report for last year it was mentioned that the Board of Trade had under consideration the important recommendations contained in the report of the Committee of the Royal Society on Colour Vision. This year it is announced that the Board have the matter still under consideration, and will establish "an entirely new system of examination as soon as the necessary arrangements can be completed." Defective colour vision is not unknown amongst photographers, and some suffer from it without being aware of the fact. This may account for the circumstance that some people cannot possibly tone a batch of prints all to the same colour.

Residues.—At the time when silver was nearly double the price it is now, and residues contained twice as much, or more, of the precious metals than they do at the present time photographers took very little heed of their wastes. They sent them to the refiner at odd times and were generally content with the return made. Now the residues—probably the depression in trade has something to do with it—are considered an important item, notwithstanding the depreciation in the value of silver and the fact that, however carefully collected, they cannot possibly be anything like half as rich in silver as they were when the paper was sensitised at home on strong solutions. In anticipation of the annual Christmas collection, we have already had several inquiries from correspondents as to the proportionate amount they ought to expect from the residues of gelatino-chloride printing-out paper as compared with those from albumen paper; some evidently expecting more. Now, it is quite impossible to answer such a question, inasmuch as the different gelatine papers in the market do not all contain the same amount of silver and neither do albumen papers. The only way to arrive at the correct value of the wastes is to burn the papers, and dry the other residues, then reduce the whole to a fine powder and pass through a coarse sieve. It can then be easily assayed, or, if sent to a respectable refiner, its full value may be ensured. No correct or even a rough estimate of the value of residues can be formed when they are sent away in the state they frequently are, and an unscrupulous refiner would be aware of that fact.

IS CELLULOID TRUSTWORTHY?

In your leading article two weeks ago you dealt with the question as to whether celluloid must necessarily deteriorate, and apparently come to the conclusion that it does not. But I think we may go further, and assert that, so far from deteriorating, it actually improves with age, and that Messrs. Guiterman's cry of alarm deals with a purely imaginary danger.

You point out in your article that pyroxyline naturally gives off nitrous fumes, more especially if confined in air-tight vessels—stoppered bottles, for instance—in which case, in the course of a few months, it will entirely alter its character, and eventually arrive at a semi-plastic condition, but I have never known it show any signs of "spontaneous combustion." If kept loosely in paper, the vapours escape as they are formed, and, though the wrapping-paper may be rotted, the pyroxyline itself does not appear to undergo any change.

That is the case with pyroxyline in the "raw" state; but what about collodion films—that is to say, pyroxyline after it has been dissolved and dried? It does not seem that the tendency to acidity is nearly as great under those circumstances, if, indeed, it exist at all at ordinary temperatures. No evidence exists, that I am aware of, that our negative films give off any acid emanations, nor, in the case of collodionised prints, are we accustomed to expect any such behaviour. A film of collodion, spread upon the surface of an albumen print, is supposed to add to its permanency; but surely, if that collodion film was constantly giving off dangerous nitrous fumes, the reverse would be the case.

But a very remarkable instance came under my notice a few weeks' ago of the permanency of thin collodion films, and, now that the question has arisen, an apparent proof of the absence of any evolution of nitrous fumes. I found accidentally, between the pages of a book, where it had lain since very shortly after the publication of the specification in 1864, a piece of carbon "tissue," made according to Swan's original process, and consisting, as some at least of my readers are aware, of a film of pigmented gelatine, supported on one of collodion.

Now, although that morsel of tissue has been for nine-and-twenty years pressed closely in contact with the pages of that book, there is not the slightest symptom of any rotting action, such as occurs when raw pyroxyline remains for any length of time in contact with paper. I have purposely turned up the page to re-examine; but, beyond a faint stain of bichromate, the paper is quite unchanged.

I forget the precise details of the mode of preparation of that tissue, whether, in fact, the collodion film was washed previous to

applying the gelatine, or simply dried, but I rather think the former, in which case the pyroxyline might be supposed to be left in a purer condition than before solution; still that provides no reason for any diminution in the tendency to decomposition, unless we imagine, as some of the early experimentalists into the composition of gun-cotton have done, that in the process of solution, to form collodion, and more particularly in washing or precipitation, it forms compounds, notably a hydrate, that are more stable than the original substance itself.

In another instance I shall mention there is every reason to believe that some such change, accompanied by a decided diminution in the tendency to give off acid, does occur. In 1877 the French Photographic Society awarded a prize to M. Chardon for a washed collodion emulsion process, one of the principal points in connexion with which was the employment of pyroxyline that had been already converted into collodion and reprecipitated with water. This precipitated "cotton" was of two kinds, called by M. Chardon "pulverulent" and "resistant" respectively, the one being thrown down with hot, the other with cold, water, and both presenting the appearance of fine flocks or coarse powder, and resembling, except in feel, pure tapioca.

For many years I had, amongst other samples of pyroxyline and papyroxyline, several packets of these precipitated products, some of my own preparation and two forwarded to me from Paris. The peculiarity I wish to notice is that when, some four or five years ago, I came to overhaul these old specimens, the only ones that did not necessitate repacking, owing to the rotting of the wrapping-papers, were those that had been precipitated, and which might, therefore, be presumed to have undergone a change.

On the other hand, I have often noticed in connexion with collodion pellicle in the dry state—that is to say, the mixture of pyroxyline and bromide of silver freed from soluble matter by washing—not only strong evidence of corrosive action, but also a palpable smell which might be bromine or nitrous acid, or both, showing that in this instance washing does not remove the tendency to change; nor, indeed, does it in the case of dry-collodion films when spread upon glass, as is shown by the gradual destruction of the undeveloped image by time. To counteract this, Mr. Warnerke proposed to impregnate the film with an alkali in order to neutralise the acid given off.

What is true of collodion films seems to be equally so of celluloid, for, so far as I can see in connexion with any samples that I have had access to, whether in the shape of films or the more solid form, there appears to be no appreciable acidity. The experiment with the hot iron quoted by Messrs. Guiterman & Co. serves only to demonstrate some slight difference between two samples of different manufacture, but has no practical importance, since, as a matter of fact, we do not habitually heat our negatives to 240° or 250° Fahr., and it is open to very serious question whether such treatment is equivalent to an "anticipation of the action of time."

I have not tried the experiment with blue blotting-paper, either at the normal or higher temperature, but I have in my possession negatives taken on some of the earliest celluloid films sent out four or five years ago, as well as samples of the uncoated films. These have all been kept, with the exception of a few cut stripe which have been loose in a box between the leaves of a book; but there is yet no symptom of any acid reaction, and, if the films will keep perfectly for that period, they are as likely as not to keep indefinitely.

I suggested at the outset of this article that celluloid films most probably improve with age, and I base this supposition partly on the fact that, whereas when these samples first came into my hands they were freely soluble in methylated spirit at the ordinary temperature, they are now insoluble even when heated. This is equally the case with the portions that have been kept loose and those preserved in a book, but the former have entirely lost their original odour of camphor, and the latter nearly so, so that, as the camphor volatilises with time, the celluloid actually becomes more permanent.

It is, perhaps, not straining a point too far to suppose that a similar result would accrue from the gradual evolution of nitrous acid, for, as is well known, gun-cotton in any form loses its solubility as it becomes de-nitrated, and, consequently, in the form of a film less liable to injury. That the presence of acid in excess is not a desirable adjunct is quite true, but that it is so serious a danger as Messrs Guiterman would have us believe I cannot think. In the free state it is easily dealt with, while that held in combination is given off so gradually, that if the films be properly stored it need cause no trouble or uneasiness. The very process of development, in fact, tends to aid in the de-nitration, and, judging from the action of alkalis upon pyroxyline and collodion, I do not imagine it would be difficult to eliminate the last traces of acid, and render the films quite insoluble if so desired.

In conclusion, if my most valuable negatives were on celluloid instead of glass, I should stand in no further doubt of their permanency than I do at present.

W. B. Bolton.

JOTTINGS.

There should be "cakes and ale" in York-street just now, for I see that the 1894 Almanac has reached the prodigious size of 1336 pages. My best congratulations to Editor and publishers. Apart from its great value to all connected with photography, in either a commercial or a manipulative sense, I can conceive that the Almanac may have other uses just as interesting, if scarcely so peaceful. "Bill, who's that bloke?" "Stranger." "Then heave (half) a brick at him." The Almanac would form a capital substitute for the Black Countryman's missile of endearment.

Mention of the Almanac reminds me that I have attained the overpowering honour of being "named" in its pages. I am accused of unfair criticism. Here are the circumstances. On August 18 last I remarked, *àpropos* of the Photographic Convention, the Photographic Congress, the Camera Club Conference, &c., and the diffuseness and verbosity of individuals studying photography in its scientific aspects, that there was too much "talkee-talkee" in photography. Four months afterwards Mr. Snowden Ward publishes in the Almanac (at page 655) an account of an International Bureau of Photography, of which he is chairman, and of the existence of which I was ignorant until reading his article. In the course of this he says: "We want all the helpful criticism and all the suggestions possible, but we protest against the unfair criticism that is found, in one of its mild forms, in the recent writings of 'Cosmos.' He condemns us for talking and not working." I invite Mr. Ward to explain how, on August 18, I could unfairly criticise and condemn a scheme which, so far as I knew or cared, was not then in existence.

Mr. Ward's article, like most of Mr. Ward's writings, is well worth reading, if only on account of the refreshing optimism pervading it. In the last regard he is an object of my sincerest envy. I am myself an incurable pessimist, and therefore, am constitutionally unable to look upon men and things through rose-tinted spectacles. It is not my fault; I was born like it. The objects of the International Bureau are (1) "To secure the official recognition of photography by the governments, local as well as central, of all civilised nations." If official recognition of photography by the Government will better the lot of the individual photographer, and ensure plenty of auriferous deposit in his Button Park, I extend my benediction to Object I; but I fail to see how it will. Object 2 "is to secure the establishment of national depositories for the receptions and care of photographs, and especially negatives, of literary, historical, or scientific value," and I hope it may, but shall be agreeably surprised if it does. Object 3 "is to establish an International Bureau for the exchange of prints and other reproductions of negatives in the national depositories, and to enable colleges, museums, and students to obtain photographic records from every land," which is a charming dream, and in all probability will never crystallise into a solid reality. There is no harm in sighing for the millennium; but some of us, even at the risk of being scolded for not joining in the chorus, may reasonably be allowed to doubt whether such a thing will ever take place while human nature remains what it is.

The battle of the printing papers is waging with apparently as much vigour as in the old days when platinum *versus* bromide was the

question of the hour. I observe that two matt-surface print-out papers and a print-out platinum paper are on the point of introduction. With these and developed platinum bromide, carbon, albumen, and the new school of rough surfaces, there is something to suit all tastes and styles. The more tastes and the more styles there are the better, say I. They certainly relieve positive printing of the danger of monotony, at any rate.

Some plain truths were uttered at the meeting of the National Association of Professional Photographers on November 10, and reported at page 738. The profession is admittedly in a bad way, but the fault, as was pointed out, rests chiefly with photographers themselves. Mr. T. Birtles, of Warrington, hit the right nail on the head with plain common-sense directness seldom encountered at meetings of this sort. "It had been said" (he remarked) "that the public undervalued photographers' work. Well, he thought the public took them at their own prices, and if photographers sold work at low prices they had only themselves to blame." True for you, brother Birtles; would that there were more of your stamp in the profession. Upon my word, professional photography would appear to be a last refuge for men whose business capacity is of the very lowest order. At the meeting in question photographers were urged to take up process work as a means of improving business. I echo the advice. The fact is, at the present moment there is a large amount of photographic work of many kinds being done all over the country by people who are not photographers, and the profession, as a whole, is at the loss. The more's the pity.

Friends, Rum'uns, Countrymen, and Brothers, A Merry Christmas to you all. To those of you who are professionals I will also say, May your shadows never grow less. You know the kind of shadows I mean, of course. To those of you who are amateurs, I say, Go forth and multiply. To all those in photography whom it may concern, I wish whatever they may wish themselves! [N.B. Please pack all hampers carefully, address them legibly, and prepay carriage.]

COSMOS.

THE LUMIÈRE-LIPPMANN COLOUR PHOTOGRAPHY.

[Photographic Society of Philadelphia.]

IN the spring of 1882 there were exhibited in the Photographic Exhibition in the Champs de Mars, in Paris, photographs by the Lippmann process of a parrot, a branch of holly, pieces of coloured glass, &c., which Alphonse Berget and others declared were true reproductions of the colours of the objects. I could see in these photographs only the colours of thin films, metallic and changeable as such colours usually are, and, in some instances, not even confined to the coloured objects themselves, but spreading over objects that were uncoloured in the original. These pictures were also devoid of either whites or blacks, the high lights of the objects being rendered more like black than the shadows. Others, notably Mr. Cameron Swan, who wrote a letter on the subject to the *Times*, noticed the same defects in these photographs, and Captain Abney, who had experimented with the process, found that, by varying the time of exposure, he was able to make a blue photograph with red light, and *vice versâ*, and coloured photographs with white light. It was generally admitted that the results obtained by Professor Lippmann did not sustain the claims made for the process, and when it was announced this year that the brothers Lumière had succeeded in so far improving upon Lippmann's method as to obtain really satisfactory colour photographs of natural landscapes, people who had seen the photographs for which such extravagant and inaccurate claims were made a year before were naturally, and very justly, sceptical.

Now, however, the Lumière photographs have been shown in public in London, and, although there is still a certain amount of mystery surrounding them, it is possible to form a truer estimate of their character and importance, and to make an intelligent comparison with another and more successful method, based upon quite different scientific principles.

The Lumière photographs are about three inches square, and by light reflected from their surface at most angles they have much the same appearance as the French albumen process lantern positives, the high lights of the picture looking like clear glass, and the shadows having the appearance of an albumen or gelatine film filled up with a dense, dark-coloured deposit of silver. It is said that by transparency they are negative images, but those shown are sealed up so that they cannot be examined by transmitted light.

Unlike Lippmann's photographs, these examples show colour only when the light is reflected from the surface at one particular angle, and for that reason the colours are not "changeable." This in itself is really a very important improvement, although it carries us farther away from, instead of nearer to, the popularly desired conditions in colour photography. It is, indeed, a significant fact that real and undoubted improvement intensifies instead of lessening a characteristic defect of the original Lippmann photographs, which some writers have not hesitated to say would "undoubtedly" be overcome—namely, the inability to see the colours at all angles.

If the pictures were uncovered the critical angle would, undoubtedly, be perpendicular to the surface of the plate, but it would then be necessary to provide some means for illumination and vision in precisely the same direction. It is also necessary that the source of light be large enough to illuminate the entire surface of the photograph equally with parallel rays, and it should be seen by parallel rays coming from it. A rough approximation to these conditions is secured by covering the picture with a shallow prism, and then examining it by the reflected light of a sufficient expanse of even white or grey sky, holding the picture at nearly arm's length from the eye. More satisfactory results could doubtless be obtained by means of a special device, which could be used like the stereoscope or the photo-chromoscope. It would be quite easy in this way to exactly fulfil the theoretical requirements for illumination and vision, and, at the same time, to magnify the picture, which must now be made to occupy only a very small angle of vision in order to be seen all at once.

The pictures are also projected upon a screen by means of the megascope or aphengescope lantern, and, in the absence of a special device for examining them by daylight, this is the only really satisfactory way of seeing them. It is, however, necessary to employ a powerful electric arc light in order to project them with satisfactory brilliancy up to even two feet diameter, as compared with ten feet, or twenty-five times greater area, for the photo-chromoscope pictures with the same light.

Seven pictures were shown at the Photographic Congress and at the Camera Club; four landscapes, two portraits with accessories, and one reproduction of a chromo-lithograph—a rather poor result, the original of which was not shown. Unlike Lippmann's photographs, they rendered the deepest shadows black and the high lights white, and showed many delicate shades of colour, which impressed the spectators as being something more than the ordinary colours of thin films. One of the landscapes was beautiful, although the foliage appeared to be that of autumn, while it was understood that the photograph had been made in early summer. In parts of some the chlorophyll green was fairly well represented, but in others, where autumn foliage was not suggested, the green was raw and metallic. The red of a tile roof looked dull and faded, the blues of the skies were criticised by some of the spectators, and the flesh in the portraits had an unnatural purplish hue; but, in my opinion, these defects are only such as one ought to expect from the manner in which the process was carried out, even assuming that it be really capable of making accurate colour reproductions if carried out in a thoroughly rational manner. From a theoretical point of view (and it follows, from a practical point of view), it is not reasonable to expect that a mixed colour like chlorophyll green will be accurately reproduced on a plate not sensitive into the red of the spectrum below the first absorption band of chlorophyll, or which is disproportionately sensitive to that red as compared to the sensitiveness to green. In the first place, the green rays only would act in producing the picture, resulting in a raw, metallic colour, and, in the other case, the red rays would act too much or the green too little, and result in a brown or red hue suggestive of autumn tints. Flesh colour, if the plate is disproportionately sensitive to blue, and not sufficiently corrected by yellow screen, must take on a purplish hue; or, if over corrected by yellow screen, a yellow hue must result. It follows that the plates must not only be sensitive to all colours, but the sensitiveness must be properly distributed along the spectrum, or, what amounts to the same thing, must be modified by the use of a quantitatively selective colour screen made up and adjusted by experiment in photographing the spectrum itself, just as I have for years made selective colour screens for carrying out the photo-chromoscope process and for orthochromatic photography, until the spectrum photographs correspond to the spectrum itself in the relative visual intensity of the different colours. Until this is done, it is not reasonable to expect that delicate shades of compound colours will be accurately reproduced by any process. It would appear from this that by no evident possibility can this method ever possess any advantage over

the photo-chromoscope process in the matter of accuracy, because in both cases it depends (admitting every possibility for the Lumière-Lippmann process) upon the relation of sensitive plates and colour screens, which must be regulated in the same way for both processes.

One of the most remarkable things about this Lumière process is its rendering of blacks and whites. According to Lippmann's theory, the blacks would be rendered by clear glass, and the whites by a film filled up with laminæ of deposit which would reflect light of every wave-length. In short, the greatest amount of deposit and opacity would be in the whites, and the smallest amount in the blacks of the picture, as in an ordinary photographic negative. I have already observed that the Lumière photographs, when seen by ordinary reflection, resemble a positive instead of a negative. It is further remarkable that the greatest amount of light reflected from these photographs comes from the parts which look like clear glass, and that even this amount, which makes the whites of the picture, is only equal to the reflection from a black glass, or the surface of the gelatine film itself. The shadows appear black, not because there is no deposit there (in which case the deepest shadows of the picture would be as "white" as the high lights in the examples shown), but because the glass is obscured by a deposit so thick and matt that it scatters the light striking upon it, instead of reflecting it straight back at the critical angle. In other words, we appear to have a positive where we are told that there is a negative; if this be true, is the positive the result of a "reversal" of the image by the long exposure; and, if so, is this reversal one of the conditions of success?

Does not this image, built up by photographic action upon the sensitive plate, act by a process of subtraction from the white light, which would otherwise be reflected from all parts of its surface alike, instead of by reflection from internal laminæ in the manner assumed by Lippmann?

Lippmann's theory, as I understand it, calls for a different series of lamiuæ within the film for every wave-length of light, amounting, where white light acts, to over 30,000 laminæ in a film no thicker than a single wave-length of red light! Would not such a series of laminæ in a film reflect a great deal of light instead of adding nothing whatever to the normal reflection from its surface, which is all we appear to have in the examples shown? Cannot every colour actually shown in the Lumière photographs be reproduced by means of a single interference film of varying thickness, backed up or broken by a granular deposit of varying density? Have we anything more than this in the Lumière photographs?

It seems reasonable to suppose that the long exposure given to these pictures would produce a reversal of the image. The dense deposit in the shadows might result from the action of scattered light in the camera, or to preliminary exposure, or to the use of a too active developer, or to any or all of these causes combined. May we not be given an opportunity to learn the truth, in order either to prove Lippmann's theory, or to formulate a new and more rational one?

At first glance it might appear that an examination of the Lumière photographs by transmitted light, might yield an answer to all of my questions, by showing that the image is really a negative one; but it is not even necessary, in order to explain the "whites" of these pictures, to assume that the image is positive throughout, but only that there is a superficial reversal, just sufficient to prevent the production, in development, of a deposit superficial enough to obscure the normal surface reflection of the gelatine film.

I have some hesitation in putting forth views which a more thorough examination of the Lumière photographs might lead me to modify; but since such examination is forbidden, I can only hope that the questions which I raise may help to bring about such a thorough investigation of the subject as its importance demands.

In conclusion, it is worthy of note that the Lumière-Lippmann process, whatever its capabilities as to accuracy may prove to be, when it is carried out according to theoretical requirements, is necessarily subject to limitations similar to, and in some respects greater, than the already successful photo-chromoscope process, which is carried out with commercial sensitive plates and ordinary development. Knowledge of this fact, which cannot be gainsaid, will doubtless lead many people to take an active interest in the friendly rivalry which promises to attend the further development and application of the two methods.

F. E. Ives.

THE SPEED OF PLATES: A CRITICISM AND A REPLY.*

He then proceeds to fall foul of the "law of error" formula, and here it would seem that Dr. Hurter misses the whole point and use of an approximate formula. It is claimed for the law of error formula that it gives an expression which fits the curve actually drawn from measurements on the plate, through that range of transparencies which is of use to the photographer. Dr. Hurter complains that, plotted according to his method, the law of error formula gives a parabola. This is certainly no valid objection, for can a parabola or a straight line be drawn through the greater number of fixed points? If, as is acknowledged, the parabola, is it not true that a parabola can be made to fit closer to a given curve than a straight line? Dr. Hurter's straight line gives a point in the diagram which, according to him, fixes the speed of a plate. Abney's parabola also gives a point (its vertex) which depends solely on the plate and its treatment, and may be made just as well as, and probably better than, any other to represent the speed of the plate. It has already been shown that Abney's curve deduces the number representing the speed from a practically useful set of exposures, while Hurter & Driffield's does not. It is only necessary to draw the curves to see that Abney's calculated curve fits that drawn from observation far closer than Hurter & Driffield's. In fact, this is shown in the diagram produced by Dr. Hurter at the discussion of Abney's paper, although the case is an unfavourable one for the latter author's method.

Having once started, however, on the discussion of Dr. Hurter's arguments in reply to Abney's paper, one could go on refuting them almost to eternity. No one would accuse the doctor of intentional unfairness, yet many of his arguments are unfair in the extreme, For example, in one place he asserts that, it being allowed that, plotted in a certain way, the law of error gives rise to a parabola. Captain Abney proceeds to prove that this curve does not differ much, from a straight line. Surely no unbiassed person would deduce this from Abney's paper. What he does in effect say is, that, as plotted by his method, the curve of transparencies has a point of inflexion, and it is known to every tyro in mathematics that in the neighbourhood of a point of inflexion a curve does not differ appreciably from a straight line.

There is no need to discuss Dr. Hurter's demonstration of the conditions of photographic truth. These may be discovered more easily without the use of any elaborate functional equation. It may, however, be noted in passing that, unless the printer has maligned him, Dr. Hurter's solution of the functional equation is, to say the least, incomplete. Besides, it has been pointed out above that Dr. Hurter's own method of speed determination is far less in accord with the conditions for photographic truth, as laid down by him, than the law of error formula. It is necessary to point out that the equation for density thus derived is not in accordance with the equation called "the approximate equation" in the paper entitled *Photo-chemical Investigations*. There is a factor required, which is of importance, since the equation is a logarithmic one.

It would be too wearisome to hunt down the whole of the errors and confusions in Dr. Hurter's criticism to the bitter end. He looks on Abney's method with a jaundiced eye, and is consequently unable to see any good in it. One great point in the method is that the measurement of speed depends solely on observation, and not on any assumption of the law of error or any other law, though the full interpretation of the number obtained, no doubt, requires such an assumption. Yet Dr. Hurter says, "We, therefore, depend entirely upon the law of error. If that be true, the rapidity by means of it may be true also. If it be false, the rapidity may be erroneous." Surely this is prejudice pure and simple!

Dr. Hurter does not in the least seem to realise what is meant by "determination of speed." As has already been shown, a rough number only can be assigned, and this cannot be an absolute quantity, since it depends on the unit of speed chosen. All that can be done is to roughly decide the relative speed of two plates. We have no absolute unit of photographic speed to work in, but we can easily say that a rapid dry plate is about thirty times as fast as a certain wet plate. It is as if we had no measure of length. Then we should be unable to say that A could walk four miles an hour, because there would be no miles; but there would be no difficulty in deciding that B could run just twice as fast as A could walk.

It appears from his criticism that Dr. Hurter thinks that both his number and Abney's are numbers representing the speed of a plate in absolute units, and he gives much trouble to the task of showing that the numbers obtained by the two methods are so different that Abney's method makes a certain plate out eleven times as fast as Hurter & Driffield's. All this is, of course, a pure misconception. All that the law of error does is to give a method of roughly comparing the speed of two plates under similar circumstances, and all that Hurter & Driffield's method does is exactly the same thing, with the difference that the quantities compared do not necessarily in the least represent the speed of the plate as used in practice.

There is yet another fact, however, which has a serious bearing

* Concluded from page 787.

upon all the work that has been done in the matter of speed determination. In a paper presented to the Royal Society in the early part of the present year, Capt. Abney proved that the assumption hitherto made by all photographers, himself among the number, was untrue, viz., the assumption that the effective exposure was proportional to the intensity of the light multiplied by the time of exposure. If this were true, we should find that, if two patches on a plate were exposed, one at 1 foot from a candle for $\frac{1}{10}$ of a second, and one at 10 feet from the same candle for 10 seconds, they would be indistinguishable on development. This, however, is very far from being the case, and this discovery seriously affects the accuracy of all Hurter & Driffield's work, since they made their exposures by means of a standard candle, the distance of which from the plate was varied as well as the time of exposure. The discovery no doubt affects Abney's measurements and those of the writer. But, so far as those made by means of a Spurge's sensitometer are concerned—that is to say, by varying the brightness of the light from point to point of the plate, but keeping time of exposure the same for every point—they are at least comparable among themselves. The number of varying factors in the problem is certainly reduced by one so far as each plate is concerned. It is true that, at p. 9 of *Photo-chemical Investigations*, Hurter & Driffield say that they have satisfied themselves that an exposure of $\frac{1}{4}$-candle meter for 40 seconds produces the same effect as 1-candle meter for 10 seconds. But it is apparent from this that the experiments with which they were satisfied must have been quite untrustworthy, as the most casual glance at Abney's paper in the *Proceedings of the Royal Society* will show, for it is shown there that, by an experiment of the simplest nature, it is easy to prove that this is not the case. It is, perhaps, a fair argument from this that, if these authors were so readily satisfied in one case, they were probably equally easily deceived in others, and there is considerable doubt thrown on their whole series of experiments by this consideration.

To sum up, let us now review and try to assign its true position to Hurter & Driffield's work. All must admire their energy, ingenuity, and perseverance, and, in fact, their whole work, viewed as a "serious attempt" to solve the vexed question of the rapidity of plates. But they certainly cannot be credited with any real progress. No sooner was their paper published than Captain Abney, than whom there is no higher authority on the subject, pointed out, and proved to demonstration, that their method of measurement was wrong in principle, and was affected by a considerable systematic error, viz., that it could take no proper account of the large proportion of light scattered by the deposit on a negative. It now appears that they themselves have retired from the position they took up in their paper, that "ratio of gradation," and therefore also "rapidity," is independent of the developer. At least this seems to be the fair interpretation of the second paragraph in the preface to the reprint of their *Photo-chemical Investigations*, published by Messrs. Cadett & Neall, in their *Dry Plates* for June, 1893.. Here they acknowledge that "extreme modifications in the developer" may bring about some alteration in density ratios, but go on to say that this fact is of no practical use, and all photographers should "scrupulously avoid" taking advantage of it; in fact, that no one ought to use anything but a ferrous-oxalate developer! This strongly reminds one of Du Maurier's Professor of Music, in *Punch*—"You have a pleasing voice, my young friend, but you do not use it in a legitimate way." "Perhaps, if I did, it would no longer please." "Ah, what does that matter? You should always produce your voice in a legitimate way, whether it pleases or not." Anyhow, whether they have reconsidered this matter or not, it has again and again been shown that, especially with the new developers, modification in the development may produce great modifications in the resulting negative. In fact, the writer has some plates which show that visible reversal may be produced or not at pleasure on similar and similarly exposed plates by varying the development.

In the original paper the main formula, which purported to be deduced from theoretical considerations, was abandoned in favour of an approximate empirical formula, and one object of the present paper has been to show that even this approximate formula, and the whole method of speed determination, of which it is the groundwork, is based on a misconception, and is practically useless, as it applies to a portion of the plate; that is to say, some of the highest lights of the negative, that is not, as a rule, utilised by the photographer. In fact, it may be said that Messrs. Hurter & Driffield's paper is a monument of painstaking, but misapplied, ingenuity.

H. M. ELDER.

"MATT P.O.P."

It is curious to note that the growth in favour of gelatino-chloride paper for printing-out purposes, which has been such a marked characteristic of photographic progress during the last two years or so, has, for a considerable time, been linked with an increasing taste for matt-surface effects. At the first glance, this statement may appear slightly contradictory, since the manifest advantages of gelatine paper are, in a measure, discounted by stripping the prints from a granulated surface. Public taste, however, appears to have decided that a great many subjects suffer no technical loss while acquiring an augmented artistic effect by a suppression of the glacé surface of the paper, so that the "matting" of gelatine prints has become very general. Such a fact was bound to arrest the attention of the manufacturers, and thus, as we briefly announced last week, the Britannia Works Company have introduced a printing-out paper which has a matt surface *per se*, and consequently, at one stroke, relieves the photographer of an operation which was not always assured of success, even when carefully performed.

At this time of the year photographic printing by sunlight is fraught with much difficulty; hence, last week, we were only able, as the result of a compulsorily slight practical acquaintance with the paper, to outline its leading points. Since then, we have had further opportunities of printing with it, and this, coupled with the interest always attaching to the latest printing surface, justifies us in returning to the subject. The paper support, which we understand has been specially prepared, is a very light one, having a smooth surface. The quantity of gelatine upon it is apparently small and the sensitive coating being without gloss, even in the light, until the silver commences to discolour, "which side is which" is not obvious. We are inclined to think the paper extremely rapid, as, in a poor light, we found some fairly dense negatives fully printed in about half an hour. The colour of the prints as they leave the frame is a peculiarly agreeable dark purple—quite unlike anything of the kind obtained with other papers. The surface of the paper is homogeneous, so that the fine details of the image are preserved, while the gradations in the negative are well rendered.

We may with advantage here quote the essential points of the makers' instructions for the use of the paper. They recommend printing to be done in the shade, unless the negatives are specially strong in contrast. The image loses little depth in toning, &c. The prints should be washed in several changes of water for fifteen minutes. Separate toning and fixing are recommended, the bath for the former being the sulphocyanide one. The prints dry darker and colder in tone than they appear when wet. For warm brown tones, the bath should be diluted. After toning five minutes washing in several changes is advised, and two hours in running water, or many changes, after fixing.

Our own experiments were made with a combined bath. With this we found it necessary to print considerably darker than the ultimate print was desired to be. Toning took place readily, and by arresting or prolonging the action we were enabled to obtain a range varying from warm brown to deep purple black. While wet the prints appear like ordinary gelatine prints, but when dry the resemblance disappears. Their lack of surface renders such a degree of care in subsequent handling, mounting, &c., as is the case with the highly surfaced prints, needless.

The results yielded by the new paper are not only artistically pleasing, but, looked at from the purely technical point of view, the fineness of detail, softness, fidelity of gradation throughout, especially in the half-tones, and all freedom from "double colour" should render Matt P.O.P. a great favourite. Above all, it is a simple paper to work, and, as it is capable of giving the most charming effects in the way of tones, it should do much to keep silver printing popular among all classes of photographers.

Mr. Howson last week showed us a selection of prints from negatives by Frank Sutcliffe, Crooke, Hodges and other clever photographers on the paper, and it was impossible to be otherwise than delighted with them.

PHOTO-ZINCO IN HALF-TONE.

[London and Provincial Photographic Association.]

NEARLY all beginners at photographic process work commence by making their negatives on dry plates, and, although I have at various times, whilst not exactly advocating their use, certainly encouraged it, now having learnt wisdom from experience, I cannot find compensating advantage accruing from their use. The chief argument in favour of dry plates put forward by most, is the old one of the fickleness of the silver bath; that, I take it, is a notion left over from the time when the wet-collodion process was in general use, and when it was so necessary, in order to obtain the utmost sensitiveness, to work the bath in such condition that even a variation of temperature would cause fog. For photo-zinco this is all changed, a large amount of acid being requisite to ensure clearness of lines

gives the desired stability to the bath, and consequently freedom from fog and uncertainty.

This being so it is possible to make three negatives finished and ready for printing in less time than one dry-plate negative can be done, so the sooner experimentalists abandon dry plates and try the wet process the better for results, certainty, and economy.

The grained screen.—This is a very important piece of apparatus, and I have here, by favour of Messrs. Penrose, four specimens of Levy's ruled screen, and from Percy Lund & Co. a specimen of Wolfe's reproduced screen; as far as results go, each is as good as the other, although some operators insist that the Levy is best, and others, again, that Wolfe's is; so for my own part I would say, if you have either you can go confidently to work and laugh at any one who says the other (*i.e.*, the one you have *not* got) is the best.

From the thickness of the screens it is obvious that some provision must be made in the dark slide for them; in all dark slides now made for the work this is managed by making the dark slide extra thick, leaving a space of from three-eighths to five-eighths in front of the sensitive plate and behind sliding shutter, and in this recess placing a carrier to hold the screen.

Printing on the Zinc.—The next step to take will be to make a print on the zinc, this being usually done either in bichromated albumen or in bitumen, the albumen process requiring a less exposure to light than the bitumen; but it has the drawback in requiring rolling up with ink before etching, and this is an operation requiring very great skill and care; this can, to some extent, be got over by dusting over with resin and warming the plate, which gives a resist as hard as bitumen.

Bitumen is best dissolved in chloroform, and the zinc plate sent round will show you just about the proper thickness the film of bitumen must be, if at all thicker there will be a difficulty in getting sufficient exposure to penetrate the film to the metal, hence it will float away under the turpentine used for development.

Specimens of straight polished zinc as used for line work, and of round polished zinc as necessary for half-tone prints, are sent round for comparison.

I have also here specimens of the rollers used, viz., a nap roller and a glazed one; the nap roller is the ordinary lithographic roller, the grain of the leather being outside; the preparation of such a roller is very important, as, unless it is properly done, the roller will be useless; a roller in the condition now shown you (*i.e.*, quite new) is worth 15*s.*, but if it was in really good working order would be cheap at 25*s.*

This roller is a glazed one, and is used to ink up the surface of the plate, only, as you see, the surface being hard and smooth.

Etching a half-tone block requires great skill and care, and calls for ability to use the brush in order to get the best effects, and unskilful use of the brush will quickly spoil what would otherwise be a good block.

The use of albumen and bitumen for printing on the zinc is now threatened with supersession, a process called Enameline—of which I now pass round a specimen—bidding fair to be better adapted than either for the purpose.

The process is a secret one (being of American origin), so I cannot presume to even make a guess at it, but I will pass round another specimen done by a process of my own, which has a very similar appearance to the other, and is done with a mixture of isinglass, white of egg, and bichromate.

The process is in itself very simple; a zinc plate grained in a weak bath of nitric acid is coated and whirled, then dried, exposed to light under the negative for from three to five tints of a Johnson actinometer; on removal, the image can be seen quite bright; it is next immersed in cold water to remove the bichromate and unaltered albumen, and dried. It is now carefully examined under a powerful glass, and if the whole of the grain can be seen sharp and without any rottenness in any part, the plate is ready for burning in, an operation done on a hot plate or in a Bunsen flame; here the image gradually develops until a beautiful blue black is attained, when it is ready for the etching bath without any rolling up of any kind, and, when the etching is complete, the plate is mounted and printed from with the enamel image on it intact. This method is only used for half-tone blocks, as the ordinary albumen process gives all that is necessary for line work.

W. T. Wilkinson.

MANIPULATIONS OF THE OPTICAL LANTERN.

[North London Photographic Society.]

In the paper which I am about to read I have no intention of going into lantern manipulation in general, but propose only to deal with the single lantern and blow-through jet, describing the manner of working them for the benefit of those members who wish to improve upon the results obtained from the paraffin lamp for home lantern work, enlarging, reducing, &c. I think the principal reason which prevents many from using the limelight is the exaggerated and almost unfounded idea of the danger attending the use of it. This idea is erroneous. With such ordinary care and attention as amateur photographers usually bestow upon the manipulation of their instruments and work, they can use the limelight with as much confidence as a paraffin lamp. For my own part I have more anxiety when using a paraffin lamp in a lantern than when using a blow-through limelight jet. A highly inflammable and explosive substance like paraffin used in a lantern, the interior of which becomes very highly heated (sufficiently so with me to have broken my condensers on two occasions) inspires me with much more trepidation than does the limelight. The few accidents which have occurred since high-pressure gas cylinders came into use have, I believe, been traced to carelessness or ill usage, and now that oxygen and hydrogen cylinders are respectively fitted with right and left-hand screw threads, thus compelling the gas compressors to fill the cylinders only with the gases for which they are intended, and the users to use their fittings in like manner, the prime cause of danger is eliminated, and, if only drawn steel cylinders are used, one may rest satisfied that the probability of an accident is very remote.

A few words describing how steel cylinders are made may interest you. A disc of steel is, by various machines, pressed into the form of a cap, and finally forced through a hole in a die by a plunger, the outside diameter of which is equal to the internal diameter of the cylinder. The cylinder is then in the shape of a test tube. The open end is heated and cupped over, and the neck formed by special tools. A hole is bored in the neck and threaded, and the valve is screwed and soldered in. The cylinders are tested by hydraulic pressure to more than double the greatest pressure to which they will be eventually charged, which is 1800 pounds on the square inch. They are made in sizes to contain from six feet to 100 feet of gas. I think a twenty-feet cylinder the most useful and economical for an ordinary worker. A lever key is best for regulating the flow of gas, but, for turning off the valve, an ordinary key is better, because, the lever operating with so much more power, one is apt to screw up too hard with it, and thus injure the valve seating.

Now, with respect to regulating the flow of gas to the jet, it is quite possible to do without a regulator, but even experienced hands find it difficult to manage the light without the aid of one when the cylinder is full, for, the pressure being so great, the slightest turning of the valve is sometimes quite sufficient to blow out the light, and make a great hissing. When the cylinder is three parts empty the regulator can be dispensed with, perhaps with advantage, and, when nearly empty, to get all the gas out of the cylinder, the regulator must be put aside, as the pressure is not sufficient to work the valve of the regulator, which thus stops the passage of the gas. I am referring to Beard's regulator, which I think is the best and most generally used. When using gas from the cylinder without a regulator, the tap at the jet must be opened full, and the rubber tube must not be tied on to the connexion, as otherwise the pressure will accumulate in the tube and burst it, but when using a regulator the tap at the jet must be turned off, the valve of the cylinder then opened with the key, and the tap of the jet used to adjust the light. If the tap at the jet be not turned off first, the regulator does not act, but the gas passes from the cylinder to the jet, as though no regulator was there. With regard to the jet, a screw-down tap to the oxygen is an improvement on the ordinary tap, as the flow of gas can be much more nicely adjusted.

I think that the ordinary tap for the hydrogen is the best when house gas is used, because the house gas, being at low pressure, the passage way of the tap must be large in proportion to allow sufficient gas to pass, and the screw-down taps that I have seen do not possess a gas way large enough for the purpose. The nipples of the jet are of prime importance, and there are several forms of these. I think that form is best in which the oxygen nipple is sunk below and inside that of the house gas to the extent of one-eighth of an inch, the house-gas nipple having an orifice smaller than its interior diameter at the position of the oxygen nipple, thus mixing the gases better, and concentrating them on to a smaller area on the lime producing a better light, and improving the definition of the picture, as the smaller spot of light forming the illuminant the finer is the definition.

The limes are an important consideration. Soft limes give the best light, but hard limes are more enduring, and so more economical. Some are only moderately hard, and they come half way between the soft and hard variety, and, I think, are the most satisfactory for general use. Mr. Lewis Wright recommends that the pin to which attached should be slightly tilted forward (*i.e.*, towards the the jet is condenser), and I think that a slight improvement in the light is thereby gained, the nozzle of the jet sometimes cutting off from the condensers some portion of the rays proceeding from the incandescent lime.

I have found the ordinary double plano-convex condensers answer every purpose; they should be mounted in the lantern as close up to the slide stage as possible, and the objective used to form the image should have the lenses, which form its back combination (*i.e.*, those nearest to the condenser), as large a size as possible consistent with the optical considerations involved, because, if these lenses are too small, they cut off some of the cone of rays proceeding from the condenser, and so enfeeble the light. I will proceed to describe what I consider the best way to get a good light and to obtain an evenly illuminated disc on the screen. After the regulator has been screwed into the neck of the cylinder, make the

connexion by the rubber tubes, the oxygen to the tap on the right of the jet, the house gas to the left; turn off the oxygen tap at the jet, and turn on the oxygen at the cylinder by the lever key, light up the house gas and let it warm the lime for a minute, now turn the house-gas flame down to about an inch in height, and very gently open the oxygen tap till the oxygen at the nipple of the jet is carrying all the house gas forward on to the lime; turn on a little more house gas, then a little more oxygen, and so on, gradnally adjnsting the two taps until the best light is obtained. When this is done turn the lime round several times, slowly, in order to thoroughly heat it. Look through the back door of the lantern at the reflection of the lime on the condenser, and, having loosened the screw which bolts the lime-turning arrangements to the tubes of the jet, adjust the lime thus horizontally until the small black spot, which is observed in the centre of the illnminated portion, jnst disappears, and, when this is done, tighten the screw. Now draw the jet a little distance back from the condenser, adjust the jet on the pin, vertically and horizontally, until the spot of brighter light on the screen is in the centre of the disc, put a slide in the stage and focus it; take it ont again, and then slide the tray and jet towards the condenser, nntil, on observing the screen, you notice it as nearly as possible eqnally illuminated. If there appears a want of light or a slight blue shadow at the top of the screen, the jet must be lowered; if at the bottom, it must be raised; if it is on the right side of the screen, the jet mnst be slightly swerved to the left; if it is on the left, it must be shifted to the right—of course I am referring to the lime end of the jet.

What I have said, I know, will be very stale to some of you, but I have made an effort to describe the elements of the manipulation of the lime-light for the gnidance of those who know nothing about it, and not in order to bring forward anything new which might appeal to the experienced.

E. W. Parfitt.

Our Editorial Table.

The "Rocket" Plate.

Elliott & Son, Barnet.

There is no doubt of this new plate of Messrs. Elliott & Son being remarkably quick. We submitted a sample to trial during the dull weather we have lately been experiencing, and under conditions best calculated to test for rapidity, and succeeded in getting fully exposed negatives. The "Rocket" plate develops easily and cleanly, and is possessed of great technical excellence.

A View by Moonlight.

By William Brown, Paisley.

A view of the village of Lamlash, Arran, which was shown at a recent meeting of the Glasgow Photographic Society, has been sent to us by Mr. Brown. It was taken on August 28 last, the day after full moon, and was exposed from 10.30 p.m. to 12 with a Ross's half-plate rapid symmetrical lens. During the first half-hour a No. 3 stop was employed, and during the remaining hour the lens was worked without any stop. The plate was a "Verel's Matchless," developed with pyro and ammonia. The moon must have been very bright and the atmosphere exceptionally clear to have enabled such an excellent picture to have been obtained.

News and Notes.

Lewisham Camera Club.—December 15, Lantern Evening; Prize Slides.

Leeds Camera Club.—December 21, Grand Lantern Evening, for members and friends, in the Large Room, New York-street.

West London Photographic Society.—December 17, Technical Social Meeting. *Carbon Printing*, Mr. L. Selby.

Photographic Club.—December 20, *Soda* versus *Ammonia as an Alkali in the Developer.*

Messrs. Arthur Schwarz & Co. inform us that they have been appointed sole wholesale agents by Dr. Hesekiel, for his Grain Platina Paper (matt surface).

"The Photogram" is the title of a new monthly magazine devoted to photographic and photo-mechanical work, to be issued under the editorship of Mr. Snowden Ward and Mrs. Weed Ward.

Messrs. Perken, Son, & Rayment inform us that the "Optimus" 100 Guinea Photographic Competition closes on December 31, after which no further prints can be received. A copy of the rules and list of prizes may be obtained of the firm, 99, Hatton-garden.

Central Photographic Club.—Friday, December 15, instead of the discussion, *Films* versus *Glass*, Mr. John Howson will give his first demonstration of *The Working of the New Ilford Matt-surface Paper*, at the Club-rooms, Coleman's Hotel, Henrietta-street, Covent Garden, W.C.

Liverpool Amateur Photographic Association.—Thursday, December 21, Lantern Lecture, by Mr. W. Harvey, *A Trip to Chicago.* Auction of Photographic Goods, the property of members, January 11, 1894. All articles intended for sale should be left with the Attendant, with full description, also reserve price. A few copies of spare presentation prints will also be put up to auction.

At the Central Photographic Club, Coleman's Hotel, Covent Garden, there is on view, till December 21, a "one man" collection of photographs, by Mr. Thomas Fall. It includes examples of portraiture, group, landscape, and animal study work. Small though the collection is, it is well worth a visit, as it shows Mr. Fall's powers to advantage. Visitors are admitted on presentation of card.

Munster Camera Club.—December 20, *Amidol as a Developer*, by A. Roche. 1894: January 3, *Retouching* (illustrated), by J. O'Connell. 17, *On Lens Stops and Exposures*, by H. Lund. 31, Discussion on *Printing Papers*, opened by K. B. Williams. February 14, *A Ramble in the Highlands*, by A. Newsom. 28, *The Stereoscopic Camera*, by R. Foley. March 7, *Photographic Dodges*, by J. Day. 21, Members' Slides. April 4, Annual Exhibition.

The Photo-Autocopyist.—The photo-autocopyist is an apparatus for easily obtaining a number of reproductions of a photograph by collotypy. A bichromated gelatine film is printed in the usual way, developed, placed on a stretcher, inked, and a print taken by pressure. The apparatus is supplied complete in a neat and handy form. Those of our readers who have access to our volume for 1891 will find the process described in detail by Mr. Warnerke. The address of the Company is 72, London-wall.

Bristol International Photographic Exhibition.—The entries for this Exhibition have now all been made, and we hear that the Bristol Committee are more than satisfied with them, both from their quality and number. The work of judging takes place this week, and the Exhibition opens on Monday with a *conversazione*, at which the Very Rev. Dean of Bristol will perform the inaugural functions. The exhibits are thoroughly international in their character, there being many frames from the United States, Canada, Russia, Sweden, and all parts of the Continent. The Committee have decided to issue cheap season tickets (*3s. 6d.* only) for the five weeks during which the Exhibition remains open. This will doubtless prove a great advantage to the local public, and will, we should think, add materially at the same time to the success of the Exhibition.

Forfarshire Photoographic Lantern-slide Competition.—*Honorary President:* Alexander Robertson, of Burnside, Sheriff-Substitute of Forfarshire.—*Honorary Vice-President:* Robert Whyte, Procurator-Fiscal of Forfarshire.—*Chairman of Committee:* Gilbert W. Don, Clocksbriggs House.—*Vice-Chairman and Local Secretary:* J. Watson Craik, Forfar.—*Treasurer:* R. Bruce, Banker, Forfar.—*General Secretary:* W. J. Anckorn, Arbroath, N.B. Rules and Regulations of Lantern-slide Exhibition and Competition: 1. The Committee will place the Forfarshire medals at the disposal of the Judges, whose decision will be final. 2. Entry fees 1*s.* for set of twelve slides. 3. The Competition is open to all photographers, no distinction being made between amateurs and professionals. Trade manufacturers barred. 4. The Slides to be forwarded to the General Secretary, together with the entrance fee, on or before December 30, carriage paid. 5. The winning Slides will become the property of the Forfarshire Exhibition Committee. 6. The Committee will not be responsible for any damage to slide exhibits. 1st Class—Landscape, Marine, and River Views. 2nd Class—Hand Camera. 3rd Class—*Genre.* Two awards in each class.

Presentation to Mr. Edgar G. Lee.—An Ordinary Meeting of the Newcastle and Northern Counties' Photographic Association was held on Tuesday, December 5, at the Art Gallery, Newcastle. Mr. J. P. Gibson, Hexham, presided over a very large gathering. Mr. John Watson read a paper on *Lantern Manipulation*, and afterwards gave an interesting demonstration of the various processes. The next business was a presentation to Mr. Edgar G. Lee, who is retiring from the Hon. Secretaryship, in which post he has been succeeded by Mr. James Brown. The Chairman, in making the presentation, referred to the past history of the Association, pointing out that, in its early career, it had associated with it many prominent scientists, such as the late Professor Marecco and Professor Herschell. It had had three Secretaries. The first, who put the Association on its legs, was Mr. J. B. Payne, of Messrs. Mawson & Swan. Then came Mr. Pike, who was succeeded six years ago by Mr. Lee. During Mr. Lee's term of office the Society had enormously extended, the membership rising from something like forty to 160. It had also taken a very prominent part in the photographic activity of the kingdom. The Association occupied a very good position as compared with other provincial societies, though he should like to see the general average of the work improved. They had in their ranks many eminent photographers, but the general average might still be raised. Alluding again to Mr. Lee, he said that gentleman had developed a reputation second to no man in the world as a lantern-slide maker. Mr. Lee had become a specialist, he had stuck to that one branch of photography, and by perseverance had raised himself to the high position he now occupied. Mr. Lee had always been most willing and anxious to assist beginners, and there was hardly a beginner who had not had the benefit of his advice. He then handed over the present, which consisted of a purse of gold, a silver inkstand, and an album. Mr. Lee, in returning thanks, said he should still continue his active connexion with the Association.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 23,490.—"Improvements in Photography and in Photographic Cameras." A. C. Ponton.—*Dated December* 6, 1893.

No. 23,642.—"Improvements in Photographic Dark Slides." G. F. Horne.—*Dated December* 8, 1893.

No. 23,670. — "Apparatus for Exposing Successive Photographic Plates, Magic Lantern, and other Slides." BIRT ACRES.—*Dated December* 8, 1893.

No. 23,607.—"Tinted or Coloured Covers for Photographic Transparencies." W. F. BUTCHER.—*Dated December* 8, 1893.

No. 23,469. — "An Improved Method of Preserving Drawings, Etchings, Chromos, Photographs, and suchlike, which are framed, from dust or damp." J. M. YOUNG. *Dated December* 6, 1893.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 18 ...	Camera Club	Charing Cross-road, W.C.
,, 18 ...	Dundee Amateur	Asse. Studio, Nethergate, Dundee.
,, 18 ...	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 18 ...	Hastings and St. Leonards	
,, 18 ...	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 18 ...	Richmond	Greyhound Hotel.
,, 18 ...	South London	Hanover Hall, Hanover-park, S.E.
,, 19 ...	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 19 ...	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 19 ...	Exeter	City Chambers, Gandy-st., Exeter.
,, 19 ...	Hackney	206, Mare-street, Hackney.
,, 19 ...	Keighley and District	Mechanics' Institute, North-street.
,, 19 ...	North London	Canonbury Tower, Islington, N.
,, 19 ...	Paisley	9, Gauze-street, Paisley.
,, 19 ...	Rochester	Mathematical School, Rochester.
,, 20 ...	Brechin	14, St. Mary-street, Brechin.
,, 20 ...	Bury	Club Rooms, 13, Agar-street, Bury.
,, 20 ...	Leytonstone	The Assembly Rooms, High-road.
,, 20 ...	Manchester Camera Club	Victoria Hotel, Manchester.
,, 20 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 20 ...	Southport	The Studio, 15, Cambridge-arcade.
,, 20 ...	Southsea	3, King's-road, Southsea
,, 21 ...	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 21 ...	Camera Club	Charing Cross-road, W.C.
,, 21 ...	Glossop Dale	
,, 21 ...	Greenock	Museum, Kelly-street, Greenock.
,, 21 ...	Hull	71, Prospect-street, Hull.
,, 21 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 21 ...	Oldham	The Lyceum, Union-st., Oldham.
,, 21 ...	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 22 ...	Cardiff	
,, 22 ...	Central Photographic Club	Coleman's Hotel, Henrietta-st., W.C
,, 22 ...	Croydon Microscopical	Public Hall, George-street, Croydon
,, 22 ...	Holborn	
,, 22 ...	Maidstone	"The Palace," Maidstone.
,, 22 ...	West London	Chiswick School of Art, Chiswick.
,, 23 ...	Hull	71 Prospect-street, Hull.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

DECEMBER 12,—Ordinary Meeting,—the President (Captain W. de W. Abney) in the chair.

The following were elected members of the Society :—Messrs. W. A. Cadby, L. Cohen, E. Farquhar, F. W. Grant, T. C. Hepworth, C. Job, Adolph Meyer, Spencer and Mrs. J. N. Hignett, and Mr. W. M. Warneuke.

The PRESIDENT announced that the Society had acquired a number of negatives by Rejlander, and that prints would be on view in a short time.

Messrs. W. S. Bird and Thomas Bedding were elected Auditors of the Society's accounts.

DISTRIBUTION OF THE IMAGE IN MULTIPLE FILMS.

Mr. S. HERBERT FRY read a paper on this subject, in which he dealt with the theoretical features of the Sandell multiple-coated films and their practical treatment. He said that the respective films not only differed in sensitiveness, but also as to character of image, and were, besides, physically dissimilar. The top film produced abundance of detail in the brilliantly lighted parts of the picture, and the bottom emulsion clear shadows. The multiple-coated film might thus be described as a composite film, having opposite photographic properties. In his estimation, it was not possible to make one emulsion having all the qualities required, and that an equal effect could not be obtained by mixing emulsions of different characters. After pointing out that light exercised a selective action on multiple films, the more energetic rays exercising their function on the lower and less-sensitive emulsion, he said that, in an ordinary film, those rays passed through and caused halation. The multiple film acted as a light filter. Better and truer renderings were obtainable with a multiple than with a single and homogeneous film. In the case of an abnormal exposure, a selective developer must be used. He would begin with one weak in alkali. Such a one would attack the lower film first, and, when sufficient density was obtained, a normal developer could be used to produce detail. He could not say whether the slow film influenced the top, and, as regards solarisation, he said he did not find any noticeable effect produced, if development were continued far enough. The more reversal there was, the more image there must be developed in the lower film.

In reply to Mr. Warnerke, Mr. FRY said the films could only be stripped in the first, wet stage.

The PRESIDENT, in moving a vote of thanks to Mr. Fry, said the use of multiple films was not new, as double films of collodion and gelatine had been employed. In a paper read before the Royal Society six years ago he (the President) had shown the advantage of using an emulsion sensitive to the ultra-red rays with another below not sensitive to them. One was able to separate the two, and get the whole of the spectrum together. It was a good opportunity of studying the image, as one acted as a feeder for intensity to the other. The top film by itself would give a feeble image, but it could be intensified. It was more preferable to intensify by the ordinary method of development. By having a substratum of sensitive salt, one was able to get any amount of density required.

THE LIPPMANN-LUMIÈRE-VALENTA COLOUR PHOTOGRAPHS.

Mr. F. E. IVES read a paper on this subject, which, in some respects, criticised the results in the same terms as in his paper read before the Philadelphia Society on November 8 [see page 798]. It was a question how much of Lumière's success was due to an attempt to carry out Lippmann's theory and how much to accident. He had not been able to believe in the possibility of producing the results. The images should be negative, but Lippmann's own photographs showed the greatest deposit in the high lights. He suggested that the rendering of the whites and blacks might be due to long exposure producing reversal. The action which rendered light and shadow was different to the action which produced colours. The two distinct actions proceeded together, and, therefore, as the process was not one indicated by Lippmann's theory, it must be regarded as partly an accident. He thought the results could be produced by interference. When in Vienna, Herr Valenta had shown him some results produced on plates sensitised with cyanine, the pictures being backed with Brunswick black and mounted under a prism. Chloro-bromide plates, sensitised with eosine, had also been used, with abnormal results, red being produced by the action of the blue, and violet by green. The colours were not produced in the film, but only by something practically equivalent to interference. Spectroscopic examination supported the view that none of the colours were pure. All the colours were mixtures. The second example, however, seemed corrected in the spectroscope. For reproducing correctly, the sensitive film should be scarcely thicker than a single wave-length of light. Having criticised the method of projection employed, the light being so powerfully concentrated that reflection from a black glass would appear as white on the screen, he concluded by saying that he thought the photographs were not obtained in accordance with theory. The results were more or less accidental, and successful working conditions could not be calculated, but must be worked out purely by experiment. [We shall take the opportunity of printing the paper in full on an early occasion.]

In the discussion which followed,

Mr. L. WARNERKE explained that M. Lumière's colour photographs were protected in order to secure them against damage in handling.

Mr. H. A. LAURANCE said he assisted in the preparations for showing the pictures at the Society of Arts, and imagined there was a prism over the images because there was a most beautiful spectrum thrown from the prism.

Mr. IVES said that it was quite right the pictures should be mounted, as the colours were exceedingly delicate. He did not know that M. Lumière had ever exactly stated how the pictures were mounted.

Mr. CHAPMAN JONES asked if there was any information that the colours were produced by the corresponding colours in the spectrum. In those Mr. Ives showed there seemed a small proportion of yellow.

Mr. IVES said that Herr Valenta stated that in the better examples the colours occupied their correct positions. In the pure spectrum there was very little yellow. The more impure it was, the greater the sensation of yellow.

Mr. T. SEBASTIAN DAVIS asked if the colours which had been projected by the prism were not mounted in front of the glasses?

Mr. IVES replied that the colours were more brilliant with the prism.

Mr. LAWRANCE asked whether the spectrum photographs Mr. Ives showed were taken in an arc light or daylight?

Mr. Ives said the light was taken from a large crater, so that there was very little of the carbon spectrum in it. He thought that the people who made the claims to which he had referred should photograph the Fraunhofer lines by the Lippmann method, by which no one had yet photographed the sun spectrum.

The PRESIDENT, in moving a vote of thanks to Mr. Ives, said he had photographed a sun spectrum by the Lippmann process, but by long exposure he got red where blue ought to be, and blue where red should be. He found that a great deal had to do with the exposure. It required a brilliant spectrum and a wide slit. He did not think the criticism as to the want of yellow in Valenta's results was a crucial one, as, by reducing the light of the spectrum, no yellow at all would be obtained. In all the photographs by the Lippmann method he had seen, there was one great fault, the want of being able to produce a pure red, it was always of an orange character. He did not suppose they would ever get pure colours by the method. As regards the use of the crater of the positive pole of the electric light, he found that to be a standard light in 1884, as a cubic square of one-eighth of an inch in the centre always gave the same light. He believed a patent had recently been taken out for it. Colour photography was yet in its infancy, and we must wait for more developments before we could say that everything was accomplished. His own belief was that photography in natural colours would be photography in pigments, but the latter faded. Becquerel's colours were purer than Lippman's.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 7, Mr. A. Haddon in the chair.

PHOTO-ZINCOGRAPHY IN HALF-TONE.

Mr. W. T. Wilkinson gave a paper on this subject [see page 800], exhibiting several screens of different degrees of ruling, nap and glazed rollers, zinc plates, and examples of images on zinc in various stages of preparation.

In the course of a discussion which followed, Mr. W. E. DEBENHAM recommended Schlippe's salt for intensifying the collodion negatives.

Mr. WILKINSON said there was a danger of getting veil with it.

Mr. DEBENHAM had used it after iodide, and found no veil. It gave a deep red-brown deposit. He thought it very generous of Mr. Wilkinson to publish his isinglass, white-of-egg, and bichromate process.

In reply to further questions from Mr. Debenham, Mr. WILKINSON said that

with his process there was no intermediate inkings, the plate being etched straight off. The etching fluid was nitric acid, the solution being of the consistency of vinegar; etching took about a quarter of an hour, the finer details in the high lights being watched for.

In reply to the Chairman, Mr. WILKINSON said that etching by a current of electricity was not commercial, although it was scientifically practicable.

In reply to Mr. Debenham, he said printing was done to about the same depth as collotype. He would not repolish a spoiled plate. The spoiled bitumen or isinglass film could be washed off with warm water and oxide of zinc used for the plate. As regards the distance of the ruled screen from the collodion plate, it was generally placed on the silvered-wire corners of the dark slide. The ruled lines of the screen were filled in with pigment. As to the use of mirrors, he had had one in use for five years, and had only had it resilvered once, at a cost of threepence. He had repolished it with baked rouge and fine cotton-wool in chamois leather, slightly warming the plate and polisher.

After Mr. Wilkinson had answered other questions, a vote of thanks was passed to him.

Central Photographic Club.—On Friday last Mr. Algernon Brooker, of Hastings, delivered his lecture, *Winchelsea and Rye*, illustrated by 140 slides. Starting from Hastings, he led his hearers on through Ecclesbourne and Fairlight to Winchelsea, pointing out the places of interest *en route*. He gave a short historical account of both Winchelsea and Rye, illustrated by ancient and modern maps, showing the great change which had taken place in the surface of that part of Sussex by the receding of the sea and changing of the course of the River Rother. Views of the church at Winchelsea, its monuments, and some details of carving were shown and described. Comparative exposures, made on "Sandell" and "backed ordinary" plates were called attention to. After various "photographic bits" in the way of gates and odd corners, Mr. Brooker proceeded to deal with Rye, and managed to get some amusement out of his description of the corporate seal. The lecturer's best hits in description were of the bakery at Rye and its doorstep tenant who at night always "felt the cold," and was at times troubled with "symminess in the head." The wise descriptions of the weather by the ferryman at Rye were also referred to. A description of the "pirates' chains," and the pillory in the Town Hall at Rye, and the difficulties surmounted in photographing them, followed by a series of paddling scenes on Hastings beach, brought a most instructive evening to a close.

Ealing Photographic Society.—December 7, the President (Mr. H. W. Peal) in the chair.—Two nominations for membership. An exhibition of members' lantern slides was given by Mr. T. Simpson, assisted by Dr. Gibbons. The slides first shown were the work of Mr. T. Crisp, and included views at Burnham Beeches, Virginia Water, Kew Gardens, Stanwell, Hillingdon, and the Brent; a characteristic scene at Brentford Market, and some effective studies of chrysanthemums from negatives on isochromatic plates. The Hon. Secretary (Mr. Murphy) contributed a series of views taken during a recent tour in the south-west corner of France, and comprising scenes at and near Bordeaux, Dax, Orttiez, Pau, Bayonne, Eaux-Chaudes, &c. He also showed some views on the Henley Regatta course, and in Ireland, and a pleasing *Sunset on the Mill Pond, Hanwell*. His final slide consisted of a reproduction of a placard dated 1813, giving a list of the prizes offered for competition at Ealing Fair in that year. Besides prizes for jumping in sacks, and grinning through a horse-collar, a pig was to be run for, a pound of tobacco to be smoked for, a shift to be run for by young women, and a pound of tea to be drunk for by old women. Mr. B. E. Peal furnished half a dozen choice views representing *Hanger Lane, Perivale Lane, Hayes Church, Swakelys*, &c. Mr. Roland Whiting showed some slides of microscopic objects, amongst which those depicting crystals of various substances as seen by polarised light were greatly admired. The exhibition concluded with an admirable series of slides by the President, reproducing the illustrations in David Roberts' *Egypt and Nubia*. These slides, which elicited frequent applause, were notable not only for their technical excellence as photographs, but for the artistic beauty of the original pictures. It was announced that the meeting on the 14th inst. would be a demonstration on *Enlarging*, the Society's enlarging apparatus and dark room being used. The following week there will be a demonstration of development with amidol, metol, and glycin.

Hackney Photographic Society.—December 5, Mr. W. Houghton presiding. —Question: "What effect in exposure would snow have in winter?" Reply: "Disregard the glare and whiteness and expose for the dark portions of the subject. Snow pictures are generally under-exposed. Fast plates give more density than formerly. Select a plate with a thick emulsion." Question: "What time is sufficient for washing a uranium-toned bromide print? The instructions say, 'Wash till all yellow traces disappear.' Prints had been left in a long time, and the picture nearly disappeared altogether." Reply: "One must watch them carefully and remove after inspection in daylight as soon as the last trace of yellow has gone, not forgetting the back of the paper." Question: "What advantages have isochromatic plates over ordinary ones for winter landscapes?" Reply: "There is always an advantage in yellow light. Mr. Birt Acres has said it gave roundness." Mr. HUDSON stated an interesting fact he had just read under date 1859, that a bullet in motion had been photographed. It was, however, explained to him that it was not done by a lens. The exposure is made by an electric spark; the electric contact is made by the bullet itself whilst passing the plate. A discussion then took place on excursion matters, with a result that a sub-committee was formed to arrange dates, places, &c., and leaders for the summer outings, and that a list be published in advance.

Putney Photographic Society.—December 4, Mr. H. Faulkner in the chair.—The CHAIRMAN said that in the absence, through illness, of Mr. Horsley Hinton, who was to have read a paper on *Work in the Field*, Mr. A. E. Leblanc, representing Messrs. A. Schwartz & Co., had very kindly undertaken to give a demonstration on *Dr. Andresen's Cartridges*. The Chairman further said that Mr. Horsley Hinton was now fortunately reported to be making satisfactory progress toward recovery, and that there was every reason to hope that he would still be able to give his paper before the close of the season. Mr. LEBLANC said that no doubt Dr. Andresen's preparations were well known in their usual form to most of the members present; he had come that evening to point out the advantages of the cartridge form. This form had been originally applied to developers only, and introduced for the convenience of tourists; but the immediate success of the new departure had been such that cartridges were at the present time issued for an acid fixing bath for general purposes and for a combined toning and fixing bath for albumen and gelatino-chloride papers in addition to developing cartridges of amidol, eikonogen, and metol. The advantages of the cartridges to travellers are numerous; amongst others may be mentioned that the salts are in a dry state and highly concentrated, and that they therefore occupy very little space; all risks of broken bottles and the wasted solutions being absorbed by and damaging and destroying other contents of the travelling bag were done away with; they were also very convenient in use; when required, it is only necessary to empty the contents of the cartridge into the proper quantity of water; the solution is then ready for immediate use. Each cartridge, being hermetically sealed, will keep indefinitely in any climate, and as each is only sufficient, for a limited quantity of solution, they will be found very useful in places where the ordinary chemicals will not keep satisfactorily in their dry or dissolved state, and for amateurs everywhere who only develop or tone small quantities at intervals. In summarising the qualities of the various developers, Mr. Leblanc said that eikonogen was first specially made as an all-round developer for negatives, papers, and lantern slides for India and China. Rodinal was a powerful developer, but, being a liquid, could, of course, not be used in the cartridge form. The amidol acid developer did not keep long in solution, and should therefore be mixed as required; it was a useful all-round developer. Metol was the latest of Dr. Andresen's developers, and combined the advantages of the others without any of their less satisfactory qualities; it would keep in solution for any reasonable time—he had personally used it nearly three months after mixing without noticing any loss of power. With this developer potassium bromide does not retard, but has only a clearing action; glacial acetic acid was the best retarder. Glycin is a special developer for lantern plates and reproductions; it keeps well in solution, and development may be prolonged without fear of fog or veil. The fixing cartridges make an acid fixing and clearing bath, and have the advantage that negatives or prints may be passed into it direct from the developer. The developing action ceases immediately, which is by no means the case where intermediate washing has to be resorted to. The combined toning and fixing cartridges made up a complete toning and fixing bath, equally suitable for albumen and gelatino-chloride prints, simply by being dissolved in the proper quantity of water, and was ready for use immediately. Mr. Leblanc then proceeded to develop a couple of negatives and some prints on Nikko paper (exposures unknown) in metol, and to tone some Solio and Paget print out prints; the results were very satisfactory, and the solutions made from the cartridges acted with the greatest regularity and smoothness. It should be observed that development should be carried much farther than appearances would at first lead one to judge; in fact, he always developed until the picture appeared in fair detail on the back of the negative. Prints should be printed fully for the for the combined toning and fixing bath, but in this particular there was no difference from the ordinary formulæ. Mr. Leblanc said that the use of Dr. Andresen's developers and fixing solutions did away with the necessity for very thorough washing between each operation, and that the great care generally necessary to keep all trace of other solutions away from any one was with them of much less importance; he had found no injurious effect from handling a negative in the developer with fingers which had just been in the fixing solution. He had never had any trouble with his fingers when working with metol, although he had used this developer even when there were cuts and scratches on them.

Richmond Camera Club.—Monday, the 11th inst., Mr. Cembrano in the chair.—Mr. Birt Acres delivered a lecture on *Clouds: their Form and Movement*. Mr. ACRES began by alluding to the part which clouds play in the economy of nature, and then explained the mode in which cumulus clouds are born of the sea, with the sun for their father; and how, owing to the more rapid radiation on land, the day-formed clouds are wafted landward at nightfall. He gave the theory of the trade winds, with their counteracting upper currents, and many other interesting facts and theories connected with his subject, concluding his introductory remarks with an explanation of the different forms of clouds, according to Howard's classification. Then followed a series of very beautiful lantern slides, mostly in carbon, illustrating cloudland in every conceivable form and aspect. Mr. Acres detailed his *modus operandi*; but, as it involved the polarising and analysing of the light, and as it transpired that the proper prism could not be bought for 100*l*., it may be doubted whether many members of the Club will follow it.

South London Photographic Society.—December 4, Mr. Maurice Howell (Vice-President) in the chair.—The evening was devoted to a demonstration (by request) of *Platinotype Printing*, by Mr. F. W. Edwards, the President of the Society. In working platinotype it is necessary to avoid dampness during printing, as it causes flatness and degradation of the prints. During cold weather, he considered it advisable to use the developer slightly warm. Cold solutions increased contrast, while a warmer developer brought out more detail. A properly exposed print could be left in the developer for any length of time without any fear of over-development. The presence of air bubbles at first did not matter; wet the spots, and they develop up like the rest of the picture. Large prints can be developed a portion at the time by drawing them through the solution again and again. It is necessary not to touch the prints before development with fingers which have become contaminated with acid from the fixing bath. Under-exposed prints may sometimes be saved by developing in a hot bath. The paper takes less time to print than albumenised paper. During printing, it must be shielded from damp by backing it up with rubber pads. Any one starting the process, Mr. Edwards recommended the use of one negative until good results were obtained. Between forty and fifty prints were developed, fixed, and washed during the meeting. Attendance, fifty-eight.

Tooting Camera Club.—December 7.—The second of this season's Ladies' Nights was devoted to the exhibition of slides by means of the optical lantern. Slides were shown by Messrs. Victor Robinson and A. H. Anderson, members. A picture by the latter gentleman, entitled *Tottie*, a photograph of a pretty little girl about three or four years old, whose facial expression was quite a study, was greatly admired. Some sixty slides kindly lent by Mr. A. R. Dresser were then exhibited. A set of comic slides by Messrs. Wilson & Co. of Aberdeen, lent by Mr. Nock, were also passed through the lantern. They were entitled *A Trip North*, and were photographic reproductions of engravings representing the adventures of three friends in Scotland.

Woodford Photographic Society.—December 7, the President in the chair.—Mr. H. T. Malby read a paper on *Copying*. Speaking of the new departure, frequently attended by failure, that amateurs find their first attempts to copy photographs, paintings, or engravings, he gave a record of his own work and procedure. The tripod being so very difficult to manipulate for copying to scale, lantern slides were shown of a simple hand-made contrivance for holding copy and camera, allowing longitudinal adjustment for focussing and lateral movement of either copy or camera for those cases in which an illustration had to be copied from one side or corner of a large drawing, the camera back being always parallel to the copy board. For line work the lecturer recommended the slowest plate possible, having been very successful with plates coated with the Ilford special lantern emulsion, and most with some specially thickly coated by the Britannia Works Company. For half-tone copying his best results had been obtained on Ilford ordinary plates; and, in working from coloured copies, Ilford isochromatic. Correct exposure was stated to be of the greatest importance, a Watkins exposure meter being recommended; and, for line work, backing the plate absolutely necessary. In addition to lantern slides illustrating the apparatus used, several were shown of the different classes of work, details of the methods of working accompanying their appearance on the screen. Next meeting (informal), December 21, Discussion on toning gelatino-chloride prints. Visitors invited.

Bath Photographic Society.—November 30, Mr. Austin J. King (President) in the chair.—Formal business having been dispatched, the chair was taken by the very Rev. Monsignor Williams, to enable the President to give a lecture, entitled *Through the Basque Provinces*. Mr. KING commenced by saying that a man must be very hard to please who cannot find much to interest him in the district which lies between Bordeaux in France and San Sebastian in Spain. The most wonderful vineyards in the world, every varying feature of climate and soil, almost every type of vegetation and every mode of cultivation, excite the attention of those whose interest it is to know what can be got out of mother earth and by what means. The geologist marvels at the strange features of the barren lands which lie around Arcachon, and the marvellously distorted strata of the Pyrenees. The lover of English military glory may rejoice at the survivals of English domination of these fair provinces, and gaze on the redoubts, ruined bridges, and blackened walls which tell of Wellington's invasion of France at the end of the Peninsular War. The student of ethnology will find in the Basques a people more ancient than any inhabiting Europe. Does any one exult in the glorious majesty of some huge mountain? Let him wander amidst the Eastern Pyrenees, and gaze on the hills hoary with perpetual snow, dressed around the base with most luxuriant vegetation. Does the fierce oncome of the mighty sea excite his fancy? Let him stand on the rocky coast of Biarritz or St. Jean de Luz, and see the rolling billows of the Atlantic roaming in from the Bay of Biscay with a resistless force which hurls about vast rocks and mighty breakwaters as a child may play with shingle on a river's bank. If he cares to see nature at her best, a thriving and a happy people, and a land abounding in comfort as well as beauty, if he asks but to be allowed to *rest*, here he may spend days, enjoying idleness as he only does who regards it alike as a rest from labour and a preparation for more. The route chosen was by steamship *Liguria*, from Liverpool to Bordeaux. The passage was not a pleasant one, rough sea, cold wind, and rain. Pauillac was reached in three days. On one side of the Garonne is the St. Emilion district, on the other that of Julien. Pauillac itself includes the vineyards of the Château Lafitte, which produces the costliest wine in the market. From Pauillac to Bordeaux is a run by train of about two hours. As the country is flat, and there are no tunnels or bridges, the railway carriages carry two stories. Bordeaux is a large city, 242,000 inhabitants, and occupies a magnificent position on the Garonne. The year has been wonderfully prolific for wine, and the difficulty has been to obtain enough casks. The appeals for coopers in the windows on the quay being almost piteous. The lecturer next described some of the customs of the casking fraternity and the more important features of the city. Passing on to Arcachon, a seaside resort, some amusing peculiarities of the place were given. Lourdes was next visited, and many pictures were shown illustrating the buildings, the castle in which Napoleon imprisoned Lord Elgin in 1804, the Upper and Lower Church, general views of the town, &c. The number of pilgrims, said the lecturer, is immense. They arrive by thousands, sometimes even by tens of thousands, and every evening there is a procession. To see these thousands of persons, men, women, aged old souls with one foot in the grave, and children scarcely able to walk, gentle and simple, bearing shaded candles in their hands, winding up and around the paths on the hills and mountains, singing psalms and canticles, will produce a wondrous impression even on the most callous. Leaving Lourdes, Pau was next visited, and thence to the little seaside town of St. Jean de Luz, about twelve miles south of Biarritz, and a few miles from the Spanish frontier. The district between Bayonne and San Sebastian is still peopled by the Basques. In south-western France and north-western Spain they hold their ground with a tenacity which is one of the marvels of history. These Basques seem never to have been troubled by national aspirations. The French Basques are as loyally French as the Spanish Basques are loyally Spanish. Their ambition has ever been to manage locally their own affairs. They speak a language of their own, which is neither French nor Spanish, nor a mixture of the two. It is a distinct language of quite another family. Their churches are all built of one type; the men occupy the tier gallery, the women the centre. Three peculiarities are very striking in these people. The Beret, or cap, something in shape like a Tam O'Shanter, the canvas shoes, with soles of jute, and bound round the calf with tapes, and the walking-stick made of medlar saplings. Hand-ball is the national game, played in many different ways. The lecture, which was well attended, was illustrated with upwards of sixty photographic lantern views, both the negatives and the lantern transparencies having been specially made, by Mr. King for the purposes of this lecture, and from a technical point of view they were most satisfactory as displayed on the screen. Articles peculiar to the Basques were on the table for examination after the lecture, also a large number of stereographs, to further illustrate the scenery and customs of the people. At the conclusion of the lecture, the CHAIRMAN (Monsignor Williams), in felicitous terms, very cordially returned thanks to the lecturer.

Birmingham Photographic Society.—December 5, Mr. J. T. Monsley in the chair.—Mr. Fry, representing the Paget Prize Plate Company, demonstrated the development of proofs on printing-out paper which have only received a part of the normal exposure. The process consists of immersion in bromide solution, then development with hydroquinone, and afterwards the ordinary toning. This gave satisfactory results from prints only about one-tenth exposed.

Leeds Photographic Society.—December 7.—The forty-second annual report was read. The Society was founded in 1853, and is therefore the oldest in the United Kingdom. The subjects brought before the Society at its meetings during the year have been of great interest and importance; indeed, in this matter it is believed that the Society compares favourably with any in the provinces. The following gentlemen were elected as Committee for the ensuing year:—Messrs. Herbert Denison, J. H. Walker, H. P. Atkinson, B. A. Burrell, F.I.C., T. Butterworth, Godfrey Bingley, L. A. Warburton, H. L. P. London, Robert Steel, and Dr. Jacob. The best thanks of the Society were given to Mr. W. A. M. Brown for his gift of this year's photographic periodicals; also to Messrs. Pearson and Denham for their books. Mr. Godfrey Bingley exhibited a large collection of his new lantern slides—Views in Yorkshire, Scotland, West Somersetshire, North Devon, and Cornwall. His negatives were chiefly made on isochromatic plates and films, and showed very fine results. He received the best thanks of the meeting. Mr. Denison showed some slides made by the carbon process.

Liverpool Amateur Photographic Association.—November 30, Mr. William Tomkinson presided.—A lantern lecture was given by Mr. W. P. Christian on *Quiet Corners in France and Italy*, in the course of which photographic views, taken by the lecturer, of famous old towns and villages situated near the Italian Riviera, Venice, and the Italian lakes, were thrown on the screen, with the most pleasing results. A sample Thornton-Pickard automatic camera stand was exhibited to the members at this meeting.

EXTRACTS from the annual report: — "With the increased accommodation afforded by the new club-rooms, it has been the endeavour of the Council to further the usefulness of the Association in every way possible, and they allude with great satisfaction to the increased number of practical demonstrations, lantern evenings, &c., held during the year. From February 23 to the end of April, every Thursday evening was set apart and some subject of interest provided, a special feature being the series of six practical demonstrations by Mr. W. T. Wilkinson, of Manchester. Owing to the large number of members who availed themselves of these meetings and the benefit derived, the Thursday evening series were resumed on November 2, and it is intended to continue them until the end of April.—A pleasant gathering took place on the afternoon of Thursday, April 13, when four lady members—viz., Mrs. Marriott, Miss Adams, Mrs. Morrison, and Mrs. Southell—entertained the members to afternoon tea.—On April 10 a very successful auction of photographic goods, the property of members, was held in the club-rooms, when over a hundred lots were offered, and good prices realised.—The coffee meetings, held at four o'clock every Wednesday, have been very well supported; much useful work has been exhibited and valuable hints given to beginners, and matters relating to photography have been discussed in an informal way.—It is with deep regret the Council have to record the death, on November 9, of Mr. T. S. Mayne, a most ardent worker, and to whose personal influence and energy much of the success attending the International Photographic Exhibitions held in Liverpool, 1888 and 1891, was due. They have also to record the death of three other members of the Association, Mrs. Nicklin, Mr. James Lahy, and Mr. J. R. Jacksonr.—The number of members at the beginning of the year was 278; new members elected during the year, 56; resignations, lapses, and deaths, 25; leaving 309 members on the roll at the end of the year.—The excursions, with the exception of those to Ince Blundell in the early part of the year, and to Shrewsbury and Wenlock Abbey, did not receive the support deserved."

Sheffield Photographic Society.—December 5, Mr. Ernest Beck in the chair.—Mr. Richard Keene, of Derby, gave his lecture, entitled *Six Days' Photographic Ramble over Derbyshire Hills and Dales*, which was illustrated by 150 slides. Most of the pictures were taken nearly thirty-eight years ago, and, although some of the landmarks had been destroyed and many of the old inhabitants passed away, most of the old halls were in almost as good preservation as ever, notably Haddon Hall, which is always a happy hunting ground for the photographer.

Midland Camera Club.—December 1, Dr. H. Edwards in the chair.—A new Thornton-Pickard tripod stand was exhibited. The report of the Exhibition Committee was received and adopted. The report stated that, photographically, the exhibition was a decided success. Objection was taken to the exclusion of professionals from the members' classes; and, judging from the opinions expressed, it is very unlikely that any such distinction will be made in future. The office of Treasurer being vacant, Mr. T. H. Cox was elected, and Mr. H. Cooper takes the office of Librarian. At the close of the business, a number of lantern slides were exhibited by Messrs. C. Parker, H. Parker, H. Cooper, C. S. Baynton, G. Warren, and R. J. Bailey.

Widnes Photographic Society.—December 6, Mr. V. C. Driffield in the chair.—A paper was read by Mr. ARTHUR WAREING on *The Chemistry of Photography*, dealing with all the more important reactions involved in the production of a photographic negative. After having dwelt on the desirability

of a correct understanding of the scientific principles upon which all photographic operations depend, which, although to the amateur not an absolute necessity, is, at any rate, most likely to enable him to attain to the highest perfection in the pursuit of his art, the essayist explained the various theories (which have from time to time been published) of the action of light upon the sensitive film, concluding that the result was a physical rather than a chemical one. He illustrated the distinction between the physical action of light tending to the production of amorphous forms, and the chemical action producing elementary dissociation or molecular disarrangement. He then described the method of preparation of a gelatino-bromide emulsion, the coating and drying of the plate, the method of development, and its final fixation. He concluded with an explanation of the processes of intensification and reduction, explaining the circumstances under which either might be necessary. Messrs. Driffield, Newburn, and Warner commented upon the paper, and complimented the essayist upon its very able and comprehensive character, and a hearty vote of thanks was accorded to him.

Edinburgh Photographic Society.—December 6, the President (Dr. Drinkwater) occupying the chair.—A paper, the second on the rota, entitled, *Brief Notes on Lantern Slides*, was unavoidably postponed, owing to the rather sudden indisposition of its author, Mr. William Hume. An illustrated (with lantern views, &c.) paper on *Matters Pertaining to the Art Side of Photography*, was read and dilated upon by Mr. JAMES PATRICK. His contention was, that there was no such thing as mechanical aids to the composition of a picture, by which he meant to convey that a picture could not be composed, or even selected, by rule, yet there were a few principles, arrived at by the study of the best works of the "masters in art" which, if carefully and judiciously applied to every picture, would greatly conduce to success. In showing about thirty transparencies from his own pictures, Mr. PATRICK pointed out the application of these principles as being helpful in the good composition of views from nature where there could only be choice or selection, not arbitrary making of subjects. The lecture and demonstration were wound up by an urgent wish that the members in their outdoor work should do more than pourtray the mere external beauties of nature, which were patent to all; they should rather strive, in dealing with subjects that had the elements of poetical and sentimeutal beauty, to convey, by their treatment of such, a little of the feeling excited by the subject itself, holding that works so rendered, however imperfectly, would do more to elevate, and stimulate, and to raise photography in the scale and as a fine art, than all the bare and bald renderings of the hard facts and prosaic details of nature, however excellent might be their mere photographic truth and skill. A short conversation followed, in which several members took part. The remarks were all void of the controversial spirit, being rather the expressions of individual taste than the laying down of any special lines or infallible rules for producing effects. After the routine of minute reading, &c., was over, five new members were admitted by ballot—Messrs. Allan, Cumming, Grey, M'Culloch, and Slater. The PRESIDENT then intimated the general course of business for the remainder of the session. There would be three Popular Meetings: the first, on December 21, by Mr. W. Lamond Howie, on *The Scottish Alps;* the second, by Mr. James Patrick, on January 26, *Through Fife with a Camera;* the third, on February 23, for the usual display of members' work; also that a series of lectures on photographic subjects would be given during the season, and, where necessary, the papers at the monthly meetings would be demonstrated once a week in the dark room of the Society.

Photographic Society of Ireland.—November 23, Professor J. A. Scott (President) in the chair, when the lecture, entitled *Photographic Sketches Here and Elsewhere* (illustrated), was delivered by Mr. V. E. Smyth. Mr. Smyth showed a varied assortment of slides representing tit-bits in Holland, Switzerland, Italy, and at home, and described a tour through these countries.

FORTHCOMING EXHIBITIONS.

1893.	
December.....	*Madras. The Hon. Secretary Amateur Photographic Society, Madras.
,, 18–Jan. 22, 1894	*Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

GELATINO-CHLORIDE PAPER.

To the EDITOR.

SIR,—I notice a letter in your last issue from the Britannia Works Company *re* the above subject, and having looked through the ALMANAC, and finding that no doubt it was my article therein which had given them offence, may I point out to them that I wrote against gelatine papers as a whole, and not against any particular makers? If my article has given them, as it appears to have done, a free advertisement, I am sure they ought to be very much obliged to me.

First as to my contention that gelatine paper was more expensive than albumen home-prepared (not ready-sensitised). This I maintain is correct. True, I did not in my calculations reckon the cost of labour, plant, &c., but for argument's sake we will place to the credit of gelatino-chloride, 3*s.* 10½*d.*, leaving albumen still the cheaper by 4*s.* per quire, although I do not admit for one moment that labour and plant would cost this. Secondly, are we to infer that with gelatine paper there is no waste? My own experience is quite the reverse. I maintain that there is quite as much, if not more, than with albumen. True the paper is a trifle larger in the sheets, but, as they have to be trimmed as a rule before toning, this is not a very great advantage, the paper being very liable to become affected by damp, although protected by a pad of indiarubber. On a fine dry day printing a rich purple, on a wet day a foxy red, I ask you, sir, does this not affect the resulting tone of the print? For this reason I maintain that it is more difficult to get twelve prints alike in tone and depth of colour than it is with our old friend albumen.

I ask the gentleman, whoever he may be, which is the simplest to work, and which gives the best all-round results? As he appeals to practical men, if he is practical himself, which, of course, I have no reason to doubt, he must be able to answer this question, but naturally his interests will be on the other side.

Now, as to the consumption of more gold. Again I maintain I am not in error, or else why do the Company, or, for the matter of that, other makers, give in their formula two grains of gold to the sheet? Surely, if the paper could be toned with, say, one grain, is it not a great waste to use two grains? It is a well-known fact among practical printers that certain brands of albumen paper can be toned with less than one grain of gold per sheet, although one grain is given as the standard quantity, so will leave it to your readers where the false statement comes in.

As to yellow prints and double tones, no doubt careless working will account for this, but in my own case I obtained them although I followed the instructions to the letter; this was some months back, as I have ceased using it now. In conclusion, I may inform the Company that I have no interest either way, pecuniary or otherwise, in the rise or fall of gelatine or albumen paper, but, being asked by the Editor for a practical article for the ALMANAC as in former years, wrote what I considered would be an interesting subject to its many readers. I have no wish to enter into a controversy; but, as the Company have forced themselves to the front by their letter, it gives me no other option but to reply to them, and will leave your readers to judge who is in error.—I am, yours, &c.,

Rose Cottage, Bowbridge, Stroud, Glos. J. H. SMITH.

To the EDITOR.

SIR,—Notwithstanding the Britannia Works Company's denial of the experiences as stated by several contributors in your ALMANAC, I beg to say I am yet another user of above paper who has found many of these experiences perfectly correct. I am not a "scribbler" in your ALMANAC or any other, nor have I any interest in any photographic paper company whatever, either albumen or otherwise. I can truthfully say that gelatine paper does consume more gold than albumen, and, if good, even tones, approaching purple, be looked for, considerably more. I have never found yellow stains, but I have found yellow prints. In short, my experience (after exhaustive trials with both plain and distilled water) is this: You make up bath to 16 ounces, as directed, with 2½ grains of gold. Take, say, a tube or packet yielding 6 10 × 8s. Tone 3 pieces; these proceed beautifully, and tone in about 6 to 10 minutes. Pour toning bath back into bottle. Try and tone remaining 3 10 × 8s in 3 or 4 days. Now these absolutely refuse to tone, and, if kept in bath for 20 or 30 minutes, high lights get slaty, and, if put in hypo, come out so with the rest of the picture yellow. Adding more gold only seems to make print more washed out than ever. I suppose I shall be told "*gold deposited*"—if so, it is due to the paper. I thought so; bought new everything, even to bottles. All the same. The only way to tone remaining three is, remove from old, wash, and place in a freshly made bath, throwing the old one, with the greater amount of gold, down the sink. It is quite possible that this procedure may satisfy small workers, but I found it impossible to tone a large batch, getting all prints even, unless I am prepared to lose a quantity of gold. (How I proceeded for years with the old albumen, using acetate or lime, was, after toning, pour back into bottle, adding gold to sheets used. These baths have worked, more or less, for 3 months.) If the Britannia Works Company, with all the means at their disposal, will show me and numerous others how to avoid this behaviour of the toning bath, I will thank them.

I beg to apologise for using so much of your valuable space, but I like the process immensely, and should be deeply grateful to any one who could let me know how to successfully work it.—I am, yours, &c., for once a SCRIBBLER.

P.S.—I send you, Mr. Editor, a parcel of prints to show you that I think my knowledge of photography should enable me to manage printing-out paper.

[The prints referred to will be retained in our office for a few days to enable those interested to call and examine them.—ED.]

SPOTS AND PINHOLES.

To the EDITOR.

SIR,—In THE BRITISH JOURNAL OF PHOTOGRAPHY for September 29 is a letter from a gentleman named Fisher upon the above, and, as a careful reader of the JOURNAL for many years, I have not seen any reply given to it. He states the interesting fact that the plates of one maker gave spots and pinholes *ad libitum*, whilst those of two others were entirely free from this defect. He put the fault down to dust and a defect in the film from the plate being imperfectly cleaned previous to coating, and from blistering when drying after coating, also frilling at the edges. So much for the case.

This apparently inexplicable puzzle is easy of solution when you get the key to the riddle. Many years ago the writer experienced the same trouble, and returned to the makers some dozens of plates in consequence. The time occupied in touching out spots in a gross of valuable negatives was hard lines, both for himself and assistants; and, after many experiments had been made to discover the cause, it was proved to occur in every brace of plates which had tissue paper between them, to the non-removal of the antichlor (hypo) left behind in the paper, which, acting on the film by pressure, having been possibly packed while warm and before being desiccated, the spots on one plate were reversed. Other makers whose plates he used put blotting-paper between them, and there was never any defect. Even after five or six years' keeping the plates were in excellent order. Your correspondent can prove this for himself by taking one of the same brand of plates and placing a sheet of the defective tissue over the film side, and giving it a full exposure in a printing frame to a good light, then developing with our old friend pyro and soda, and a good black surface will be formed, on which the pinholes, &c., will be fully brought out if the paper be the same. That is how we discovered it.

Trusting that this explanation may meet the difficulty and be an assistance to others,—I am, yours, &c., HARDING WARNER.

Malvern Link, December 11, 1893.

ROLLABLE FILMS.

To the EDITOR.

SIR,—To the users of the rollable films now in the market the letter of Mr. Bourne and your Editorial will be welcome. After some years' experience with Kodak films, I have come to the conclusion that the tendency to curl and twist in those films varies in different spools and is more pronounced in the films sent out of recent years than in those made four or five years ago. So marked has that tendency become, that of all the spools exposed by me during the past season abroad I have found very few films that would remain flat on the dish during development, and therefore now find it advisable to place the film face upwards on glass, and secure each end to the glass by an elastic band. If kept in that position during development, fixing and the subsequent washing, I find that there will be very little difficulty with the films afterwards. Of course, the mark made by the elastic band at each end will slightly curtail the size of the negative.—I am, yours, &c., CELLULOID.

Prestwich, Manchester, November 28, 1893.

RAPID FILMS *VERSUS* PLATES.

To the EDITOR.

SIR,— Mr. Conybeare treats the differences in our views so reasonably and with so evident a desire to get at the truth, that I think we ought to work together to unravel this subject. But he will allow me, I hope, to say that his own experiments show that he does not take the precautions I consider necessary, as he says that one of his was inconclusive, "due to either the light having gone off between the two exposures, or showing it to be a less powerful developer," which indicates that he did not take the precautions I consider necessary to secure a perfectly equal light which, however, may be easier in this climate where we have sunshine on some days unbroken by a cloud from sunrise to sunset. I always take the midday of one of these days for comparative experiments.

But Mr. Conybeare may remember that I noted the fact that the great difference I found in extremely short exposures, as between films and plates, did not appear in time exposures. This renders the problem more puzzling. Then, the quality of the plates is another element of uncertainty, and I am almost disposed to think that there are brands of plates made on the Continent quicker than any I have been able to get from England. The fact, is that I have got fair negatives with an exposure of 1-1000 sec. by the Thornton-Pickard estimate, with a Schleussner plate, while with no film have I been able to get the same at the lowest power of the focal-plane shutter, at the speed of 1-200, *i.e.* But my experiences were not made, as Mr. Conybeare supposes, in "ordinary work" but mainly as experiments for the purpose of deciding this question which seems to me of great importance.

I said that the very rapid films fogged after two months, which does not involve, as Mr. Conybeare seems to think, a change in my statement, but simply that the films which had the reputation of being the most rapid in the market went bad after two months, while the rapid films of other makers are good after eighteen months, but not so rapid to begin with. I have no doubt that the celluloid has a certain chemical effect on the emulsion that is put on it, and to determine this the makers of the very rapid plates might help us by coating plates and films alike with some of the most rapid emulsion they can make.

As to amidol in comparison with other developers, I have given it the most severe and exact tests in my power, and I find that it does not give the results that pyrogallol does. This is the opinion also of the most careful and scientific experimenters I know. I consider it as on a level with eikonogen, and the two the least energetic developers on the list.

As to the reason of the deterioration of films, I believe that the letter of Messrs. Guiterman touches the truth; but, as I know nothing of the nature of their wares and the difference between them and other, I can go no further. The whole subject is mysterious, like many chemical combinations. There seems to be some relation between extreme rapidity and rapid deterioration, and this corresponds to the condition with plates, of which the slowest keep best.

I enclose you two prints, taken at the highest speed of the Thornton-Pickard focal-plane shutter, to show you what I got with plates; with films I did not get a printable image. I am, yours, &c.

W. J. STILLMAN.

MESSRS. HURTER & DRIFFIELD'S WRITINGS.

To the EDITOR.

SIR,—It is frequently assumed that Messrs. Hurter & Driffield have not written any papers on their method of speed determination of plates in a popular and easily understood form. This assumption, like many another one with respect to Hurter & Driffield's work, is quite erroneous. We are now reprinting some of these papers, and shall be pleased to supply them free to any of your readers; or, if your space permits, you may possibly like to reprint them in THE BRITISH JOURNAL OF PHOTOGRAPHY.—I am, yours, &c., MARION & Co.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Wanted, 8½×6½, or 12×10 rapid rectilinear lens, by a good maker, in exchange for quarter-plate hand camera, fitted with eighteen single metal slides, focussing screen, finder, and rapid-view lens.—Address, W. HOLMES, Photographer, 136, Derby-road, Heanor.

Wanted to exchange a seven-string banjo, nickel-plated hoop, twenty-four brackets, splendid tone, in American leather case, new last August, for half-plate camera, no lens, or an enlarging lantern.—Address, J. COX, 26, Edward-road, Clarendon-park, Leicester.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & Co., 2, *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

CATALOGUE REGISTERED:

Thornton-Pickard Manufacturing Company, Altrincham.—*Catalogue of the Thornton-Pickard Photographic Specialities as appeared in* THE BRITISH JOURNAL ALMANAC *for* 1894.

PHOTOGRAPHS REGISTERED:

George Emberson, jun., Chertsey.—*Four photographs of Miss Nelly Wick, the Champion Shaver.*

Richard Tudor Williams, Monmouth.—*Two Photographs of His Eminence, Herbert Vaughan, Cardinal Archbishop of Westminster.*

W. C. GORDON.—Two photographs were registered.

A. M'CANN.—As chemicals work slower in cold than in hot weather, you might try the effect of a gentle heat. If this fails, write to the makers.

GEORGE BANKART.—1. Yes. 2. Yes, by Ross & Co. 3. They are now advertised; see advertisement in ALMANAC. 4. In all probability. Thanks for enclosure.

J. P. W.—If you refer to the formulæ in the ALMANAC, you will find several that are excellent. Try one or more of them, and adhere to that which suits your purpose best.

W. MURREN.—It is evident that the toning bath you employ is not adapted for that special paper. We have used a good deal of it, but have not obtained weak tones such as those of the specimens enclosed.

CHAS. JONAS.—If the gelatino-chloride paper has become the colour of "whity brown shop paper," the best way to utilise it is to burn it, and add the ashes to the residues. There is no way of using it photographically.

ANDREW SMALL.—Burton's book on *Photo-mechanical Printing* (published by Marion & Co.) may suit you. There is also a translation, by Mr. E. C. Middleton, of a book on collotype by Schnauss, which enters fully into the subject.

W. G. RAINSFORD, D.D. (President, Crewe Amateur Photographic Society).—We made repeated applications for particulars of your Society's officers, &c., for inclusion in the ALMANAC, without receiving any reply. Hence its exclusion.

FOCUS.—1. It will not pay to grind focussing screens by hand. 2. Most photographers back their own plates. If you have any preparation better than can now be obtained, you might give it publicity. 3. Write to the principal dealers.

H. P.—Your query is one that should be referred to a solicitor. We cannot in this column undertake to give advice on legal matters as regards the law of "Landlord and Tenant," although either the landlord or the tenant may be engaged in the photographic profession.

E. BLICK.—We cannot recommend any dry plates of better quality than those made in this country. We have never heard before that plates of better quality are made on the Continent than here. Be that as it may, English plates are probably more used on the Continent than those of native production.

W. RANOR.—It would be impossible to say which is the most permanent—gelatino-chloride or collodio-chloride prints—as the former have only been on their trial for a few years. The latter have had a longer trial. We have some by us that we made over a quarter of a century ago, and they show no sign of changing.

JOHN DORMER.—We cannot account for the flare spot in the micro enlargement unless on the assumption that, having removed the eyepiece, there is reflection from the inside of the tube. This you will be able to ascertain from personal observation. If it prove to be so, then a remedy will be found in lining the tube with black velvet.

J. COOK.—The colouring is nice and effective, and you should persevere in the development of the industry. How any one can obtain a patent for a similar system of colouring that can be valid rather puzzles us, as sets of liquid colours for this purpose have been in the market for many years. We shall know better when the specification is published.

CLUTHA writes: "In your issue of 1st inst. (supplement, p. 116), Mr. James Lewis refers to a vegetable parchment which is obtainable in rolls of sixty inches in width, which makes an admirable translucent screen. Could you kindly mention in your next number the address of some firm which supplies it?"—Messrs. Bemrose & Son, Old Bailey, supply it.

S. X.—Most of those who work professionally use a dynamo machine for the decomposition of the copper. But one we assume is not available in your case, therefore we should advise you to employ a Smee's battery of a tolerably large size. For the size plates you mention, the platinised silver plate should not be less than eighty to ninety square inches.

T. S.—We should advise you not to carry out your idea of making a collection of photographic copies of bank-notes of the different denominations, as an attraction to your showroom. Your friend the bank clerk, who promised to lend them to you, ought to have told you that to reproduce bank-notes in any form was illegal, and would subject you to prosecution if the authorities were aware of it.

CURATE.—If the music is copyright it would be piracy to copy it, even for lantern slides for your own entertainments in the parochial rooms, and in copying it you would, of course, render you liable to the penalties according to the law. There would be no harm in asking the publishers for their permission. They might possibly accord it, but that is somewhat doubtful if they hold an unexpired copyright.

THOS. A. MORYSON.—The imparting of a matt surface to paper prints by the application of matt varnish was suggested and tried many years ago, but no one seems to have cared much for the effect produced. Far otherwise was it with stereoscopic transparencies, as produced by Ferrier & Soulier some forty years since. The matt varnish employed by them was, we think, composed of a solution of white wax, and gave a grain so fine as to be imperceptible even by a high magnifying power.

SYNTAX.—Although the Copyright Act is in a very unsatisfactory state, it is quite clear on the point upon which you seek information. If any one has pirated a picture in which you hold the copyright, you have your remedy in a court of law. The infringer is liable for penalties or damages. We do not remember the details of your previous communication. The photographers referred to agreed to give the illustrated papers permission to reproduce the pictures, in which they hold the copyright, for 21*s.*; but this does not bind any one else to do the same. Every one has the right to make what terms he chooses.

CHESTERFIELD.—If the cylinder has been tested by your boiler-testing apparatus every time before it is sent away to be charged to double the pressure of the gas when it is filled, we should not care about having much to do with that vessel when fully charged. Have you read the expert's evidence given at the inquest on the late Bradford catastrophe?

SELCINNUR.—To obtain the full benefit of the nine-inch condenser when used with a small plate, let such plate be placed so far from the condenser as just to be covered by the cone of light emerging therefrom, and employ an objective no longer in focus than to cover the plate and take up all the rays transmitted through the condenser. An objection to using stereoscopic transparencies as lantern slides lies in the fact that they are, or ought to be, much denser than the latter. But, if thin, they will answer quite well.

HOWARD DALE.—We occasionally use the Kodak, and with uniform success. An aperture of *f*-11 amply suffices for snap-shot work. Some workers use a much smaller stop, *e.g.*, *f*-16, and get good instantaneous effects. Of course much depends upon the lighting of the subject, and, if the weather is dull, the speed of the shutter should be made slower than on a bright summer day. With thin films there will be practically no halation. They are quite easy to develop and dry, and the exposed portions may be detached from the remainder on the roll.

CYMRO.—A portrait lens must be specially constructed to allow of the reversion of the back crown. Among the peculiarities of construction are these:—The front combination should be of much shorter focus than the back, the curves of the back combination should be of longer radii than in the present form, and the distance between back and front rather less. There is always a difference between the back and the equivalent focus of a portrait combination. Your stop marked *f*-8 is not quite correctly marked; *f*-9 or, possibly, *f*-10 would more correctly represent its value.

COLLOTYPE asks: "What is the best form of hand machine for collotype process—the ordinary litho with scraper, or the one with vertical pressure? Also do you know of a thoroughly practical man that would teach the process?"—In England the ordinary typographic press, such as the "Albion Press," as supplied by all dealers in printers' materials, is the one most generally used. On the Continent presses with a scraping pressure are more generally employed. An advertisement in the columns of the business portion of the JOURNAL will possibly secure you a tutor.

VARNISH AND FROST writes: "Can you inform me how I can take the frost out of varnish on oil paintings? I had twenty varnished during an afternoon this week, and next morning they were all dull and 'starred' with frost. Have revarnished one as an experiment, but it comes through again just the same. They are all direct portrait paintings in oil."—From the description we do not understand the case, unless an unsuitable varnish was employed. We have never heard of an oil painting, not on a photographic basis—and that is what we surmise is meant—being "starred" by the varnish, or by any varnish that is usually employed for such pictures.

E. MILLHOUSE says: "I have recently taken up the carbon process, using ——'s paper and instructions. Everything went smoothly enough until the second transfer came along, and in every case I was unable to strip the final support from the temporary support. Increasing the amount of yellow wax in waxing solution has been tried without success. I have, of course, followed out the instructions in every respect. Besides soaking the final support in warm water, I have tried cold water before applying to temporary support. Can you kindly suggest one or two probable reasons for my failure?"—Our correspondent fails to say what was the temporary support, whether glass, zinc, or Sawyer's flexible support, and the kind of waxing solution employed. If either of these supports was employed, with the wax solutions recommended for them, there should be no difficulty.

PYRO writes: "Would you be good enough to reply to the following through THE BRITISH JOURNAL OF PHOTOGRAPHY? I have completed an invention which I wish to patent, but have not the necessary capital. Would it be possible to register it first and patent it afterwards? What would it cost to register? Supposing I registered my apparatus, how long should I be protected? If anybody copied or made apparatus like mine, I suppose there is a penalty for so doing? The question is, Can I register something that is made, or does registration only apply to photographs and trade marks? I should feel much obliged for your reply."—Registration does not apply to apparatus. Our correspondent can obtain provisional protection for his invention for twelve months, the cost for which is twenty shillings only, if he does not employ a patent agent. If, before the end of nine months, he lodges the complete specification, a patent will be secured for four pounds, which will last for four years.

RECEIVED.—*Handbook on the Use of Compressed Oxygen*, by K. S. Murray. In our next.

CONTENTS.

PHOTOTYPY F. THÉVOZ & CO, GENEVA NEGATIVE REV. KEENE

WINDSOR CASTLE

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1755. Vol. XL.—DECEMBER 22, 1893.

SOFT PRINTS FROM HARD NEGATIVES BY THE CARBON PROCESS.

In the article on carbon printing a fortnight ago, the subject of obtaining vigorous prints from feeble, or perhaps it would be more correct to say the delicate, gelatine negatives of the present day, was dealt with. We here propose to deal with another and opposite phase of carbon working, for it is not an uncommon thing, even now, to sometimes find negatives of quite an opposite character to those alluded to. We do not mean simply vigorous ones, in which the lights and shadows are in perfect harmony throughout, but that class in which the high lights are dense and hard, while the shadows are thin and bare—such, indeed, as used to be termed of the "soot-and-whitewash" type. Negatives of that nature were much more prevalent in the collodion days than they are now, and it was those which gave the greatest trouble to the inexperienced carbon worker in times past.

Reference was made in the previous article to the fact that very little had been done — or, at least, published — as to modifying the working of the carbon process so as to adapt it more completely to the delicate negatives now so general, as in the case of some other processes. It so happens, however, that this process is capable of variation, to suit different requirements, to perhaps a greater extent than any other printing method. What was published as the best condition for working when the average type of negatives was so different from what it is now has been handed down, and usually accepted by novices as the most suitable at the present time.

A little consideration will suffice to show that, to obtain the best results from negatives of an extremely opposite character, the object will be to exaggerate the contrasts in the one case, and subdue them in the other. It is the latter point that will now be considered. It is well known to all experienced carbon workers, that the more highly sensitised the tissue is, or, to be more correct perhaps, the more bichromate it contains, the softer, and with less contrasts, will be the resulting prints. Therefore the tissue to secure this end must be highly sensitised, and, if the sensitising is done at home, a bath of even seven per cent. may be used, and a tolerably long immersion allowed with advantage. There is, of course, a limit to the strength of bath that can be used, inasmuch as, if it be of too great a strength, some of the bichromate salt will crystallise out on the surface of the gelatine as it dries, which would, of course, be detrimental. Tissue that is so strongly sensitised as this must not be expected to retain its solubility for so long a time as that which contains a smaller proportion of the bichromate. But the quicker it is dried the longer it will keep, and it so happens that quickly dried tissue, as a rule, gives softer prints than that which has taken a long time to dry. Hence there will be a double anvantage gained by drying this particularly sensitised tissue more rapidly than usual. This highly sensitised tissue, although it will not keep so long as more weakly sensitised, may, if quickly dried, generally be found to retain its solubility for a week or ten days. In the former article it was mentioned that tissue that was sensitised in the making prints, as a rule, with less contrast than that which is rendered sensitive afterwards. For this reason it will be an advantage, as well as a greater convenience, to employ the former.

As to the printing, this should be done in a strong light—direct sunlight if that be available—so that the densest portions of the negative are quickly penetrated. As the "continuating action" has a tendency to increase the contrasts, it follows that the picture should be developed soon after the tissue is taken out of the printing frame. Here is a very useful dodge that is usually adopted by carbon workers when dealing with negatives of the "soot and whitewash" nature. After the tissue is removed from the frame it is exposed to light for a few seconds, but not sufficiently long to produce fogging or veiling of the high lights, when the print is developed. This slight exposure seems to fix or complete the feeble action the light has exerted through the densest parts of the negative, and prevents the more delicate tints of the lights from washing away before the development is completed. In working from hard negatives over-printing should be avoided, so that moderately cool water will suffice in developing. Then the deepest shadows can be locally reduced by pouring over them a fine stream of hot water from a jug, or by rubbing them with a soft camel's-hair brush, or the two artifices combined.

There is yet another means by which the carbon process can be modified to meet extreme requirements, namely, in the manufacture of the tissue itself. By varying the composition of the gelatinous matters employed, and the apportionment of the pigment to them, the manufacturers are enabled to adapt the tissue to almost every possible requirement. But, as our readers are scarcely likely to go into making their own tissue, it will be needless to enter into this phase of the subject. They may, however, rest content that with the tissue now supplied by our best makers they will obtain that which is best suited to average negatives, and which, with a little modified treatment, will yield results equal to every practical requirement.

THE WET-COLLODION PROCESS.

II.—How to Make Pyroxyline.

Although we have described the making of soluble cotton as a somewhat messy process, we can, nevertheless, recommend that, from an educational point of view, it should be tried. We shall commence by describing a method extensively practised many years ago on account of its simplicity and the good results obtained.

Have in readiness some clean carded cotton-wool, and separate it in tufts, and into a porcelain vessel of suitable capacity, such as a breakfast cup or a bowl, according to the extent of the operations, place a quantity of finely crushed dry nitrate of potash. We always employed the common saltpetre of the shops for this purpose. Now pour in slowly enough sulphuric acid to form a thick solution of the consistence of boiled oil or furniture varnish. A glass rod must be employed for mixing the nitre and acid. The cotton is now immersed in this, tuft by tuft, taking care that each, by the action of the glass rod, is thoroughly submerged and made wet throughout before another is added. Turn the cotton well over to ensure its all being acted upon by the solution. Do not add more cotton than can be easily brought into contact with the liquid. After remaining for from three to four minutes, the cotton, which is now pyroxyline, is lifted by means of two rods or slabs of glass, and transferred to a basin of water, in which it is thoroughly washed in several changes of water. The water is finally wrung out, and the cotton spread out on a towel to dry in a current of air, this being facilitated by pulling asunder the now tangled tufts. When quite dry, it will be found to have considerably increased in weight.

For those who prefer to work to scale, the proportions given by Count Montizon may be adopted, which are: one and a half ounce nitrate of potash, ten drachms of sulphuric acid, and forty grains of cotton. We have made pyroxyline by this formula, but always considered that the proportion of sulphuric was too small. We have also worked by the proportions given by Ash Haddow, which are: five parts of nitrate of potash, ten parts of sulphuric acid (by weight), and one part of water.

When the mixture is made, it is accompanied by the production of heat, and it is important that the cotton be added before it is allowed to cool, for, as it cools, the mixture becomes quite thick.

The final washing of the cotton should be given with tepid water, to ensure the removal of the bisulphate of potash, for if any traces of this salt be left in the cotton, although, so far as we have found, it does not lessen the sensitiveness of the resultant collodion, yet does it impart a certain degree of opalescence to the collodion film when spread upon glass. This does not interfere with its utility for negatives, but is apt to be detrimental to its employment for positives and lantern ransparencies.

When cotton has been prepared as directed, it is not really *gun* cotton, which is prepared in a slightly different manner. It is, however, explosive in a slight measure, and hence, if the drying is completed by spreading it before a fire, exceptional care should be taken that no sparks get near to it.

We believe that almost all the large makers of soluble cotton now do it by the admixture of nitric and sulphuric acids. When these are mixed in nearly equal proportions, and allowed to get cold, the cotton treated by immersion therein is highly explosive, but very sparingly, if a tall, soluble; but, by warming the mixture before immersing the cotton, the solubility is increased, and what photographers desire is, the extreme of solubility without explosive qualities. These properties are imparted by weakening the acids in a slight degree by the cautious addition of water, and raising the temperature to 130° Fahr. previous to the immersion of the cotton.

Haddow, the earliest and most exhaustive experimentalist in this direction, availed himself of these facts in order to produce collodion wool by the use of acids, without the trouble of calculating the proper mixture according to their strength. He mixed five parts by measure of sulphuric acid and four of nitric acid (not lower than 1·4 sp. gr.) in an earthenware vessel, and added *small* portions of water at a time, testing after each addition by the immersion of a tiny portion of cotton. This addition of water was continued until a fresh piece of cotton was found to contract and dissolve on immersing. When this took place, half the quantity of sulphuric acid originally used was added, after which as much cotton as could be soaked was immersed for ten minutes, care being taken that the temperature of 130° was maintained. Thorough washing in several changes of water follows, litmus paper being employed to indicate the total removal of the acids. This gives a cotton that dissolves perfectly and instantaneously in ether without leaving a film behind, and the film it produces is of great strength and transparence.

Instead of cotton-wool, filtering paper is preferred by many in the preparation of pyroxyline. It is certainly easy to manipulate, but beyond this it does not appear to possess any special advantage. Linen, too, has by some been strongly recommended. For this we have this good word to say—that, when dissolved in ether, it gave the strongest and toughest film we have seen.

It is impossible to say from an examination of the collodions of commerce whether they are prepared from wool, paper, or linen, as information of this nature is not usually given to the world by the respective manufacturers.

PHOTOMETERS FOR USE IN PRINTING.

Although the rapid spread of process work and the revival in popularity of carbon printing have given a prominence to the employment of the photometer that did not exist a few years ago, there are other applications of the instrument equally useful in their way, but almost, if not altogether, neglected at the present time. In the two branches of printing above alluded to, a photometer of some sort may be said to be an absolute necessity, and is consequently provided as a matter of course; but in more than one department of both professional and amateur work, although no thought is given to the matter, considerable advantage is to be derived from its systematic use.

To give but one or two examples, let us mention the production of opals or transparencies on print-out emulsion plates, a class of work which, in the absence of specially constructed frames, allowing of the accurate preservation of register while the progress of the printing is watched, is little better than guesswork. Such frames are necessarily expensive, and, unless required for regular use, as in a professional establishment, are seldom provided, the amateur or other small producer preferring to trust to luck or subterfuge in securing accuracy of exposure. Intimately connected with the same branch of printing is the newly introduced system of development of gelatine-chloride proofs on paper, which promises to be largely employed during the duller months of the year, if not, indeed, even during the

summer. Here we have little hesitation in saying that considerably more uniform success would be obtained if the exposures were gauged by means of the photometer rather than by mere inspection.

But another phase of the question may be looked at, and this refers chiefly to printing in platinotype, though, in a less degree, also to gelatino-chloride. It is needless to point out, much less enlarge upon, the necessity in the former process for guarding the paper against damp before and during exposure and previous to development. The importance is less generally recognised of treating gelatino-chloride paper with similar, if perhaps not such rigid, care; but the necessity does exist, nevertheless, and many of the complaints of failure and want of uniformity of tone would remain unheard of if a little more trouble were only exercised in the matter of protection of the paper from damp.

At this period of the year it avails little to keep the printing paper, whether platinum or gelatino-chloride, in calcium tubes or other damp-proof receptacles, or to back them up in the printing frame with indiarubber sheets, if, every time the frame is opened for the examination of the prints, the latter is freely exposed to an atmosphere heavily charged with moisture. The very fact of the paper having been previously kept in a state of practically perfect desiccation renders it all the more liable to absorb with avidity the moisture to which it is presented, and, almost before it is possible to suspect it, the seeds of future harm are sown; but, if the exposures are made by means of a single photometer, there is no need to open the frame at all; and, provided both negative and paper are thoroughly dry to commence with, and are put into the frame in an ordinary warmed room—as all printing rooms should be—the print, after exposure, may be returned to its case in absolutely the same condition after exposure as before. This is certainly not the condition of affairs when it has been opened for examination half a dozen or a dozen times in a cold, damp atmosphere, such as prevails as we write.

For these and similar purposes a simple form of photometer will be found a most valuable addition to the photographer's appliances, whether he be amateur or professional. But here we would ask those of our readers who are not technically acquainted with the instruments used by photographers under this name to grasp fully what is meant by the term, and to distinguish between that and the somewhat similar term "actinometer." The latter, as usually employed by photographers, is an instrument designed to measure the actinic or chemical value of the light, and is used as the basis upon which to work out a series of calculations, perhaps with the assistance of an "exposure table." "Photometer" is the designation applied, outside photography, to the instruments used for estimating or comparing the relative illumination, or candle power, of artificial lights; but, as used in photography, it signifies rather a means of registering the amount of work done by the light in a given time.

Very many different patterns of photometers have been introduced and used during the past thirty years, and some of these are articles of commerce. In its simplest form, as applied to photographic purposes, the photometer partakes of two principal types, which may be illustrated by the "Johnson" and "Woodbury" instruments, introduced by the late J. R. Johnson and the late W. B. Woodbury respectively. The first consists of a scale of "tints" of gradually increasing density, formed by the superposition of a successively increasing number of thicknesses of fine paper or other material, behind which a piece of sensitive paper is exposed. By experiment, the printing value of a negative is ascertained; that is to say, the number of the tint on the photometer that is impressed during the same period as that required to give the best result with that particular negative. This number having been once ascertained, all that is necessary is to expose the photometer side by side with it, and, when the ascertained tint is impressed, the exposure of the negative may be taken as correct.

In the type of instrument of which Woodbury's is the most familiar form, a series of coloured tints made to represent the successive colour assumed by a piece of sensitive paper are ranged in a circle round a central aperture of clear glass, behind which a strip of test paper is exposed. This instrument is used in the same manner as the former, the reading being complete when the centre aperture presents the same colour as the tint which has been found to best suit the negative under treatment.

Of the two forms, the latter would undoubtedly be the more convenient, if it were only possible, in the first place, to accurately represent artificially the colour produced by the action of light upon any kind of sensitive paper, and, again, to prepare a paper which will invariably give the same colours. No one who has used either albumenised or gelatino-chloride paper—and these are the only ones that are practically available—will have much faith in the possibility of securing with the same exposure, or, indeed, with any exposure, the same gradation, and, above all, the same colour. In the matter of gradation some specimens will print harder than others, or, in other words, take a comparatively shorter time to produce a certain depth of tint, while, in the matter of colour, that may be anything, from brick-red to rich purple.

This, in fact, constitutes the weak point of the Woodbury and similar types of photometer, for it requires but a brief trial to convince any one of the extreme difficulty of judging the relative depth of two tints that are dissimilar in colour; moreover, when a certain depth is reached, it is next to impossible for the eye to distinguish between slight variations, even though the colour be the same. Attempts have been made to overcome the first difficulty by examining the tints under yellow or other coloured glass, so as to practically produce a monochromatic scale, while, to get over the difficulty of distinguishing between tints of considerable depth, the alternative of printing out two or more tints of a lower grade has been adopted. Neither of these has, however, proved completely successful, and for moderately accurate work the coloured scale is little used.

With the graduated translucent scale, however, the question of colour is altogether unimportant, provided the sensitive test paper is impressed by the same coloured rays as the surface to be tested. For example, a test paper sensitive to the green and yellow rays would obviously be of little value in testing a film impressed only by the blue and violet rays, and *vice versâ*. It follows also that the translucent screen or scale should itself be as free as possible from chromatic peculiarities; that is to say, it should be as neutral in character as possible, or, if required for use with films possessing any colour peculiarities, should approach as nearly as possible to the same character. For general purposes, nothing has been found better than successive layers of tissue or other fine paper, as white and free from colour as possible. Then the various grades are produced by increasing degrees of opacity irrespective of colour. If, on the other hand, a screen were formed of, say, thin transparent

films of coloured ge at ne, we should naturally expect, if not an altogether different scale of gradations, at least a scale that would vary with every different source of light, and not improbably at every different hour of the day and season of the year. Want of attention to this most important point has rendered untrustworthy many examples of the graduated scale that have passed through our hands.

One other point that cannot too strongly be insisted on is the necessity in all cases of suiting the trial paper used in the photometer to the sensitive film to be tested as first referred to. Neglect of this important point, or, rather, the practical impossibility of attaining it, is the chief reason why a really accurate actinometer for use in measuring camera exposures is a practical want. Thus, to employ a chloride paper in the photometer in timing the exposure of bromide enlargements would be a palpable absurdity, since the chloride paper is wholly unimpressed by any rays lower down in the spectrum than the blue, while the bromide is more or less sensitive to all the visible rays, but markedly so to the yellow. The consequence would be that, if with one particular kind of illumination an absolutely correct reading were possible, it would be altogether inaccurate when the light was changed.

This difficulty need not operate, however, so far as our present purposes are concerned, as these refer principally to the "print-out" processes in which chloride of silver, bichromated gelatine, platinum, and bitumen are employed, none of which exhibit any appreciable sensitiveness except to blue and violet rays. Although the different processes may vary, and do very materially, in absolute sensitiveness—take, for example, platinotype and bitumen—there is no reason to anticipate any serious inaccuracies in the readings obtained with chloride of silver paper, whichever of the processes it may be applied to.

Wherever possible, it is, of course, advisable to employ the same or a similar test paper in the photometer to that being tested—gelatino-chloride for gelatino-chloride, and albumen for albumen; but it is obviously impossible, except at great trouble and inconvenience, to use carbon for carbon, or indeed to be strictly accurate. But the agreement between the different results is practically so close that there need be very little difficulty in working with a tolerably uniform sample of either albumen or gelatine paper.

Of course, for strict accuracy, the proper plan will be to prepare a special paper, as is always done for purely scientific purposes; but we are not now thinking of any such extreme niceties, and we think it will suffice for all the purposes of every-day work to place reliance upon the paper in actual commerce. Any variation, if such there be, will not be sufficient to cause any serious trouble with the carbon and similar processes, while in the case of albumen or gelatine papers the variations will be identical, both on the photometer and the printing frame.

The most important point that remains is to secure a satisfactory graduated scale, and that part of the question will be treated in a separate article.

Non-rusting Bunsen Burners.—Every one who has had much experience in the use of Bünsen and other gas burners in the dark room or laboratory is familiar with the rusty and generally uncomfortable appearance they attain after a little hard use, and sometimes without any service, simply after being placed aside on a shelf. There seems every reason to believe that such effects may be entirely prevented by the use of Fletcher's "Chematto Enamel." All burners of cast iron so coated are unchangeable by even a continued red heat, and appearance may also be considered, for enamel-coated burners, either dead or bright, can be had in any colour, or in gold or silver, and all alike unchangeable by heat. Our readers must not expect an "Aspinall enamel" effect, but for burner or gas fires the appearance is both neat and cleanly.

Art Progress.—The Duke of Westminster, speaking at the presentation of prizes to the successful students at the Chester Science and Art Schools the other evening, paid a high tribute to mechanical photography. Referring to the progress of art, he said the various processes now being carried out enabled almost the poorest of our fellow countrymen to have very beautiful works of art upon their walls. Notwithstanding the rapid spread of art teaching, it seems somewhat a pity that high-class photographic reproductions of the Old Masters in our national collections are not obtainable by students at a more moderate price than they are.

Easy Rule for Converting Thermometrical Degrees.—The frequent use of Fahrenheit or Centigrade degrees in one and the same periodical show that there is still by no means a universal preference for the latter, hence a ready mode of converting one into the other will be useful. We notice in a recent issue of the *Chemical News* the following communication from Mr. G. Watmough Webster, F.C.S., bearing on this subject:—

I think many of your readers will be interested in the appended rule for the mutual conversion of degrees Centigrade and Fahrenheit, which I devised many years ago for simplifying the usual method of calculation as given in various technical manuals, the latter being cumbrous and not quickly performed, except by an expert reckoner. Almost any one can readily make the conversion by the new rule without even needing paper and pencil. Such a method might be expected to have been published before, but I have not seen it, nor has any one to whom I have imparted it.

To reduce a given number of degrees Centigrade to Fahrenheit.

Rule.—Double the number and subtract one-tenth of the result.

Fahrenheit to Centigrade.

Rule.—Increase the number by its ninth part and halve the result.

The necessary subtraction or addition of 32 at the proper stage is performed in the usual manner.—I am, &c.,

Temperature of Ignition.—In the use of the mixed gases for lantern purposes, the question sometimes arises as to whether coal gas or pure hydrogen is most readily exploded in case of a rise of temperature. An important contribution to our knowledge of the matter has recently been made by Prof. Victor Meyer in conjunction with his assistant Herr A. Münch. It was found that with purer hydrogen and oxygen the initial temperature required to cause explosion varied between 612° and 686°, no difference being found whether the gases be dry or moist. The presence of platinum foil prevented explosion, quick combustion always took place even when a temperature of 715° was reached. When hydro-carbons were used with oxygen, it was found that the temperature needed to induce explosion was lower the greater the proportion of carbon present. Thus the mean temperatures of explosions with methane, ethane, and propane were 667°, 616°, and 547° respectively. It will thus be seen that, whatever the difference may amount to in practice, it is a fact that pure hydrogen and oxygen will be more difficult to explode than mixtures of coal gas and oxygen.

BRISTOL INTERNATIONAL PHOTOGRAPHIC EXHIBITION.

I.

The Bristol International Photographic Exhibition was opened on Monday last, December 18. It is to remain open until Monday, January, 22, 1894. The Exhibition is being held in the galleries of the Academy of Arts at Clifton, a noble suite of rooms admirably adapted for the purpose, and such, indeed, as seldom falls to the lot of a photographic society for the purposes of an exhibition. About a thousand frames of photographs, &c., are placed on view, and they are disposed with such excellent taste and judgment that the visitor

may pass from room to room and be greeted with a variety of *ensemble* and effect such as is usually absent from most collections of pictorial photographs.

So many notable photographic exhibitions have been held since the occasion, ten years ago, when the Bristol Society held its last display, "so many things," as the late Lord Beaconsfield is alleged to have remarked, "have happened since then," that the Council may well have been excused if the Exhibition just opened was entered upon with a certain degree of trepidation.

For exhibitions of a high order are to-day, in a manner of speaking, as common as blackberries in September. Ten years ago it was different. Still, the result has justified the Bristol Society's enterprise, for it has emerged from it with *éclat*, if not triumph. Not merely does the Exhibition amply uphold its international character, three continents as it were being represented in it, but, from a general point of view, we accord it unstinted praise as fully representative alike of modern photographic work and workers. To scan down the list of exhibitors is to encounter the names of the principal exponents of latter-day photographic art. One feature deserves pointed notice, and that is, the almost total absence of prominent examples of the fuzzy school in the manner of the Dudley Gallery. Neither the Exhibition nor the visitors thereto will be the worse for this. The judging appears to have been well done, the "tail" of the display is a small one, and, on the whole, the Exhibition has undeniably earned the stamp of success. We trust that the West of England public will take every advantage of the opportunity given them by the Bristol Society to study photography in its latest and most agreeable phases, and that the financial results will be as gratifying as the artistic. To Mr. Hood Daniel (the President) and to Mr. Bligh Bond (the Hon. Secretary) every congratulation is due.

The Judges' Awards.

The Exhibition comprises twenty-one classes, which, to our thinking, is too many. The Judges were Messrs. S. P. Jackson, R.W.S., Valentine Blanchard, B. Alfieri, Payne Jennings, and H. A. Hood Daniel (President of the Society). In their report they say that "the Exhibition is exceptionally large, and the classes with few exceptions are so strong and of so high an average grade of quality that the difficulties presenting themselves could only be overcome and justice done by the award of extra medals." Their awards are:—

Class I. (Champion), gold medal, No. 176, *Kelp Gathering, Iona*, W. M. Warneuke; first extra silver medal, No. 130, *A Still Delight Steals o'er the Earth*, J. B. B. Wellington; second extra silver medal, No. 185, *Saturday Afternoon*, F. M. Sutcliffe; third extra silver medal, No. 308, *Miss M. Wilson*, H. S. Mendelssohn. Class II. (Large Landscapes), silver medal, No. 8, *On the Derwent*, Bernard Lintott; bronze medal, No. 50 (*a*) *Sun, Fog, and Frost*, (*b*) *A Winter's Day*, (*c*) *Stanford Lane*, Robert Frost; extra bronze medal, No. 55, six *Views along the Streams of Normandy*, Rev. Precentor Main. Class III. (Small Landscapes), No. 201, *Strand on the Green*, Henry Smith; bronze medal, Nos. 238–246, a hayfield series, Walter Norgrove. Class IV. (Large Marine), silver medal, No. 813, *On the Top of the Tide*, Bernard Lintott; bronze medal, No. 796, *Whitby Harbour*, F. M. Sutcliffe. Class V. (Small Marine), No. 292, eight views by H. Oswald Isaac, and Nos. 280, 286, 297, three frames by Mr. H. W. Bennett, bracketed equal, each receiving a silver medal. Class VI. (Large Instantaneous), bronze medal, No. 524, *Toby and Jack*, Edward Hawkins. No silver medal awarded. Class VII. (Small Instantaneous), silver medal, No. 528, hand-camera studies, Percy Lewis. No bronze awarded. Class VIII. (Interiors), silver medal, No. 627, *The Choir, St. Paul's Cathedral*, H. W. Bennett; bronze medal, Nos. 673 and 675, *Haddon Hall* and *Tewkesbury Abbey*, Harold Baker; first extra bronze medal, Nos. 637, 655, 656, *Library, Hampden House; Grand Hall, Mentmore; Interior, Waverley Abbey*, S. G. Payne; second extra bronze medal, No. 685, three interiors, G. Hepworth. Class IX. (Architecture), bronze medal, No. 581, *Gateway, Whitby Abbey; South Porch, Tatton; Porch, St. Stephen's, Bristol*, W. Crofton Hemmins. No silver medal awarded. Class X. (Small Portraits), silver medal, No. 459, *Portrait Studies*, Harold Baker; bronze medal, No. 467, Harold Baker. Class XI. (Large Portraits), silver medal, No. 417, *Portrait of a Child*, W. M. Warneuke; bronze medal, Nos. 472 and 473, *Rev. Stopford Brooke* and *Mr. H. E. Davis*, Fred Hollyer. Class XII. (*Genre*), silver medal, No. 355, *Where'er you go, &c.*, Miss E. J. Farnsworth; bronze medal, No. 358, *Life in a Court*, F. M. Sutcliffe. Class XIII. (Enlargements), silver medal, No. 850, *Polar Bears*, H. Sandland; bronze medal, No. 860, *Reflections*, W. A. Cadby. Class XIV. (Transparencies), silver medal, No. 874 and series, E. Brightman. Class XV. (Stereoscopic Transparencies), silver medal, No. 919, J. H. Spencer. Class XVI. (Lantern Slides), silver medal, No. 885, T. M. Brownrigg; bronze medal, No. 891, George Hankins. Class XVII. (Scientific), silver medal, No. 691, &c., enlarged photomicrographs, W. I. Chadwick. Class XVIII. (Botanical), bronze medal, No. 564, *Fruit*, J. T. Hopwood. Class XIX. (Zoological), silver medal, No. 730, *Animals at the Zoo*, H. Sandland. Class XX. (Local Survey), silver medal, Nos. 770–777, *Bristol Churches*, E. Brightman; bronze medal, No. 763, *Bristol Churches*, W. C. Hemmons. Class XXI. (General), silver medal, Frena camera; bronze medal, No. 1012, *Pompeian Lady*, F. Hollyer; first extra bronze medal, No. 334, flashlight portraits, F. Bromhead; second extra bronze medal, Allendale slide changer. Total, forty-one awards. There are 189 exhibitors, and, including a loan collection, Judges' exhibits, &c., 1023 exhibits.

The Classes.

The class for large landscapes is, undoubtedly, a good one, Mr. Bernard Lintott's medal picture, *On the Derwent*, a carbon study of cattle in the foreground of a river, trees and hills rising off to the distance, being full of quiet dreamy charm and softness. Mr. R. J. Fry has three Welsh views, ably executed; and there is an Alpine series by Mr. W. England. Mr. Wellington shows his familiar *Evening on the River Thames*. A word of praise is due to Mr. E. Hawkins for *Winter* and *Hoarfrost*, two carefully treated studies of not easy subjects. Mr. R. Frost, however, with three small views of a similar nature, is even more successful, the bronze medal going to him for a frame of delightfully printed studies on Matt P.O.P., their delicacy and gradation being remarkably good. Extremely interesting are the Rev. Precentor Main's capitally executed *Views along the Streams of Norway*, the treatment of the subjects, chiefly houses on the banks of rivers, converting them into very pleasing pictures. The reflections in the water and the technique are good. As an example of misapplied industry, Colonel Senior shows a view of the *Marble Rocks, Jubbulpore*, apparently printed on ferro-prussiate paper. The picture is a blot on the class. Precentor Main has two other frames, *Old Bits of Rothenburg* and *On the Pegnitz, Nuremberg*, characterised by great charm, the latter being nice examples of gelatino-chloride printing. Mr. Lord's *Fenland*, a river view, some delicately handled Alpine views by Mr. W. Moline, and some large pastoral studies by Mr. Worsley Benison will attract notice. Mr. G. T. Harris has a good view of *Rossett Mill*, and if the Rev. H. B. Hare could have managed to have left out the two small boys from the foreground, we should have better liked his *Oldoun Bridge*, which, however, is a capital view of an ancient bridge over a stream, with bare trees and antiquated houses composing an excellent bit of work. On the whole, this is a good class, unspoiled by impressionistic eccentricities, and dominated by the vast and ubiquitous *Wave* picture of Messrs. Elliott, which will certainly awe Bristolians by its mammoth proportions.

The awards in the Champion Class will be found above. The class is a large one. It included Lord's *You Stupid Boy* and *How's that?* Burrow's *Mining Series*, Sutcliffe's *Stern Reality*, Shapoor Bhedwar's *Feast of Roses* series, Warneuke's *Ethel*, and *Miss Laura Johnstone as Desdemona:* F. W. Edwards's *The Nave, Westminster*, Byrne's portrait of *Mr. W. K. Selle*, Wellington's *Eventide*, Cadby's *Study of a Child*, Treble's *Wretched Criminal*. Miss Clarisse Miles has several examples of home portraiture of ladies, evidently taken by flashlight. The poses are in all cases graceful, and the treatment good, but the lighting is, in some instances, imperfect. Mr. Byrne's *Richmond Horse Show* series is also included, as well as Mendelssohn's *The Misses Wilson*. Many other well-known pictures are hung, and the class, take it all in all, is a fine one, although it contains a few mediocre works, which could only aspire to Championship honours in company inferior to this. A grand piece of work, by Fred Boissonas, of Geneva, *The Troglodytes*, or cave men, as they may be supposed to have been in remote ages, is a monument of creative and

photographic skill. On the banks of a river, bounded by lofty rocks, some of these strange creatures are grouped about a primitive craft, others being in a cave in the rocks. If devoid of pictorial prettiness, this work is of profound interest. It certainly deserved judicial recognition.

Numerically large, Class III. (Small Landscapes) is perhaps only of average merit. Mr. Henry Smith's medal for a soft view of *Strand-on-the-Green* was luckily earned. The same gentleman shows a rustic bit, with a church in it, and labels it, *Hark! the Sabbath Bells are Pealing*. Query, why? Mr. H. O. Isaac's eight pretty little landscape studies are nicely printed in platinum, and Mr. Lintott also shows a frame of small but tender Derwentwater views, apparently printed in platinum, one of them being from the original negative from which his enlarged medal picture was made. To our thinking, Mr. Lintott's work is the best in the class; it is admirable in technique and thoughtful in execution. Mr. Walter Norgrove's *Scenes in the Hayfield* possess merit, albeit the subjects are rather commonplace and hackneyed.

As to Class V. (Small Marine), we have noticed Mr. H. W. Bennett's *Stiff Breeze* (silver medal with other subjects, including *A Race Home*) before, but it loses none of its charm on reinspection. Mr. W. P. Marsh has a series of seascapes (some with wrecks), in which he has secured some striking and faithful effects. Mr. W. J. Crudge also shows waves, capitally caught and well printed; and, among a large number of excellent marine and yacht studies, a series by Mr. H. O. Isaac are conspicuous by their crispness and clearness. Indeed, the seascapes form a capital class. Here, thank goodness, are no astigmatic abominations; all are clean and sparkling, and yet full of movement.

Gallery No. 2 is set apart for three Classes, X., XI., XII. (Small Portraits, Large Portraits, and *Genre*), and, though we are forced to say that it contains a not inconsiderable quantity of commercial work of a commercial quality, take it on the whole, the portraiture will be found as good, and should be as attractive, as any other section of the Exhibition. First to attract attention is Mr. Mendelssohn's Champion Class medal portrait of *Miss Wilson*, a small soft study, printed to a charming brown tone. Several of Count Gloeden's figure subjects are spoiled by the proximity of some portraits by the same gentleman, rather hard and chalky. Mr. T. Protheroe, of Bristol, has a frame of six large portraits, all evincing great care and taste, and well printed in platinum. Mr. Protheroe's other exhibits are, perhaps, less successful. A pleasing little portrait of a lady reclining, by Mr. D. J. Scott, is labelled, *Portrait of a Gentleman*. A series of six flashlight studies of dramatic themes—scenes from *Ours* and other similar subjects—well deserve their award, as they are capitally executed, the lighting having been arranged to secure harmonious and natural effects. Miss E. J. Farnsworth sends several of her delicately handled and unconventional classical studies, for one of which she has gained an award. This represents a female figure with a lyre. The facial expression is capitally caught, but there is less freedom in the pose of the figure than in Miss Farnworth's other efforts, notably the always-pleasing *Cupid Captive*. Hard by hangs Mr. Sutcliffe's medal picture, two old women gossiping, illustrating *Life in a Court*. This is a capital bit of figure arrangement. The faces of the models are lifelike, but the lighting of the picture strikes us as being incorrectly translated. Mr. Ernest Lambert's large studies of heads show that he pays due regard to the conservation of character in his subjects, which is not the case with many other exhibitors in this room. Lewis Cohen's *Bivouac* is included. In the *Genre* Class there is a group of four kittens, startled by something that has put them *On the Alert*; it is very cleverly done. The agreeable inscription, "sold," will show how quickly clever work of this kind is recognised. Mr. W. P. Marsh is the producer of the picture. Two frames of agricultural studies, depicting farm scenes and farm folk at work, by Mr. W. Crofton Hemmons, of Bristol, have simple and attractive themes, skilfully executed, except, to our thinking, in so far as relates to the focal treatment, which is of the ultra-diffused kind. There are effects lying between crispness and fuzziness which Mr. Hemmons and others may well be advised to cultivate in preference to "impressionistic" renderings, which are only recognised as artistic by a self-conscious and ephemeral handful of egotistical heretics. *The Village Corn Doctor*, by Mr. F. Stewart Seed, which shows the operation indicated by the title in progress, distasteful in its subject, and should not have been hung. In addition to his *Naver* and *Feast of Roses* series, Mr. Bhedwar sends some striking portrait studies; but one of them, *To Thee I Pray*, a girl with uplifted head, has a most strained and unnatural effect about the throat, which could have been averted in the posing of the head. Prince S. C. del Barma has also some portrait studies of Indian ladies, and Mr. Mendelssohn several other examples, notably two of *Miss Wilson* and *Mr. Gladstone*, which are very fine.

Mr. Alfred Freke's large portraits are capitally done, technically speaking, but one representing three young ladies has a great deal too much "linear repetition" in the arrangements of the arms and the disposition of the figures generally. The silver medal for small work goes to Mr. Harold Baker for a frame of *Portrait Studies*, printed in sepia carbon. The ladies (the Dene sisters, we believe) are all most artistically posed, the light soft and subdued, and the whole effect exceedingly tender and agreeable. Mr. Baker also takes the bronze medal for a frame of platinum portraits. Mr. W. W. Winter shows several large portraits in his usual style, and Mr. Byrne is, we think, best represented by his pretty and pleasing studies of children. Two of his large frames of portraits of ladies are perfect in technique, but the faces of the aristocratic sitters are quite expressionless. One frame shows a group of singularly beautiful ladies in a box *At the Opera* (platinum), but it is not easy to tell whether they are amused or not at the performance. The other is intended to tell a tale of *Sympathy*. A lady, with a letter, is kneeling with bowed head before another lady. If the former is mentally distressed, her face does not show it; if the latter feels any sympathy for her friend, she very successfully conceals it. But perhaps the large and aristocratic *clientèle* Mr. Byrne possesses is not given to allowing its emotions any facial expression? Mr. Hollyer's portraits of the Rev. Stopford Brooke and Mr. H. E. Davis deservedly take a medal, and the same gentleman shows his clever *Paderewski* and the late *Albert Moore*. In *genre* perhaps nothing is so successful as Dumont's *Love Letter*, two women in the field, laughing over the amatory missive in the most natural manner.

We shall conclude our notice of the Exhibition next week.

ON THINGS IN GENERAL.

The communication regarding copyright photographs printed in this Journal, p. 372, is worthy of the attention of all photographers possessing photographs likely to be utilised by the publishers of newspapers and magazines. I am afraid it is rather a *brutum fulmen*, although I am sorry it should be so, for I am entirely in sympathy with the meeting. The point is here: If a photographer possesses a picture which had the copyright properly secured, he has the law in his own hands; he can charge what he likes; if the photographs have not been registered with the necessary conditions complied with, he may ask a guinea, but he is not likely to get it. The utmost recognition I ever received when one of my photographs has been utilised, has been a copy of the paper containing the piracy, and this rule has been more "honoured in the breach than the observance." It may be well, while I am on this subject, to recall a few conditione overriding this copyrighting, though they are well known by some. In the first place, any photograph, whenever taken, can be "registered," as the provisions required for conferring copyright are termed. But the copyright cannot be sustained unless certain conditions prevail. When the first copy of the photograph is sold, a distinct bargain has to be made as to who is to possess the copyright. If such bargain be not then made, there cannot, at any future period, be any copyright. This point is continually lost sight of. When such bargain is made, a description or replica of the picture is to be sent to Stationers' Hall, and a special form filled in entailing a small fee. Here let it be noted that the "residence" of the photographer must give, not his place of business if he lives away, but the address of his dwelling-house. From this it will be seen that, if any photographer happen to discover that he has a negative of any person or place suddenly become popular or notorious, it is no use (if any copy had ever been sold) for him to rush off and "copyright it;" it would be money and time thrown away

The discussion upon celluloid which we have recently been having in these columns, will prove very useful in causing us to look at home, *i.e.*, to examine our film negatives and test the staying power of exposed films. It is not as though this substance were a definite chemical compound of known composition, structure, and properties, for it is far from possessing such certainty of structure. It and its allies are simply mixtures having pyroxyline as a main constituent in combination with other known and unknown ingredients. What their action may be in the film cannot be predicted with certainty, experiment alone can determine what, or if any action, the constituent ingredients may have upon the film exposed and unexposed.

Mr. Ives' paper upon the Lippmann-Lumière-Valenta photographs will set many photographers thinking. That the results so far obtained are very remarkable and very interesting goes without saying; but the whole burden of his paper may be said to be summed up in a suggestion, or, perhaps, one may say, query, as to the possibility of the results being brought about, not in accordance with the lamina theory, but by some other hitherto unexplained action. Not to put too fine a point upon it, is not the explanation simply an *ex-post-facto* one?

Readers of the LANTERN SUPPLEMENT should notice the remarks, on page 119, upon translucent screens. Where there is space to permit the image being thrown through, instead of upon, the screen, the effect is very beautiful. I am now referring, not to effects for large exhibition rooms, but more in the direction of private-house exhibitions or for a few dozen spectators. The most beautiful effects of the kind I ever saw were produced by throwing the picture on a piece of ground glass over four feet square; the effect was exquisite. This is, however, costly and cumbrous, and an almost equal substitute may be obtained by using, in lieu of glass, a piece of "tracing cloth," which may be obtained from any fine-arts dealer, the greatest width obtainable being forty-two inches. It might not be a pretentious piece of information to some readers to say that the ordinary linen screen does well; but it must first be wetted, and kept wet, or the light will not show through. I have seen exhibitors wet a linen screen when the picture was thrown upon the audience side. I need scarcely add that to do so is worse than useless; the reflecting surface, instead of being improved, is rendered inferior for the purpose.

There can be little, if any, need to reply to the strictures of a writer who after stating, respecting the Show in Pall Mall, "I approve of the decisions of the Judges," and expressing his contempt for those who differ from the Judges, calmly replies, when asked his opinion of one particular picture honoured with a medal by these Judges, that he is "not sufficiently acquainted with that picture." If he, A. R. E., had made the same admission with regard to art subjects generally, he would not be contradicted by me. I have, however, to thank him for his advice, well meant, doubtlessly, but very funny. May I venture to reciprocate? He is exercised in his mind to see how breadth can exist in presence of violent contrasts. Let him study a few of Rembrandt's pictures, and then make himself acquainted with some of the elementary canons governing lighting and composition. I wish A. R. E. and all my readers a Merry Christmas and a Happy New Year.

FREE LANCE.

THE DEVELOPMENT OF GELATINO-CHLORIDE PAPER.

A GOOD deal has appeared latterly on the subject of the development of the partially printed image upon the ordinary gelatino-chloride "printing-out" paper, and, like many others, no doubt, I have tried my hand at what promises to be a new power at this period of the year. My trials have been, not with the paper specially prepared for development, but with ordinary Solio, and, while the success has been variable, it is scarcely fair to blame either the paper or the system for the failures, but rather to argue from the successes that much better would have been done under more favourable conditions.

On first consideration, it did not seem to me likely that the ordinary papers prepared for printing out would offer any very great chance of satisfactorily passing the ordeal of development, as there appeared to be no guarantee of their having been sufficiently protected from the light before reaching the consumers' hands. But, on reading your leading article, and thinking the matter over, it struck me that, as a visible image seemed necessary in order to ensure a proper development, so long as the paper remained white to start with there was little danger of any injurious action arising from its chance exposure to light during preparation. Subsequent trial showed this to be the case, although I have since discovered that the absence of any visible discolouration does not necessarily prove the paper to be amenable to successful development.

As a matter of fact, I have found that some packets of the same (Solio) paper develop perfectly, whilst others, of different emulsion numbers, veil or fog badly under precisely the same treatment, and, indeed, in spite of any change of developer or other modification that I can suggest for surmounting the fog. The paper I use is white, not tinted, so there can be no suspicion that the variable action is due to the colouring matter; and, so far as I can judge, there is no visible discolouration from previous action of light. In some cases I have noticed a slight discolouration of the edges of the cut sheets from age or exposure to the atmosphere, but this cannot be set down as the cause of failure since, oddly enough, some of my successes have been on such paper.

My first attempt was made with some very slightly under-printed proofs that I picked out from a number that were awaiting toning, and the process of development was roughly conducted in full lamp light in the belief that the paper was absolutely unaffected by that class of illumination, but of that more anon. The result amply proved not only the capability of the paper to stand development, but also showed that with an almost fully printed picture it was possible to add as much or as little to it as might be desirable, and also that the tone and gradation were quite equal to any that could be obtained in the legitimate way of printing out.

On more recent occasions, when I have similarly picked out a few prints that appeared deficient in strength, and have submitted them to development, I have met with cases where one or more prints have fogged or stained, but this I had always attributed to some carelessness on my own part, or to imperfect washing or bromising, until an incident arose which showed me plainly that it is possible to have the paper in a perfect condition for printing out and yet quite useless for development.

I had recommended the development process to a friend who required a number of prints at short notice, and could not get them off owing to the dull quality of the light. Accordingly, he made the attempt of printing a number of proofs to various depths, from a faintly visible image to almost full strength, and brought them to me to be initiated in the mysteries of development. As it happened, my dark room was temporarily dismantled, and we were constrained to carry out the development in diffused daylight, using every precaution to expose the paper as briefly as possible to its influence. Suffice it to say that not one print, whether lightly or well exposed, would develop with even the most tolerable clearness; in fact, every one became more or less—chiefly the former—heavily veiled.

Everything appeared to go on satisfactorily until the image was nearly sufficiently developed, and apparently without any regard to whether it was a weak or a strong impression to start with; then suddenly, but rapidly, the whole clouded over, and in a few seconds the hitherto perfect image was buried in fog. As I have said, the result was the same whatever the exposure might have been, so that it could not be a question of exposure. I at first thought it arose from insufficient immersion in the bromising solution, but this proved not to be case, and there seemed no way out of the difficulty except to suppose that it was the development in daylight that had done it. My friend departed, leaving me the remainder of the prints to do the best I could with, and a sarcastic remark on the not too conspicuous success of operations so far.

In the evening the remainder of them were developed by lamplight, but with a precisely similar result, hopeless fog in every case, only varying in intensity and character with the development employed, and the duration of its application. Hydroquinone, amidol, metol, and para-amidophenol were in turn tried, the strength being varied from full negative strength to a degree of dilution that would scarcely operate at all; the quantity of bromide added was increased to as much as five grains to the ounce, and the bromising solution at last, as an experiment, made 100 grains to the ounce. But all to no purpose; before the image was fully developed, the inevitable veil supervened. As a last resource some bichromate of potash was added to the bromising solution, but still, so long as any developing action remained, the fog appeared, and the image at the best was but thin and meagre.

The idea then occurred to me that possibly even lamplight was too powerful, though that could scarcely be in view of my previous successes; however, to test it, a piece of the same paper, hitherto unexposed, was placed in a printing frame partly covered, and placed on the table a couple of feet from the lamp (a duplex), giving a good light. I was called away, and there it remained unexposed for about

an hour. Upon taking the paper out of the frame, to my surprise there was a very faint visible darkening of the exposed portion, showing that even for printing-out purposes, Solio is sensitive to lamplight, and I fully anticipated that that experiment was useless. Not so, however, for on development, the exposed portion developed up faintly but distinctly, while the covered portion remained perfectly clear until the inevitable veil spread over the whole, and, which is the most important point, exhibited a far greater density than the actual exposure.

It is palpable, therefore, that there is a condition of the paper in which it is subject to spontaneous reduction by the developer without exposure to light, but in which condition it is still capable of perfect action in printing out. This would be perfectly intelligible if it were invariably the case, and might be set down to something akin to "chemical fog" in a negative emulsion. But I have another sample of the same paper which behaves in precisely the same manner in direct printing, which is presumably prepared in exactly the same manner, and which yet develops with perfect clearness.

The last experiment is, I think, important. Had the slip of paper been but briefly exposed as was originally intended—that is to say, insufficiently to produce a visible image, the result could at best have been negative as it turned out. But the fact of the unexposed and absolutely uncoloured portion showing a denser darkening under development than the visible exposed part shows conclusively that the effect is not that of light. What then is it? Clearly it is not "free silver," for the employment of the bromide bath precludes the possibility of that; nor can it arise from the imperfect conversion of the chloride or other salt of silver in the film, for, as I have already fully stated, I took every precaution, both by prolonged immersion and strengthening of the bath, to secure the completeness of that action.

If the results were arrived at with papers of different manufacture, an intelligible explanation might be found in some possible variation in the formulæ—the presence, for instance, of some salt of silver not amenable to the converting action of the bromide bath. But it is scarcely a feasible supposition in this case that different batches of the same maker's paper are prepared by different formulæ. I can only suppose that, in the keeping of the paper, a point is reached at which some decomposition begins to set in, but which produces no visible change in the paper. And yet the fact remains that where there are *visible* signs of incipient decomposition clean development has been possible.

I leave the mystery in the hands of yourselves and your readers, in the hope that some solution may be found. Meanwhile, it is, I think, worth recording the facts, as thereby some fellow-readers may be induced to try again if the first attempt is not a success.

W. Lindsay.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION COMPETITION.

The Annual Exhibition of members' productions for the purpose of medal-awarding was held last Thursday, the Judges being J. McDougall, Esq., a well-known Liverpool artist; Mr. George Thompson, and Mr. G. Watmough Webster, photographers; while the latter gentleman and Mr. Edward Whalley adjudicated upon the lantern slides. We append the Judges' report, with the list of prize-winners.

To say that the works were those of the Liverpool Society is to say they were excellent, and it must be admitted some very beautiful pictures were brought together. It will be observed that all the prizes were for sets of six, with the exception of stereoscopic slides (sets of three) and enlargements, one only by each exhibitor being needed to be in competition.

Taking the Champion Class first, there can be no doubt about the beauty and superiority of the winning set, which included some studies of sheep of remarkable beauty. All were printed in a rich reddish bistre tint, which perhaps was a little strong in colour, though in nowise detracting from their effect. As showing how much depends upon the medium in which a photo is printed, it may be noted that, when some of these subjects were treated as lantern slides, much of their beauty was lost. In Class II. there was an *embarras de richesse*, and the Judges must have experienced some considerable difficulty in picking out the best; many sets containing pictures which were equal to any in the room, but the whole set failing to reach the same standard. Herein will be seen the great advantages of the "set" system. Without for a moment suggesting that what we are about to say here is to be held as referring to the pictures under review, it is common knowledge that the most indifferent photographic workman at times obtains, by what can only be termed chance, a picture of real beauty, though that remains for ever his masterpiece: To produce six pictures cannot be the effect of chance, and a set of that number, all good in technical excellence and pictorial beauty, proves the possession of skill far above the average.

Class III. was a small one, but the Judges had no need to withhold the second medal through absence of merit.

The lantern-slides competition was very close, twenty-seven sets in all being adjudicated upon, all being passed through the lantern, some of them many times over. The merits of two were so close, that the Judges awarded equal first to them, giving the bronze medal to another set very little inferior. Scarcely any of the pictures being named, it is only possible to speak in general terms; but, with regard to the winner in this class, we may say that the subjects were most varied, landscape, architecture, and flowers being included.

In Class V. the medal-winner exhibited an enlargement from an Italian courtyard with a figure at a fountain. The richness and juiciness of the shadows from a negative which, judging by the small print shown, seemed to be of indifferent merit, were very remarkable. In this class our own opinion leant to a very quiet, effective river scene with small yacht riding at anchor, though the artistic quality was sadly marred by the manner in which the picture was cut into two by the heavy line formed by the mast and its reflection in the slightly rippling water.

There were only four stereoscopic pictures, but the winning three were of great beauty, good transparencies, rich in tone, and of even quality, the subjects also being well chosen. The hand-camera work in Class VII. included some good work, some of the pictures, however, being in a sense out of court, owing to the subjects being such as could be done by a camera on a stand with several seconds' exposure.

The President offered a special prize for a ladies' class. This was not well filled, and, if we may say it, we have seen some better work by lady members of the Liverpool Society.

The new rooms of the Association, including office, committee room, dark room, enlarging room, and studio, are excellently adapted for the purpose, and the Society may be congratulated upon having one of the best homes in the country for meeting in and practising their art. They cost in fitting several hundred pounds, which the success of the triennial exhibitions have enabled them to meet without getting into debt. We are sorry to hear that next year it is not probable that they would hold an exhibition, though the triennial period would have arrived.

Extract from Report of Judges.

"We have much pleasure in handing in the accompanying awards, which, we are glad to say, are our unanimous judgment. We think it right to observe that, owing to the great excellence of individual pictures in some of the groups, we have had a little difficulty in arriving at a definite opinion. Especially was this the case in the Champion Class, and we cannot forbear drawing attention to the conspicuous beauty of two (unnamed) pictures in the group 'Art,' one a river-side view and the other a hill-side with cattle in the middle distance.

Signed { John McDougal. G. Watmough Webster. Geo. E. Thompson."

Class I. (Champion), Mr. T. F. Lloyd.

Class II. (Half-plate and under), first, Mr. Jos. Appleby; second, Mr. Geo. Allday.

Class III. (Over Half-plate), first, Mr. C. A. Simmins; second, Mr. H. Holt.

Class IV. (Lantern Slides), first, Mr. F. Anyon, Mr. Jos. Earp; second, Mr. T. B. Sutton. Extra medal allowed.

Class V. (Enlargement), Mr. Wm. Tomkinson.

Class VI. (Stereoscopic Slides), Mr. W. S. Elsworth.

Class VII. (Hand-camera Work), Mr. H. B. Forrer.

Contains a considerable number of extreme merit. G. W. W. E. W.

MR. JOHN HOWSON ON "MATT P.O.P."

On Friday evening, December 15, at the Central Photographic Club, Mr. Howson gave a demonstration on toning and fixing Matt P.O.P., which he prefixed with a paper dealing with the subject. There was a large attendance, including many professional photographers. Mr. F. W. Edwards occupied the chair.

Mr. Howson said: "Whilst I recognise freely that for many purposes and many tastes the glossy surface given by the ordinary Ilford P.O.P. gives results that cannot be surpassed, we have felt that there were still further fields to be conquered in the realm of photographic printing. We set ourselves to master the great problem of how to combine the artistic with the practical, the beauty of a matt surface with the truth and gradation only found hitherto in the enamelled surfaces. Such has been the aim of many workers before us, and many are the attempts that have been made, but I make bold to say that nothing but failures, failures of the most pronounced kind, have been the result. We have had plain salted papers, but their only claim to notice has been the absence of gloss. Such papers are useless in these days when sensitised papers must have keeping qualities. They could not be used unless prepared freshly week by week. Worse, however, is the defect arising from the burying of the image in the fibres of the paper. Prints lacked utterly all truth of gradation, and shadows were masses of darkness unrelieved by any detail. Then we have had *so-called* matt emulsion papers which had the same

fatal failing of clogged shadows, and had not, in fact, a real matt surface at all; being made by simply making the emulsion thinner than usual, they were neither glossy nor matt, and combined the disadvantages of both without a single redeeming feature. So much for past history, and now with pride I point to the Ilford matt P.O.P. as a perfect and complete solution of the hitherto unsolved problem. Nothing of its kind has ever been made before, and the future offers nothing that can equal it. Its qualities are beyond rivalry, and leave nothing to be hoped for or desired. Whatever we at Ilford have done in the past to advance photography (and we may fairly claim to have been a factor in such progress) is dwarfed into nothing, compared with the possibilities arising out of Ilford matt P.O.P. We do not speak in vain vapourings, or without good grounds, for our self-gratification."

After quoting several favourable opinions on the paper, Mr. Howson proceeded :—

"We have dozens of other letters all in the same strain, and I have limited our quotations to the first half-dozen opinions received, so as not to weary you with repetition, and I will add only one more opinion, viz., that of the editor of one of the photographic journals, who thus concludes his notice of the paper: 'This paper marks a departure in photographic printing, and we hardly know which to congratulate most, the big family of photographic workers for the increased power put into their hands, or the Company to whom the world is indebted for this vehicle of expression.'

"I will not lay too much emphasis on individual opinions, even though they are from some of the best workers of the day, but leave you to judge for yourselves from examples how far our views are justified by results.

"Not alone in point of surface, but equally in tone, is there a great advance artistically. The deadness of the surface refines the colours, and makes them more in accordance with the canons of art and the tastes of those who hope great things for the future of photographic art. From warm browns and sepias to blacks of a soft, velvety richness, not too cold or glaring, but restful to the eye, is the gamut of colour within our reach, and, withal, a perfection of gradation never before touched, an absolute freedom from double tones, and a delightful ease of manipulation, which one attempt with the paper will prove beyond doubt.

"This brings me to the practical advantages of the paper, apart from its artistic merits. I have spoken of truth of gradation and possibilities of colour, which may be said to be both artistic and practical merits; and when I add that these results may be obtained without any special precautions, or any alteration of manipulation, either in printing, toning, or mounting, I surely have said enough to justify the highest praise that could be accorded to the paper.

"Prints on Ilford matt P.O.P. are printed in the usual way, toned (side by side with the ordinary P.O.P. if you like) in the Ilford sulphocyanide bath, and mounted with starch paste just in the regular way. From printing to finishing you may work the papers side by side, ignoring absolutely the fact that they differ in any way, and when mounted you have the two kinds of prints, which is as different as possibly could be, with out one iota of extra care or trouble. Indeed, until they are mounted and dried, you are hardly aware that the two papers differ in the slightest degree.

"Now, I ask you, was anything equal to this ever attempted, or ever dreamt of, up to the present, let alone accomplished?

"There are two well-defined and great advantages accruing to the professional photographer in connexion with this paper. First, if he wants, as is most probable, prints on both matt and glossy paper from the same negatives for a sitter, he can produce them without a single moment's extra trouble, no necessity for another class of paper or another set of manipulations, and from the same negative similar results will be obtained. It is quite unnecessary to take into consideration that, for a glossy print, you must have a negative of such and-such-quality, and for matt prints one of quite a different class. Ilford matt P.O.P. yields good results from a wider range of negatives than any paper I have ever tried; be the negative hard or soft, prints from it will compare more than favourably with any other paper.

"Secondly.—There is, and has been, a cry from the professional photographer: Let us have something new to offer to our sitters—something to attract attention and compel new business. Such a want is fully answered by matt P.O.P. Prints on it can be produced, as I have shown, so easily, and, what is of more importance, of such quality that few sitters would object to pay a considerably enhanced price for such work—a price which, in view of the absence of extra labour, and but a small increase in cost of paper, must yield a more than proportionate return to the photographer. I speak here to the profession, and urge you not to throw away an opportunity so plainly put before you. Don't fail to show your sitters such prints, and don't above all, I beg, rush in and cut prices in the race for business. If an improved style of portrait is worth more to the public, as this is, it is also worth more to you, and deserves and will yield better business if you will let it.

"Of the actual manipulations and points to be noted therein, there is little to be said. Matt P.O.P. prints, much like its predecessor, lose but little in toning, &c. The progress of toning is judged in exactly the same way, and it need only be borne in mind that prints dry a little colder in colour than they appear when looked through whilst wet; and also a little darker in image than when looked at on the surface.

"Warm tones are best obtained by a bath diluted with its own bulk of water, and rich blacks by a bath with double gold, whilst sepias are to be had by toning for a short time in a bath rich in gold. I would mention once again, though it ought to be unnecessary, that good blacks are unattainable, except with a negative full of vigour and well graduated. A poor negative will never yield such a print by any process or any scheming. Mounting matt P.O.P. prints is one of the easiest possible processes. Well-boiled and strained starch paste is the best mountant, and is best applied to the print whilst it is wet; the print is placed on the mount, and rubbed down with a damp sponge or a piece of oil paper, such as is used with a letter-copying press. If any mountant gets on the face of the print, a damp sponge, carefully applied, will remove it. With only ordinary care nothing further need be done to the print, for matt P.O.P. mounts with more ease than does the glossy, but, if required, matt prints, when mounted, may be lightly cold-rolled, but must not have either heavy pressure or heat. Spotting is done with the usual colours mixed with water only, and from the very nature of the surface is much less likely to show than with other styles of printing.

"For the rest, all the many hints given from time to time *re* P.O.P. apply with equal force to both papers, and therefore they need not be referred to, except so far as I shall touch on them in the practical demonstrations to follow.

"Finally, let me say a word or two of a personal bearing. It has been said that the man who makes two blades of grass grow where only one flourished before deserves well of his country. Adapting this saying to ourselves, we may claim to have added something to the well-being of the British nation; for we have not only planted the original blade (P.O.P.), but have now added the second (matt P.O.P.), and have, in so doing, brought to England a volume of trade, which hitherto has been, for the most part, in the hands of our Continental friends. To have done this in the present day, when the cry is, 'English supremacy in trade is decaying,' is no mean accomplishment, and we feel some pride in being the means whereby such a result has been achieved."

At the conclusion of the paper Mr. Howson proceeded with the demonstration, observing that the prints lost very little in toning and fixing. He laid great stress on the necessity for a thorough washing, and said the surface was not so easily damaged as that of the ordinary gelatine paper. Both kinds of prints could be toned side by side. After the first washing an alum bath was recommended, followed by a thorough washing. The prints should be kept moving. The paper did not blister. The alum bath should not be used a second time. For toning bath, sixty grains of sulphocyanide of ammonium were dissolved in thirty-two ounces of water, and two grains of gold added. The darkest prints were taken first, two at a time, and when in the bath it was shown that the glossy prints could not be distinguished from the matt prints. Mr. Howson mentioned that the colour of the prints came back in the fixing bath, and that they dried colder, and that the colour seen on the surface of the prints was the colour that would be obtained when they were finished. A considerable range of colour from sepia to black was obtainable, but not engraving black. Fresh hypo was recommended for each batch of prints.

Several prints were toned and fixed, and a number of finished specimen prints were on view.

Mr. B. J. Edwards, in the course of a few remarks, referred to his previous experiences with matt paper, and said that matt-surface paper was one of the most permanent in its results. He endorsed Mr. Howson's remarks as to the relief it gave from monotonous grey tones, and said that no doubt the gloss in printing papers would be got rid of altogether in time.

The Chairman said that he discarded silver printing some years ago, but he had taken to it again. He had only had two days' experience with the paper, which he found dried harder and darker. He asked whether images with black tones were more permanent than those of brown tones?

Mr. E. J. Wall had tried most baths with matt P.O.P., and found that the paper worked well with all. It was also an easy paper to mount.

Mr. Howson, in replying, said that, as to whether black toned prints were more permanent than the brown, the more gold there was on the print the more permanent were the results. In regard to platinum toning, he himself could not tone with it without degrading the whites. He did not get any advantage over gold, and the same applied to uranium. He had also tried them mixed, but had never got so far as with the sulphocyanide bath. There was no necessity to go outside the sulphocyanide bath for sepias. A vote of thanks to Mr. Howson concluded the proceedings.

In a recent case in the United States Courts a deed to a certain piece of land was offered in evidence which bore the signatures of only four of the five interested heirs. A vacant space occurring where the fifth signature should have appeared led the attorneys to suspect that it had originally been placed there. Accordingly, the services of an expert photographer were engaged, and he photographed the document in the presence of the Clerk of the Court, who could not allow the original to leave his hands. The plate upon development showed traces of the missing signature, and a ten times enlargement plainly revealed it. The case in question was one which had been before the Court for a number of years, and the photographic evidence introduced reversed all previous decisions, securing the ownership of the land to the rightful heirs.—*Anthony's Bulletin.*

"HYDROXYL-MONOHYDRIDE."—A HOAX.

Journalistic Sympathy.—We deeply sympathise with our esteemed contemporary, *Photography*, in the severe misfortune which befell it last week. Taking advantage of the excusable ignorance of the staff upon chemical matters, as well as pandering to our contemporary's weakness in seeking to be in advance of its journalistic competitors with the latest scientific news, some malicious person has made it the victim of a deplorable piece of deception. Our contemporary prints the report of a meeting of an alleged new society at Brondesbury. The names of members, officers, and the meeting place are given in a matter-of-fact style, and the technical proceedings of the first meeting are reported in the customary phraseology of such literature. The President of the Society, Dr. Burton Coxe, details some experiences in development, which are of such an interesting nature that we feel compelled to quote them, and to afford them the well-deserved honour of a paragraph all to themselves.

"Hydroxyl - monohydride."—"Dr. Burton Coxe, who,' says the report, "was received with applause, said he had lately been experimenting on the lines of Colonel Waterhouse, with the addition to the developer of various little-known substances, and, if he had nothing revolutionary to tell them as to his results, he had certainly had some interesting experiences to relate. Perhaps the most promising effects had been produced by the addition of *hydroxyl-monohydride* in varying proportions. He found that a large addition had a decided slowing action, but in moderate quantities its action was very beneficial, especially in enabling the developers to flow freely, and he should now be very sorry to develop a plate without it. Perhaps the best way to employ it was to use it to make up the stock solution of pyrogallic acid with the addition of sulphite. It might be produced by treating anhydrous hydroxyl with nascent hydrogen, the reaction at a high temperature being very energetic, and the result being the pure compound. The commercial article was frequently contaminated with chlorine or carbonic acid in combination with some of the calcium salts; so he advised those who wished to use it to make it themselves. The yellow tint sometimes seen in the home-made article was due to organic matter in solution, but it had no deleterious effect. It should be used freshly prepared, as, if kept, it underwent decomposition with the liberation of ammonia. He passed round a number of negatives developed by it, and which were much admired." In another part of his issue the editor of *Photography* draws attention to the foregoing communication in these words: "Dr. Burton Coxe has been experimenting with hydroxyl-monohydride in development, and thinks very highly of it. A reference to this is found in the report of the meeting of the Brondesbury Camera Club."

A Discreditable Hoax. — We cannot say whether the Brondesbury Camera Club, its officers, members, meeting-place, Dr. Burton Coxe, &c., have any existence in fact, but we should not be surprised to find them as mythical as Mrs. Harris. It is, perhaps, hardly necessary for us to inform our readers that the substance with which "Dr. Burton Coxe" has been making such successful experiments in development, hydroxyl-monohydride, is simply that harmless, necessary ingredient of all developing solutions—common water. Our contemporary has been hoaxed. We are sorry that anybody can be found with such an uncharitable mind as to trade upon a journalist's lack of knowledge, and to hold him up to ridicule in this manner. We commiserate *Photography*, which journal has surely done nothing whatever to incur such treatment. Our aspiration is, that the author of the hoax may be discovered, and held up to the opprobrium he deserves.

Our Editorial Table.

Hand-book on the Use of Compressed Oxygen.

By Kenneth S. Murray.

As Mr. Murray says in his preface, "the subject is undoubtedly one of growing importance," and we can endorse the fact that it is one on which the author can write with some degree of authority. Various methods by which oxygen can be made are described, including of course the Brin process, in which the author is interested; the compression of the gas in cylinders; the construction and testing of cylinders, valves, unions, pressure gauges, and everything necessary to be known in this connexion, are all fully and ably treated. This work ought to be in the possession of every one interested in the use of compressed gases. It is published by Ede, Dearberg & Co., 40, Queen-street, E.C.

A selection from the timely Christmas and New Year's cards by Messrs. John Patrick & Sons, of Edinburgh, have been forwarded and are now before us. Comprising as they do photographic subjects of all kinds, from the "roaring joys of the ice-bound loch," the much-boomed "golf" course, the haunts, homes, and picturesque scenes which Scotland supplies in such abundance, they should be a welcome addition to the numerous souvenirs of the season.

They are well got up in cabinet size, on light, tasteful, appropriate mounts for postal dispatch, and what is more to the purpose, are of fine artistic feeling and quality as well as moderate in price.

Photographic Mosaics for 1894.

E. L. Wilson, New York.

The illustrations in Mosaics this year are with a few exceptions from the hand camera of Mr. A. R. Dresser, who illustrates his "Tour in Brittany" with them. Following an excellent epitome of progress by the editor, we have a section composed of papers selected from English and other journals of the long ago, illustrative of the opinions which then prevailed, there being twelve of those. A series of eighteen papers, written expressly for the Mosaics, completes a well-printed and useful book.

News and Notes.

Photographic Club.—December 27, Monthly Lantern Meeting.

London and Provincial Photographic Association.—December 28, Mr. Howson will give a demonstration of the P.O.P. matt paper, and Mr. Liddle will discourse on *Celluloid and its Imitators*. January 4, Mr. Howard Farmer will read a paper, *Hurter & Driffield; or, the Man with the Money Bags*.

Exeter Amateur Photographic Society.—An Exhibition of Photographic Work will be held at the Art Gallery of the Albert Museum in Easter week, 1894, when twenty silver and bronze medals will be offered for competition. Further particulars will be published at an early date. The Hon. Secretary is Mr. John Sparshatt, Fairfield House, Alphington-road, Exeter.

Messrs. Elliott & Son, of Barnet, write: "If you will kindly turn to the Index of Advertisers in The British Journal Photographic Almanac, 1894, you will see that, after our name, you have, by error, printed the words 'collotype printing' instead of 'carbon;' the consequence is that, during the last few days, we have had three inquiries for our prices for this process, which we do not work; at the same time, we lose a small advertisement for carbon. We should be much obliged if you will rectify this."

The 1894 Convention.—The Council of the Photographic Society of Ireland are reminding photographers that the Annual Meeting of the Photographic Convention of the United Kingdom for 1894 will be held next July, in Dublin, under the auspices of the Photographic Society of Ireland. The members of the Photographic and Scientific Societies, Universities, &c., have taken the matter up so warmly that there is every probability of the coming meeting being one of the largest and most successful ever held.

Photographic Society of Ireland.—The Council have decided to offer the following special medals for open competition amongst amateurs at the forthcoming Exhibition of the Society, viz.:—Class A, the Society's gold medal, for the best set of four Landscapes (any size). Class B, the Society's silver medal, for the best set of two Enlargements. Class C, the Society's silver medal, for the best set of six Lantern Slides. The Exhibition will be opened, on January 15, by a full-dress *conversazione*, and will remain open until January 29. The Hon. Secretary is Mr. John A. C. Ruthven, 35, Dawson-street, Dublin.

On Saturday, December 16, at the Queen's Hotel, Clifton, the members of the Bristol Photographic Association held their first annual dinner, the President (Mr. H. A. Hood Daniel, F.S.I.) in the chair. The toast of "Success and Prosperity to the Association" was given by Mr. Thomas Bedding (The British Journal of Photography). Mr. Valentine Blanchard replied for "The Judges." "Success to the Exhibition" was also given, and the speakers generally congratulated the Association on the quality of the Exhibition. Mr. E. Brightman (Vice-President), Mr. Bligh Bond (Hon. Secretary), and other gentlemen also spoke during the proceedings.

The Fountain Air Brush.—Before the members of the Photographic Club, on Wednesday, December 13, Mr. Charles L. Burdick, Chicago, demonstrated the use of a new air brush, the "Fountain." In appearance it is not unlike a fountain pen, being very neat and small. It is held in the hand like an ordinary pen or pencil. Air pressure, worked by the foot in the usual way, actuates the liquid spray, the pressure and volume of which is controlled by the forefinger pressing a small disc at the end of the brush. Besides the ordinary black pigment, the usual water colours may be used. An extremely fine grain is given, and this, again, may be regulated by the operator approaching or receding from the surface upon which he is working. This is placed on an easel. Mr. Burdick produced some very fine freehand work, and also showed several beautiful examples of coloured portraits on a basis of black crayon. He states that the brush may be used for working up bromide enlargements, or the outlines only may be first produced, and the remainder of the picture filled in. In the hands of a skilful manipulator the Fountain Air Brush should prove useful for a variety of photographic purposes. No doubt artists would also find it very handy.

CROYDON CAMERA CLUB'S LANTERN SHOW.—The second monthly display of this season, consisting of photographic views on the screen, was held on Wednesday, the 13th, at the Braithwaite Hall, when a large audience assembled. The first part consisted of about a hundred views, depicting "that flourishing corner of the black man's garden," as the lecturer described it, namely, South Africa and the Cape. After twenty minutes' interlude of songs and banjo duets came the second part, which included a series entitled *Good-bye to Old Croydon*, by Messrs. Carden, J. Smith, and G. R. White (members of the Club), and various slides by other members, viz., J. Packham (twelve brilliant photo-micrographs), H. E. Holland (South Devon and Surrey scenery), G. Paice (horses and waves), and J. Smith (thirty-six, many very fine), especially satisfactory being several from negatives taken at Club excursions to Byfleet and Forest Row.

AN International Photographic Exhibition will be held in the Art Gallery, Grainger-street, Newcastle-on-Tyne (by arrangement with Messrs. Barkas & Son), from April 13 to April 28, 1894. A special section will be devoted to photographic apparatus and appliances, photo-mechanical printing processes, and other trade exhibits, for which a special gallery will be set apart. The Judges will be Messrs. Wm. Crooke (Edinburgh), F. M. Sutcliffe (Whitby), and G. E. Thompson (Liverpool). The following is the schedule of classes and awards:—Open to professionals and amateurs. Class A (Landscapes), silver and bronze medals. Class B (Portraits), silver and bronze medals. Class C (*Genre* and Figure Studies), silver and bronze medals. Class D (Architecture), silver and bronze medals. Class E (Instantaneous), silver and bronze medals. N.B.—In accordance with the regulations of the Judges' Conference, awards go to one picture, except in case of a connective series, but it is desirable that exhibitors should send at least three pictures in any of the above classes. Class F (Enlargements), silver and bronze medals. Class G (Hand Camera Prints, series of six), silver and bronze medals. Class H (Lantern Slides, series of six), silver and bronze medals Class J (Stereoscopic Slides on Glass, series of six), silver and bronze medals. N.B.—In Classes G, H, and J, exhibitors may send more than one series, but each set must be kept separate. Champion Division, open only to pictures which have been medalled at an open exhibition. Class K (Landscapes), silver medal. Class L (Portraits), silver medal. Class M (*Genre* and Figure Studies), silver medal. Class N (Lantern Slides, series of six), silver medal. N.B.—In Class N exhibitors may send more than one series, but each set must be kept separate. Members' Classes, open only to amateur members of the Association. (In these Classes the work must be entirely the production of the exhibitor.) Class O (Series of Three Pictures, any Subject, half-plate and above), silver and bronze medals. Class P (Series of Three Pictures, any Subject, 5×4 and under), silver and bronze medals. Class Q (Series of Six Lantern Slides), silver and bronze medals. Class R (Series of Six Stereoscopic Slides, on Glass or Paper), silver and bronze medals. All correspondence and inquiries must be addressed to the Hon. Secretaries, Photographic Exhibition, Art Gallery, Grainger-street, Newcastle-on-Tyne.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 23,894.—"Method and Apparatus for Timing Photographic Development." A. WATKINS.—*Dated December* 12, 1893.

No. 23,988.—"Improvements in Photographic Cameras and Apparatus connected therewith." W. R. BAKER.—*Dated December* 13, 1893.

No. 24,114.—"Improvements in Photographic Apparatus," &c. G. T. WASHINGTON.—*Dated December* 15, 1893.

No. 24,135.—"Improvements in and relating to Magic Lanterns and to the Manipulation of the same." H. SIMPSON.—*Dated December* 15, 1893.

No. 24,187.—"Improvements in Connexion with Projecting Lanterns.' Complete specification. W. C. HUGHES.—*Dated December* 15, 1893.

PATENTS COMPLETED.

IMPROVEMENTS IN GROOVED METALLIC STRIPS FOR BOXES FOR CARRYING AND STORING OR PACKING PHOTOGRAPHIC PLATES AND OTHER PLATES, AND FOR OTHER LIKE PURPOSES, AND IN THE METHOD OF AND TOOLS FOR MAKING THE SAID GROOVED METALLIC STRIPS.

No. 1195. WILLIAM HENRY DUGARD and GEORGE HEATON DUGARD, both of Vulcan Mills, Bridge-street West, Birmingham, Warwickshire.—*November* 18, 1893.

OUR invention consists, first, in shaping in the manner hereinafter described the bottoms or closed ends of the said grooved metallic strips for the purpose of reducing to a minimum those parts of the surfaces of the said grooved strips with which the photographic plates carried or packed in the box can come into contact, and hence diminishing the liability to injuring the said plates.

The grooved metallic strips to which our invention applies consist of a strip of thin sheet metal so shaped or corrugated as to form, side by side, a series of parallel grooves with closed bottoms, the walls of the said parallel grooves consisting of double folds or thicknesses of metal. According to this part of our invention, we make the bottom part of each groove of an angular figure or of a semicircular figure, and the parallel sides of the grooves of such depth that the surface of the grooves with which the photographic plates can come into contact, when the plates are packed or stored in the said grooves, is reduced to a minimum. That is to say, instead of the edges of the photographic plate bearing on the whole surface of the sides of the grooves, as in grooved strips of the ordinary kind, the said plates, when the improved grooved strips are used, bear principally against the angular or curved bottoms of the grooves of the strips.

We prefer to form each strip with seven grooves, the outer grooves being narrower than the five inner grooves, each of the said inner grooves being of sufficient width to permit of the sliding in it of two plates, and the outer narrower grooves being only of the width proper to receive a single plate.

Our invention consists, secondly, of the following method of, and tools for, making the metallic, grooved strips hereinbefore described, and other grooved strips.

We make the said grooved strips in long lengths from strips of thin sheet ductile metal or alloy, such, for example, as brass by drawing the said strip through one or more pair of dies so shaped as to gradually corrugate the strip lengthwise and afterwards shape it to the proper form.

We will describe our method of manufacturing the improved grooved strips hereinbefore described in conjunction with the two pairs of tools which we prefer to employ.

The first pair of tools consists of two dies having corrugations upon their opposed faces, the said dies being preferably carried in a frame, the lower die being fixed on the bed of the frame, and the upper die being made capable of sliding to and from the said lower die by means of an adjusting screw. The said corrugations in the opposed faces of the dies taper from the entrance to the emerging end; that is, the corrugations are widest at the entering end, and gradually taper or become narrower as they approach the emerging end. The tapering corrugations are also shallowest at the entrance end, and gradually deepen as they approach the emerging end of the dies where the tapering corrugations are narrowest.

The upper die having been adjusted upon the lower die so that the space between them at the entrance end is just sufficient to receive the long sheet metal strip of which the grooved strip is to be made, the said strip is taken hold of by a pair of tongs, and drawn through the pair of dies by means of a draw bench. As the strip is drawn through the closed pair of dies it is gradually corrugated lengthwise, and passes from the emerging end of the dies in the form of an open corrugated strip. This open corrugated strip is finished by subjecting it to a drawing operation through a second pair of dies having larger parallel corrugations so shaped as to give the required figure to the bottoms of the finished grooved strip, as well as to enlarge alternate corrugations by compressing together the sides of intermediate corrugations, and thereby forming parallel grooves, the walls of which have a double fold or thickness of metal as hereinbefore described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 27 ...	Bath	Roy. Lit. & Sc. Inst., Terrace-walks
,, 27 ...	Burnley	Bank Chambers, Hargreaves-street
,, 27 ...	Leytonstone	The Assembly Rooms, High-road.
,, 27 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 27 ...	Southport	The Studio, 15, Cambridge-arcade.
,, 27 ...	Stockport	Mechanics' Institute, Stockport.
,, 28 ...	Camera Club	Charing Cross-road, W.C.
,, 28 ...	Glossop Dale	
,, 28 ...	Halifax Photo. Club	Mechanics' Hall, Halifax.
,, 28 ...	Hull	71, Prospect-street, Hull.
,, 28 ...	Ireland	Rooms, 15, Dawson-street, Dublin.
,, 28 ...	Liverpool Amateur	Percy-buildings, Eberle-street.
,, 28 ...	London and Provincial	Champion Hotel, 15, Aldersgate-st
,, 28 ...	Oldham	The Lyceum, Union-street, Oldham.
,, 29 ...	Cardiff	
,, 29 ...	Central Photographic Club	Coleman's Hotel, Henrietta-st., W.C
,, 29 ...	Croydon Microscopical	Public Hall, George-street, Croydon.
,, 29 ...	Holborn	
,, 29 ...	Maidstone	"The Palace," Maidstone.
,, 29 ...	Swansea	Tenby Hotel, Swansea.
,, 30 ...	Hull	71, Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 14, Mr. Alexander Cowan in the chair.

Mr. HODD asked if an acid state of the bichromate bath for carbon printing had any bad effect.

Mr. W. E. DEBENHAM said that it should not be more acid than the bichromate itself was. ANY acidity could be reduced by ammonia.

Mr. P. EVERITT had been able to get clearer margins by the use of ammonia.

Mr. MACKIE said that the Midland Railway Company had recently introduced a rule forbidding the carriage of gas cylinders in passenger trains.

It being a Lantern Evening, slides were shown by Messrs. J. Austin, Bayston, and other members, followed by slides (shown by Messrs. Newton & Co., and shortly to be published by them) from Mr. Burrow's negatives illustrating work underground in the tin and copper mines of Cornwall.

Mr. T. E. Freshwater brought a sample of a new kind of lime called the "Newtonian," one of which was used in the lantern. They are turned from hard stone-lime, and are very enduring.

MANCHESTER PHOTOGRAPHIC SOCIETY.

DECEMBER 14.—This meeting took the form of what proved to be a very enjoyable social evening, at which many of the members exhibited, in an informal way, quite a good show of photographic prints, stereoscopic transparencies, &c., rendered doubly interesting to the visitors by the particulars and information which, from the nature of the meeting, the members were able to give. Messrs. Thornton-Pickard contributed a number of their specialities, including their new automatic camera stand.

During the evening, a good commercial set of photographs of the Chicago World's Fair were shown in the lantern, and the meeting concluded by a lantern show of members' slides.

Brixton and Clapham Camera Club.—December 5, Open Lantern Meeting Dr. J. Reynolds, F.R.G.S., in the chair.—Several slides by members were passed through the Club lantern, after which a set of slides contributed by the Southsea Amateur Photographic Society for circulation by the Photographic Society of Great Britain were exhibited.

East London Photographic Society.—December 12, Ordinary Meeting, Mr. E. Stone in the chair.—Mr. John H. Gear was elected a member, and was unanimously voted President of the Society in the place of Mr. G. S. Pasco, A.P.S., resigned. A question from the question box was read: "What is the best method and plate to use to photograph a piece of red granite having gilt letters upon the surface?" An isochromatic plate, stop *f*-22, a dull light, and short exposure, was recommended, and the developer to be compounded with three times the normal quantity of pyro. The remainder of the evening was then devoted to a discussion on the negatives from which the prints were taken which had gained awards at the recent Exhibition of the Society.

Greenwich Photographic Society.—December 6, Professor Haddon in the chair.—Mr. FRY demonstrated the Paget Prize Company's printing-out papers. Upon their process of development, he said that the keynote of success was a thorough bromising of the print in the first place, and complete elimination of the developer before toning in the second. As regards the bromising, dirty backs to the prints or muddy whites were a clear indication of insufficient time in the bromide bath. Briefly, this part of the process could easily be insufficiently done, and could not be overdone. To leave the partly printed pictures in the ten per cent. bromide for at least ten minutes was a safe plan. In addition, it might be noted that, the less the visible impression or image, the greater the need for a more prolonged stay in the bromide bath. He was often asked whether other developers would do. No doubt they would; but, as the Company's hydroquinone formula had been most thoroughly tested, and found perfectly reliable, what purpose could be served by changing? He saw no reason. After thorough bromising, the important point is to clear the print from developer before toning and fixing. Unless this be done, the depth of the print continues to increase during toning, and it is impossible to say exactly how far the printing will advance, as everything depends upon the amount of reducer (hydroquinone) left in the paper. If the developer were cleared from the print, however (five minutes in running water is sufficient), no further increase in density takes place, and no occasion for exercising speculative judgment as to how far the print will alter in density arises. After Mr. Fry had demonstrated the process, Professor HADDON said that the thanks of all were due to the Paget Company for a useful method of producing prints after a slight exposure to daylight. Any business man who would get up an hour before breakfast could make in that time as many initial exposures (which could be completed in the evening) as would occupy him all day to make if he were obliged to print an image right out. Any person could see the advantage of this addition to our knowledge. He was glad that Mr. Fry had called attention to the necessity of longer bromising of the print. The action of the bromide was to convert the chloride and organic salts of silver in the paper to bromide of silver, which was not so easily reduced by light action under a developer, and was therefore more under control. As far as the washing out of the developer before toning is concerned, he referred to some experiments made by Mr. Grundy and himself, and pointed out that the *method* of washing was most important, and deprecated long soaking as being not only useless, but prejudicial. Upon the question of separate *versus* combined toning baths, Mr. HADDON said the evidence was not conclusive. He had seen prints made thirty-five years ago, toned and fixed in a combined bath, which were practically unaltered, whilst others made comparatively recently were faded. The same remarks applied to separate baths.

Hackney Photographic Society.—December 12, Mr. Robert Beckett in the chair.—Mr. GRANT asked for information regarding the Hill-Norris plates. He found that, unless you gave exact exposure, it was impossible to obtain density. The CHAIRMAN also agreed with this remark, and suggested redevelopment as an improvement, as a better result could always be obtained than by developing all at once. The soluble salts could be easily removed from the plates in a very little while. The plates were very easily dried. Mr. SMITH asked if isochromatic plates were beneficial for exposnre upon winter scenery. Wherever there is a tendency to yellow light these plates were very good. The plates also recommended were those of medium quickness, with a thickly coated emulsion. Mr. Leblanc, of Messrs. A. Schwarz & Co., then proceeded with a demonstration upon Dr. Andersen's developing, fixing, and toning cartridges, and some good results were obtained. They were strongly advocated for tourists, &c., who wished to test their exposures whilst on a journey, as they were so easy to manipulate, and saved taking a quantity of chemicals, &c., on tour. An advantage claimed for the fixing cartridges was that it could be used over and over again, and therefore a decided advantage over ordinary hypo. Glycin, as a developer, was strongly urged for use by beginners. A vote of thanks to the demonstrator closed the evening.

North Middlesex Photographic Society.—December 11.—Some time was consumed by discussions as to the Exhibition just recently held and also the nomination of the executive for the coming year. The members who had received sample packets of the Barnet lantern plate brought their results for inspection and criticism, and a good opinion of the capabilities of the plate seemed, in most cases, to be formed. The Thornton-Pickard tripod was also examined. Information was asked, and a discussion took place, on the question of the possibility of producing pictures that should show unmistakably the effect of a bright sunny day. Most members thought it a desirable attainment, and that it could be done, but seemed somewhat hazy as to how to work for the desired end. Mr. AVERY said he thought that, by giving an exposure just slightly under the normal, developing with a developer, very strong in pyro and weak in bromide and ammonia, until the high lights were fully developed, then washing that off and flooding with another developer, weak in pyro and strong in bromide and ammonia until the detail was all out in the shadows, a negative could be got which, if printed in carbon, would certainly show sunshine. Mr. MCINTOSH was in favour of rehalogenisation.

Richmond Camera Club.—December 18.—In lieu of the promised demonstration by Mr. Borghoff, an interesting novelty was introduced into the Club's proceedings in the shape of a lecture by Mr. BREARLEY on *Japan and the Japanese*, with lantern illustrations, the work of native artists. Mr. Brearley's long residence in the country well qualifies him for the post of lecturer, and his short introductory paper gave a graphic and comprehensive review of the salient characteristics of the land and its people. A large number of slides were then shown, comprising figure studies, street scenes, landscapes, Shinto and Buddhist temples, religious and social ceremonies, and a variety of other subjects. All the slides were colonred, and, little as coloured slides commend themselves in the general way to photographic connoisseurs, it must be confessed that that these, for the most part, showed such delicate and artistic treatment as to compel the admiration of all present, and to suggest a comparison with the English coloured slide by no means favourable to the latter. In fact, the difference would seem to be that in Japan slides are coloured by artists, in England by mechanics.

Woolwich Photographic Society.—December 14, Major C. D. Davies presiding.—At the conclusion of the usual routine business, Mr. W. H. BARNES read a paper on *Isochromatic Photography*, taking up, in turn, the advantages of isochromatic plates for copying oil and water-colour paintings, for photographing flowers, landscape and portrait work. The paper was pictorially illustrated with a number of photographs taken on ordinary and isochromatic plates, with and without the yellow screen, for the purposes of comparison, and further enabled Mr. Barnes to point out clearly when the screen can be successfully employed and when it is better to rely wholly upon the qualities of the plates. He concluded by passing a number of slides through the lantern for additional illustration.

Ashton-under-Lyne Photographic Society.—December 14, Mr. Greenwood in the chair.—An address was given on the subject of *Photographic Chemistry* by Mr. STEPHEN SHARP, chemist. Mr. Sharp illustrated his subject by giving numerous tests of the various chemicals used in photography, and showed the members some simple methods of judging the purity of them.

Derby Photographic Society.—December 13, Mr. R. Keene presiding.—It having been suggested to hold an Exhibition of Photographs in 1894, similar to that held at the commencement of 1893, this question was first brought under consideration to ascertain whether sufficient new work could be obtained from the members to make the Exhibition a successful one. It was arranged that it be made a biannual one, so that the next will take place early in 1895. It was also agreed to hold an Exhibition of Lantern Slides (made by the members) early in 1894, to which all interested in photography could be invited. The Rules of the Society were also revised, and the night of meeting altered from the second to the third Tuesday in each month, October to April inclusive, out-door meetings to be held from May to September. It was decided to hold the annual dinner early in January next.

Hexham Photographic Society.—December 12, Mr. Jasper Gibson (Vice-President) in the chair.—The prints and slides sent in to the recent Members, Competition were on view, and a number of members' slides were put through the lantern. Mr. W. PARKER MORRIS, the Assistant Hon. Secretary of the Newcastle and Northern Counties Photographic Association, gave a lecture on *Lanterns and their Manipulation*, and explained the construction and method of working his powerful limelight lantern. The lecturer was accompanied by Mr. Edgar G. Lee, who is well known as being one of the best lantern-slide workers of the day. A number of his slides, which are now being published by Mr. J. P. Gibson, Hexham, illustrating *Child Life in the Slums*, *Street Life*, *The Herring Fishery Industry*, and *Marine Studies*, were shown upon the screen, and were much admired for their artistic treatment as well as for their local interest.

Ipswich and Suffolk Photographic Society.—A *conversazione* was held at the Carr-street Rooms on Friday, the 15th inst. A large exhibition of pictures was furnished by the members. The President (Mr. J. Dixon Piper) showed about thirty views, mainly 24 × 20, taken direct, and Mr. Pringle (late Secretary) also contributed some charming landscapes. Altogether nearly 300 frames were hung. A quantity of apparatus was shown. A half-plate camera, with aluminium fittings by Park, attracted considerable attention, and Messrs. Marion's cameras were also much admired. The European Blair Camera Company made a good exhibit of hand cameras. Beck's also made a good show of Frenas and work done by them. A new hand camera, to carry eighty cut films, quarter-plate, the Malda, was on view. Messrs. Houghton, Eastman Company, Blackfriars Company, Thornton-Pickard Company, Elliott, Taylor, Tylar, Cresco-fylma Company, and many others were also represented. Messrs. West & Wilson sent a number of lantern slides, which were shrown on the screen by Mr. J. C. Wiggin. Music was provided at intervals by Mr. Charles Cooke and leading local amateurs. The Committee furnished refreshments in the interval, and a very pleasant evening was spent. About 200 of the local enthusiasts and their friends were present, including the Mayor and many members of the Corporation.

Liverpool Amateur Photographic Association.—On Thursday, the 14th inst., under the presidency of Mr. Arnold Cleaver, the Annual Meeting of this Association was held in the Club-rooms, Eberle-street. An entirely new feature was introduced to the meeting by Mr. H. Simpson (an old member of the Association), consisting of a lecturer's automatic optical lantern, which the lecturer has entirely under his own control, no operator being required. Previous to the exhibition, the lecturer places in order all the slides he requires to illustrate his lecture. The lecturer may face his audience, the lantern being placed in the usual position at the back of the hall, and, by means of a pneumatic tube connexion, he dissolves the pictures, changes the slides, and works the limelight. The entire arrangement is altogether unique. After the usual business routine, including the election of twelve new members, the competing pictures, which were arranged round the room, were awarded prizes as follows:—Champion Class for Past Prizemen: The gold medal of the Society, Mr. T. F. Lloyd; for half-plate and under, silver medal to J. Appleby, bronze medal to G. Allday; over half-plate, silver medal, C. A. Timmins; bronze, H. Holt; for enlargements, silver medal, William Tomkinson; for hand-camera pictures, silver medal to H. B. Forrer; and stereoscopic slides, silver medal,

W. S. Elsworth. In the lantern-slide competition the Judges had great difficulty in making a selection. Finally it was decided to award two silver medals for equal merit, viz., Joseph Earp and F. Anyon; bronze medal, T. B. Sutton; and the President's prize, open to lady members only, has again fallen to the lot of Miss Rose Collier.

Midland Camera Club.—December 15, Dr. Edwards presiding.—Mrs. W. D. WELFORD gave a demonstration on *Cresco-fylma*. She stated that success had rewarded her first attempt, and claimed as advantages the smaller apparatus necessary, and the absence of an enlarging camera or dark room when cresco-fylma is used. The proportion of cresco-fylma used in operating was 1½ ounces to ½ ounce water. Four transparencies were placed in dishes containing the above liquid, and in about two minutes the films floated off, and were placed in larger dishes containing water, and opal being placed therein. In twenty minutes the transparencies had enlarged from half to whole-plate (no loss of density being noticeable), and were then floated on to the opals, removed and dried. Questions as to the nature and uses of cresco-fylma were asked and answered. At the close of the demonstration some lantern slides by Mr. and Mrs. Welford were shown, those of clouds being very much admired. Mrs. Welford concluded a useful evening by eulogising the hand camera for clouds, street scenes, and seascapes.

Dundee and East of Scotland Photographic Association.—December 7' Mr. J. D. Cox in the chair.—A Lantern-slide competition took place, for which ten members entered, each sending in six landscape views. The prizes were adjudged by the meeting as follows:—1, Mr. D. Ireland, Broughty Ferry; 2, Mr. V. C. Baird, Broughty Ferry; 3, the Rev. E. J. Gough, Dundee. Mr. Murray Feathers gave a lecture on *The Capabilities of the Camera*. Some excellent pictures, illustrative of the different branches of the photographer's art, representing statuary figures, animals, landscapes, stellar photography, &c., were shown on the screen. Among the most noteworthy of the photographs are representations of the statuary in Dundee Museum, taken by the electric light, and an interesting collection of views of the Chicago Exhibition. Mr. Feathers gave racy descriptions of the different slides.

Glasgow and West of Scotland Amateur Photographic Association.—December 18.—Fourteen new members were elected. Mr. J. C. OLIVER gave a demonstration of negative retouching, using an enlarged paper negative, on which he pointed out the modifications required, and showed how they might be effected. Negatives in various stages of retouching were handed round, and transparencies from retouched and untouched negatives were shown by means of the lantern. A large number of slides by members were shown on the screen. An Exhibition of members' work will be opened on December 25, and will be open to the public for a fortnight.

Glasgow Photographic Association.—December 7, Mr. John Stuart (President) in the chair.—Two new members were elected. One question was in the question-box, viz., "What is the experience of members who have used the Sandell plates?" Several members had tried them—some with success, others got rather indifferent results with them. Amongst the difficulties experienced were, fixing of the plate and prevention of green fog. After the President had given his opening address, the Treasurer's and Secretary's reports were read and adopted. Mr. STUART then gave a demonstration of the developing of printing-out papers, using all the best known makes. The members watched the various manipulations with great interest. Mr. Stuart drew attention to the fact that prints from soft negatives could have more vigour given them by using a stronger developer, and those from hard negatives could have the contrasts decreased by employing a weaker developer than the normal one, and giving more time to the development, and recommended that the prints should remain in the bromide bath for fifteen minutes. He said that, if the prints were exposed to much strong daylight during printing, there was a tendency to have the whites greyed, and which often showed on the back of the print. He also showed, by the use of a brush, how hard parts of the print could be much softened. During the demonstration, Mr. Stuart showed a large number of prints made on the new P.O.P. matt-surface paper; they were passed round, and much admired by the members. Some of the prints had very pure whites, with rich blacks. It was generally conceded that, for artistic work, such a paper was much wanted. Mr. Stuart also showed a sample of matt bromide paper, to be shortly sent out by the Ilford Company, and which will admit of being worked upon with the greatest facility with the brush or pencil. A large collection of lenses, in their various stages of manufacture, for the making of photographic objectives, kindly lent for the use of the Society by Mr. J. H. Dallmeyer, London, were shown to members. Mr. Brown showed a photograph taken at Lamlash by moonlight, with one and a half hour's exposure; it was somewhat similar to an under-exposed one taken in the usual way. Mr. Platt showed a group, taken in Airdrie, after an amateur dramatic performance; it was from a 15×12 negative, which was taken by means of Mr. Stuart's flashlight apparatus. The print was much admired; the only fault found with it was, that the lens did not quite cover the plate at the edges. Transparencies by Messrs. Watson, Hanbidge, and Lindlay Miller were passed through the lantern. A meeting of the Society and friends of members will be held early in the year, and will take the form of a smoking concert.

Kilmarnock Amateur Photographic Society.—December 15, the President (Mr. T. Ferguson) in the chair.—Mr. MILLAR gave a demonstration with gelatine papers, viz., Ilford P.O.P., Solio, Nikko, Paget printing out by development. Each of these papers was illustrated by views that had been taken in Arran. For developing Nikko paper, Mr. Millar uses half a drachm of rodinal to two ounces of water. The following was given as a good recipe for mounting gelatine prints:—Best Bermuda arrowroot, 3½ ounces; gelatine (Nelson's No. 1), 160 grammes; methylated spirits, 2 ounces; carbolic acid (pure), 12 minims; water (cold), 30 ounces. Mix the arrowroot into a stiff cream with a portion of the water, while the gelatine is placed to soak in the remainder. When the gelatine is softened and the arrowroot well mixed, pour all together into an iron saucepan and bring to the boiling point. Keep at this heat for about five minutes, being particularly careful to stir continually from the moment the mixture is placed on the fire. When sufficiently cooked, pour into a basin to cool. When cool, add the carbolic acid and spirit (previously mixed) in a thin stream with constant stirring. Then bottle, and keep well corked.

Munster Camera Club.—December 5, a demonstration on the *Ethoxo Light* was given by Mr. W. Ringrose Atkins, F.C.A. Mr. John Day, President, occupied the chair.—Mr. ATKINS, in the course of his remarks, explained the manner of producing limelight by the combination of oxygen and hydrogen gases, and described the different kinds of "jets" used. He then referred to the light generated by passing oxygen through the vapour arising from methylated ether, or benzoline, illustrating his remarks by an exposition of Lawson's New Patent Ether Saturator, the construction and working of which he explained by means of photographs taken by himself and projected on the screen by means of the identical instrument itself. This appliance gives a beautifully brilliant white light, undoubtedly surpassing in brightness the usual oxy-hydrogen safety jet, and its manipulation is extremely simple. Mr. Atkins stated, in continuation of his remarks, that the convenience of the saturator in places where no hydrogen can be had would be very great, and, further, that he considered that the amount of danger which undoubtedly existed in some of the older forms of saturator was minimised in the case of the new instrument, which he used in conjunction with one of Messrs. Riley Brothers' (of Bradford) "Prestantia" lanterns, with a lens of six-inches focus. Mr. Atkins then exhibited a number of photographic slides made by himself and Messrs. Scott, Bennett, Egan, &c., which were highly satisfactory. A discussion ensued, in which the President and Messrs. H. Lund (of the Chemical Department of the Royal University), A. Newsom, R. S. Baker, R. M'Kechnie, J. Bennett, &c. took part. Mr. Lund's remarks were most interesting, and his description of the earlier pattern saturators showed his complete knowledge of the subject.

Photographic Society of Ireland.—December 8, Mr. Hedley (Vice-President) in the chair.—Subject, *Colouring Lantern Slides*, by Professor J. A. Scott. The lecture, one of the most interesting given before the Society, was largely attended by members and visitors. Many ladies also were present. Dr. Scott opened the lecture by showing some diagrams which he had partially coloured for demonstration purposes, so as to make certain portions of the subjects more striking, and said that while doing this he was led to try various styles of colouring, such as flowers, views, &c.; and to show the effect some coloured slides of apple blossoms, narcissi, &c., also Alpine scenery and other views, were thrown on the screen. At the same time the Professor expressed the opinion that most good photographs were better uncoloured, but that a bad one could be considerably improved. The varnish colours proved unsatisfactory, as they took so long to dry, even when heat was applied, unless special media were used. Experiments with oil colours showed they were insufficiently transparent, the best of these being only good when applied in thick coats, and utterly failed when merely thin washes were given. What proved satisfactory in Dr. Scott's hands were the aniline dyes, and these in all cases would not suit—only those known as the acid dyes, such as picric acid, Essin soluble blue, and some others. Those dyes are applied with a brush in washes if the gelatine be previously soaked in water, or best if the colouring be carried out immediately the final washing is concluded, and the surface gently dried with a handkerchief to remove superfluous drops of water. The dyes have the effect of staining the gelatine, and show very little or no tendency to run beyond where the brush has touched. A little dextrine is mixed with the dyes when painting on plain glass or gelatine. Another point about the staining is that the colour be kept very dilute; otherwise they appear too bright. The slides showing the effect of the colouring were in all cases received with applause, and, after a vote of thanks was passed to Dr. Scott for his instructive lecture, a most successful meeting was brought to a close. The Hon. Secretary (Mr. Ruthven) announced that the Society's Exhibition would be held next January, when a gold medal would be offered for the best picture sent in by amateurs (open competition). Particulars can be had from Hon. Secretary.

FORTHCOMING EXHIBITIONS.

1893.

December ..... *Madras. The Hon. Secretary Amateur Photographic Society, Madras.

,, 22–Jan. 22, 1894 *Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

PHOTOGRAPHIC COPYRIGHT.

To the EDITOR.

SIR,—Referring once more to the vexed question of copyright in photographs, would it not be possible to get a short measure added to the Copyright Act, by which any professional photographer, on paying a fixed sum—say, 5*l.* or 10*l.* per annum—would be enabled to protect *all* photographs sent out of his establishment?

I have no hesitation in saying there are many professionals, doing a large business, who do not pay so many shillings during the year. This would mean an increase of revenue, and need not prevent registration, for those who prefer it. This measure would, I think, if carried out, effectually scotch the pirate and cheap enlarger.—I am, yours, &c.,

SUGGESTION.

To the EDITOR.

SIR,—I have heard it stated that there was no copyright law applicable to Scotland under which the work of a photographer could be protected, and it would appear that the opinion that such is really the case must be freely entertained, at least by some speculative firms or individuals.

Those gentlemen, about this season of the year, generally flood many of the paltry shops in our small country towns with local views in the shape of trashy Christmas cards with New Year greetings printed upon them.

These productions are mostly pirated from the work of resident photographers, whose struggle for existence in these poor and scarcely peopled districts need not be made more desperate by the systematic thieving of his work, while the inferiority of said productions is very likely to affect his reputation, as they are probably palmed off upon the general public as being his own original work.

As a photographic artist I have been pretty severely dealt with in this way. It is very annoying to observe in shop windows these trashy abortions of my work, the original negatives of which cost me much anxious watching and waiting in order to secure the best possible results, reproduced in this unscrupulous manner by the speculative gentry I have referred to, aided and abetted, no doubt, by some of the paltry shop-keepers to which I have also referred.

If it were possible, I would endeavour to prevent a repetition of this unprincipled traffic in the reproduction of my work. To do this I suppose it would be imperative that duplicates of the subject should be forwarded, and registration secured before any copies are issued to the public.

I have no doubt there are many photographers similarly situated to me with respect to the pirating of their work, and it would confer a favour on me, as well it may be on others, were you to explain in your columns whether the further copying of any photograph could be protected by the ultimate registration of the original work.—I am, yours, &c.,

High-street (West), Leslie, N.B., December 18, 1893. D. ROSS.

THE SPEED OF PLATES: A CRITICISM AND A REPLY.

To the EDITOR.

SIR,—Under the above title Mr. Elder defends, against the criticisms which we passed upon it, a paper entitled "Rapidity of Plates," read by Captain Abney before the Camera Club. Although we are not members of this Club, we have, in obedience to its rules, confined our criticism to its *Journal*, "for private circulation only;" and we are much surprised that the Camera Club and its President, whilst enforcing silence upon us, have permitted Mr. Elder to give wider publicity to his remarks.

We do not suppose for one moment that Captain Abney engaged Mr. Elder as a special pleader; he is quite able to defend himself, and, as a matter of fact, published a written reply to our criticism a month afterwards. Nor do we suppose that Captain Abney approved of the style and the contents of this attack upon our work, the arduous nature of which no one can more fully appreciate than he.

But why this second reply on Captain Abney's behalf? We have pondered over this puzzling question, and find it more difficult to solve than the problem of speed determination. At first we came to the conclusion that we must have seriously offended Mr. Elder with some remarks we made with respect to his own paper, *Some Remarks on the effect of light on photographic plates*, but, on again perusing the record of these remarks, we have to dismiss the idea that we could have given such offence as would justify the attitude he has thought fit to take up. The inaccuracies in which his paper abounds, and its bitter and ungenerous tone inclined us to conclude that, in criticising Captain Abney's paper, we must, unknowingly, have criticised some of Mr. Elder's own work; and, were it not for our conviction that Captain Abney is the last person to need Mr. Elder's assistance, and that he would scorn to publish as his own work anything communicated to him by another, we should think that we had found the real key to the situation. As it is, we are at a complete loss to understand the motives which dictated Mr. Elder's angry and undignified reply.

Of some of Mr. Elder's statements we refuse to take any notice whatever. When he has studied and understands fully the work we have done, he will be entitled to be heard with respect, at present he has not mastered even the elementary part of our papers. To other of his remarks we are, unfortunately, obliged to reply lest our silence should be misconstrued, but our remarks shall be short.

Mr. Elder's definition of, and his remarks concerning the speed of plates, and the range of gradation necessary in negatives for artistic effects, are neither new nor correct, and any one can easily convince himself from our papers that we have fully considered these several points. If Mr. Elder is unable to produce two exactly similar negatives on plates of widely different speeds, we shall be pleased to give him a demonstration in Widnes, as we did before an audience in Liverpool. It is not true that we ever asserted that the ratio of gradation of a technically perfect negative must be the same as in the object portrayed; nor did we ever assert that the print from such a negative was perfect. It is equally untrue that the finest negatives have their gradations in that part of the scale which we have termed the "period of under-exposure." We have measured many wet-plate negatives, as well as dry, and we have invariably found that in sparkling negatives the opacities range from about 1¼ to 320. If Mr. Elder will produce a sparkling negative, the gradations of which lie between transparencies 94 per cent., and 16½ per cent., we shall be glad to have the opportunity of inspecting and measuring it. For the present we say that neither he nor any one else has ever seen a sparkling negative with such a range of gradation as he mentions.

That Captain Abney's method of speed determination gives numbers wholly at variance with the speeds found by our method was precisely the reason why we pointed out the weakness of a method depending upon a single density. We foresaw the fate which must, sooner or later, overtake Abney's method announced to the world in April; it is completely abandoned, even by its author, in November of the same year. We, and our friends, knew well that a method which depends upon "the period of under-exposure" must be liable to great variations and errors, the deciding densities being too small to permit of accurate measurement and reproduction, and that such a method must be utterly useless. The contradictions between the speed found by Abney's method and our own, we ourselves laid bare before the Camera Club. It is, therefore, no surprise to us, and it cannot be to any of the public, to find our statements verified by Mr. Elder.

Had Mr. Elder taken the trouble to ascertain, by means of the camera, which speed is the more nearly correct—Captain Abney's or our own,—such an experiment, carried out fairly and carefully, would have told a story which would have silenced the silly assertions dictated only by Mr. Elder's fertile imagination. For the present, we again affirm that the speed, as ascertained by our method, is a number to which the exposure in the camera must be proportional if a good negative be the desired result. We ourselves pointed out before the Camera Club that Abney's and our own methods could not possibly give the same, or proportional, speeds of a plate in absolute units; and we took the trouble to show the error Captain Abney had fallen into with his logarithms, which error led him to the conclusion that his method gave the same zero point, *i.e.*, the same speed, as ours. It appears to us that logarithms are also a source of trouble to Mr. Elder. He says that Abney's transparencies are proportional to the negative logarithm of the exposure. This is either not true, or, if it be, it is not in accordance with the "law of error" formula which Mr. Elder attempts to set on its legs again. Mr. Elder simply mistook the square of a logarithm for the logarithm of a square.

The question of Captain Abney's recent researches we intend to deal with separately before long.

There is only one other point to which we must allude. Mr. Elder wrongly accuses us of having unfairly criticised Captain Abney when we said that he attempted to prove that a parabola did not differ much from a straight line; and Mr. Elder endeavours to show that the Captain did not fall into this error. Let the Captain's errors sleep in the annals of the Camera Club; why drag them before the public, and compel us to again assert that he did commit this error, and that in the whole of the passage to which we refer (*Camera Club Journal*, vol. vii. page 129) the point of inflexion is not mentioned, and was not meant? Our criticism was not only just, but absolutely necessary.

To conclude, we adopt his own words when we say, "It would be too wearisome to hunt down the whole of the errors in Mr. Elder's criticisms to their bitter end." We have purposely steered clear of mathematics, as our object has simply been, as shortly as possible, to reassure our friends, and to show the general public that Mr. Elder's criticisms are unworthy of serious attention. While "he does not in the least seem to realise what is meant by the determination of speed," and does not offer one scrap of new experimental evidence, we have shown, and frequently demonstrated by experiments before the public, that a more than sufficiently accurate speed number can be assigned to any plate, without reference to any other plate; and that this number is expressed in units as absolute as the gramme or centimetre, though not as easily reproduced. We have also repeatedly shown the practical applications of which our system is capable, and we can only say to Mr. Elder, unless he wishes to still regard our work with a "jaundiced eye," do as others have done, who, with open minds, have only desired to learn the truth. Come to Widnes and see for yourself. F. HURTER & V. C. DRIFFIELD.

GELATINO-CHLORIDE PAPER.

To the EDITOR.

SIR,—We note the two letters in your issue of the 15th inst, and, as Mr. Smith has acknowledged that his estimate of comparative cost contained a very serious omission, we are perfectly content to leave this part of the subject where it is.

As regards "Scribbler," if he will pay us a visit at Ilford, we shall be

happy to teach him to work the paper, as he does not appear able to succeed without further help.

The remaining portions of the letters show to how great an extent the personal equation comes into play in the question. Yellow prints, impure whites in vignettes, are not met with *except where the photographer has failed to follow instructions*, and therefore such accusations are not indications of faults in the paper, but signs of want of thorough knowledge or care on the part of the worker.

Individual opinion counts for nothing against the opinion of the many, and, from our position as manufacturers and suppliers, we can state with certainty that 999 users out of 1000 find the paper all we claim it to be. Were this not so, we should not have found our first year's sales more than satisfactory, and our second (just closed) 300 per cent. better.

When the gentleman wrote in the ALMANAC (in all good faith, we are sure), "I think it will take something better than the present make of gelatine paper to supplant good old albumen," he has evidently very little knowledge of the subject beyond his personal failures, and his saying reminds us strongly of the saying of a good but equally misguided man who, in 1877, wrote on the subject of gelatine plates. This gentleman said that no photographer who was worthy of the name would buy a ready-made plate, and therefore he did not see much future for gelatine plates.

Comment or comparison is needless. We appreciate highly Mr. Smith's evident fairness, and his desire to avoid controversy, and, having pointed out what seemed to us to be his error, we do not seek a further free advertisement, as he puts it.—We are, yours, &c.,

THE BRITANNIA WORKS COMPANY, LIMITED.

FILMS *VERSUS* PLATES.

To the EDITOR.

SIR,—I have recently received a roll of thin film from the United States, with a number of various brands of plates for speed testing. The point of interest is that this package—dated October, 1893—bears the following printed warning:—"30—Sensitometer. This film must be used *within six months* from date hereon." Probably this is the first instance of a maker making reference to the non-keeping quality of a gelatine emulsion.

In justice to films, however, I may state my decided opinion that all the different brands of "the quickest plate made" sold in England ought to be labelled in a similar manner. I find most of them are deteriorated after six months' keeping.—I am, yours, &c.,

Hereford, December 16, 1893. ALFRED WATKINS.

SPOTS AND PINHOLES IN NEGATIVES.

To the EDITOR.

SIR,—Mr. Harding Warner has kindly replied in your columns to a note which I sent you some few weeks ago on the subject of pinholes in negatives. I ought at that time to have given fuller information upon my experience with these nuisances, but cannot regret the omission, because it has been the cause of eliciting a most interesting communication from your correspondent. Of the three brands of plates which I formerly referred to, Thomas's "Pall Mall" were in A. & M.'s grooved boxes; Obernetter's were, if my memory is right, packed with soft paper between the films; the third maker's were in grooved boxes. The two former gave perfect negatives when properly used, the latter were invariably covered with pinholes, there being no difference in the conditions of treatment of the three brands. The holes were in the films, leaving minute spots of clear glass; they were not merely specks of clear gelatine, and they were not visible until the film was dry, after the negative was completed. To the eye there was nothing wrong with the plates when examined as taken fresh from the boxes in which they were packed. For these reasons I concluded that the defect was due to mechanical, and not to chemical, causes.

I was especially interested in Mr. Warner's letter, because it gives another bit of evidence illustrating the danger of packing plates with silver paper between the films. This method of packing is my particular abomination. Why will not makers adopt the simple plan of laying the plates film to film, binding them firmly together, and then wedging them tightly in the outer coverings, so that the whole package is one solid mass which cannot be disturbed by shaking? I believe that many of the best photographers pack their exposed plates after this fashion when on tour. The Cadett plates in small sizes are packed in a manner which, in my opinion, is quite perfect; and, although the larger sizes of this make are not packed film to film, yet, shake the box as you will, there is no movement of its contents. I write feelingly on this point, for of late I have been preparing negatives for collotype printing, and found the greatest difficulty in obtaining plates free from mechanical defect of the film which has been caused by bad packing.—I am, yours, &c.,

Wimpole-street, W., December 16, 1893. F. R. FISHER.

THIOCARBAMID.

To the EDITOR.

SIR,—With further reference to ours of November 27, in which we drew your attention to Mr. Hauff's new preparation, thiocarbamid, used for removing stains and discolourations, for fixing and clearing, we have now pleasure in enclosing you herewith a certificate of the well-known Dr. J. M. Eder, of Vienna, and should be much obliged if you would publish it in the next issue of your paper. Thanking you, we are, yours, &c.,

FOREST BROTHERS.

17, *Philpot-lane, London, E.C., December* 16, 1893.

[We append Dr. Eder's certificate.—ED.]

CERTIFICATE OF THIOCARBAMID-HAUFF.

On October 10, 1892, Mr. J. Hauff, of Feuerbach, Stuttgart, submitted to me a sample of thiocarbamid, with the request to test same and report thereon in regard to the application of same in photography.

According to this statement of Mr. Hauff, thiocarbamid should possess the property (when added to the fixing bath) to prevent bromide silver gelatine plates, as well as chloride silver gelatine plates and bromide silver gelatine papers, from colouring the gelatine layer yellow, and should prevent the formation of so-called green fog.

The preparation sent consisted of some white crystals, and gave in water a colourless liquid. I found that it acts indeed (in acid solution) as a preventive against yellowish negatives.

I made a solution of—

Thiocarbamid	10 parts.
Citric acid or sulphuric acid	10 ,,
Water	1000 ,,

I immersed in this solution a pyro-negative strongly covered with green fog and after a short time the yellowish-green colour had disappeared. With amidol I was not able to obtain negatives showing green fog, and therefore could not make a trial.

If the salt is added to the fixing bath, it prevents the formation of green fog with plates and bromide silver papers; but it must be observed that the bath should be *acid*.

For fixing I found the following formula very useful:—

Water	1000 cc.
Fixing soda	200 grammes.
Thiocarbamid	10–15 ,,

To this solution is added 50 grammes of bisulphate of soda.

I would observe that plates as well as papers, before fixing, must be washed sufficiently so as to remove all traces of the developer.

As the action of thiocarbamid in the fixing bath is only of proportionately short duration, it is recommended to use an ordinary acid fixing bath, which, as is known, will by itself prevent to a certain extent the formation of green fog; and after the use of this, if necessary, the above discolouring bath can be applied, and which will become necessary specially for certain kinds of bromide silver gelatine paper. I can certify, therefore, that for this purpose the said salt, thiocarbamid, proves a good useful means of removing discolouration.

(Signed) DR. J. M. EDER,
Director of the K. K. Lehr- u. Versuchsanstalt für Photographie und Reproductionsverfahren in Wien.

Vienna, December 3, 1892.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance. The full name of the advertiser must in all cases be given for publication, otherwise the Exchanges will not be inserted.*

Will exchange capital brass banjo, twenty-one inches in diameter, for 12×10 or 10×8 camera.—Address, STEEL, 74, Goldstone-road, West Brighton.

Wanted to exchange a five-inch condenser for a "Lawson's patent Saturator and combined."—Address, E. J. CHESTERMAN, The Rise, Endcliffe-vale, Sheffield.

Will exchange three whole-plate metal double slides for good background, or for a rapid-rectilinear lens.—Address, H. STEEL, 74, Goldstone-road, West Brighton.

Wanted a 7×5 wide-angle lens in exchange for a seven-inch rolling press in good condition.—Address, GEORGE WILKINS, jun., The Nest, Christchurch-road, Bournemouth.

Wanted, second-hand collotype machine, in good order, for plates, not less than 15×12; particulars and lowest price; also reversing mirror.—Address, COLLOTYPE, P. O., Aberdeen, Scotland.

Will exchange first-class, five-string banjo, nickel-plated, for half-plate camera, lens with two or three slides, Lancaster preferred.—Address, JOHN K. HECK, 6, Clinton Place, Broomhall, Sheffield.

Answers to Correspondents.

*** *All matters intended for the text portion of this* JOURNAL, *including queries and Exchanges, must be addressed to* "THE EDITOR, THE BRITISH JOURNAL OF PHOTOGRAPHY," 2, *York-street, Covent Garden, London. Inattention to this ensures delay.*

*** *Correspondents are informed that we cannot undertake to answer communications through the post.*

*** *Communications relating to Advertisements and general business affairs should be addressed to Messrs.* HENRY GREENWOOD & CO., 2, *York-street, Covent Garden, London.*

*** *It would be convenient if friends desiring advice respecting apparatus, failures in practice, or other information, would call at the Editorial Office either on Wednesdays from* 4 *to* 6, *or Thursdays from* 9 *to* 12 *noon, when some one of the Editorial staff will be present.*

PHOTOGRAPHS REGISTERED:

David Forbes, Glasgow.—*Two photographs of designs for Clydebank Union Church.*

John Moffatt, Edinburgh.—*Two photographs of a group of Rev. Dr. MacGregor and Rev. Wallace Williamson, of St. Cuthbert's Church, Edinburgh.*

M. J. S.—Thanks. It is very amusing.

W. MORTON JACKSON.—Received, thanks; next week.

G. V. NORTON.—You may rely on the permanence of York's lantern slides.

E. LIESEGUNG.—By the term "working stop," the stop with which the exposure was made is meant.

J. GRABOWSKI.—We know of no one who does that kind of work. Probably an advertisement would obtain for you the address of some one who does.

R. S. P.—Our opinion is that, when such statements respecting the lens, the plate, and the developer are emblazoned on the photograph, it is a tacit confession of weakness in the artistic ability of the photographer himself.

C. RAGGETT.—This query has been answered more than once within the past few weeks. If the music is copyright, it is illegal to make lantern slides of it for the use of school entertainments and suchlike Christmas festivals.

HOROLOGER.—There is a difference of nearly four minutes per day between solar and sidereal time. Twenty-four hours of mean solar time are equal to twenty-four hours three minutes and fifty-six and a half seconds of sidereal time.

S. T. A.—The retouching is very good if the bust is intended to represent a hairdresser's figure, but, if a living being, it is just the reverse. All modelling has been destroyed, and the portrait simply represents a lifeless wax figure.

T. A. W.—If the school committee will not permit the use of cylinders of compressed gas, the only thing we can suggest is to use bags, and make the oxygen yourself, or empty it from the cylinders into bags. Failing that, an oil lamp must be used.

J. CALOE.—Try the addition of a little gum or similar mucilage to the ink. The mere statement that the method you use is very simple does not enable us to give any opinions as to whether it is suitable for "typo-printing." The better way will be to try it for the purpose.

E. B. WARD.—The numbers on the stops are according to the old system of marking, which was to the idea of the maker of the lens. According to the system adopted by some, each smaller stop requires an exposure half as long again, while, according to others, it required to be doubled.

A. M. Z.—As to which of the hand cameras named is "the best" depends, of course, upon the requirements (and means) of the individual. They are all good in workmanship and effective in use; but, beyond that, we regret we cannot go. We do not recommend particular makes of apparatus.

T. W. ABBOTT.—The only way by which the reversal of the image, as regards left and right, can be accounted for is that the plate was placed the wrong way in the slide, so that the exposure was through the glass. This is a very common way of producing reversed negatives by the wet-collodion process for mechanical processes.

NO MONOPOLY.—If the Vicar has given the local photographer special privileges for taking the interior of the church and the ancient records and registers, on condition that he allows a small royalty on the sale to go towards the annual Sunday-school treat, it will not prevent your taking the exterior of the edifice and offering the copies for sale.

PROVINCIAL.—It is doubtful if compensation can be recovered. It is the railway company that you should have have looked to for compensation. If you could hear the broken glass in the box when it was delivered, acceptance should have been refused. Then the matter would have rested with the railway company and those who forwarded the opals.

ALBUMEN.—I. The discolouration of the acetate of soda toning bath may be due to the use of unclean dishes, or contamination with foreign matter. Some papers also have the property of disorganizing the solution. 2. Simply add a little more gold the day before the bath is next used, and occasionally a little more acetate of soda. The formula cannot be improved upon.

HANTS sends us some mounts that show decided marks of mildew. He says that they have been in stock for a year or more, and asks the cause. It is possible that the mounts were not thoroughly dry when received, or they may have been stored since in a damp place. They should not be used for silver prints, even if the mould is wiped off. Damp is the origin of the mildew.

A. C. BLAND.—There is no question that some of the mounts now supplied to photographers have much to answer for in the matter of fading prints. But they are by no means the sole cause, several other factors are at work, some of which are weak negatives, weakly sensitised paper, imperfect fixing, &c. Do not for a moment surmise that, because prints, whether gelatine or albumen, turn yellow quickly, the mounts must be the cause.

T. BRAMWELL.—You are evidently causing yourself an unnecessary inconvenience. For experimenting with the wet-collodion process, the subdued light required in the dark room when using gelatine plates is not at all necessary. If the window has a north aspect, a couple of thicknesses of orange cambric or one square of orange glass will suffice. Those who are only familiar with photography with dry plates have no idea the amount of light that may be used in manipulating wet plates.

F. S. T.—In asking if you can patent your new developing solution, you will certainly have an affirmative reply. You may patent anything you choose, within reason, and the patent will be sealed, unless any one should happen to oppose it, which is scarcely probable in your case. But it must not be assumed that, because a patent is granted, it would be valid if it were contested. If this were done with a very large proportion of the patents taken with reference to photographic matters during the past few years, they would fare badly.

B. F. MASON.—The distinction between "actinic" and "achromatic" is this: The former has to do specially with the bringing together at the focus of the lens the visual rays and those by which chemical action on the plate is produced; in other words, uniting the chemical and the visual focus; whereas, by an achromatic lens, this is not necessarily the case. Some lenses are quite achromatic as regards being quite free from colour, but they may not work quite to focus. Good telescope and microscope objectives belong to this latter class.

*** Several answers to correspondents, articles, letters to the Editor, &c., are held over.

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THE BRITISH
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PRINTING-PAPERS WITHOUT GLOSS.

As our remarks will have a bearing on all kinds of paper free from added glaze, it is better not to employ the term "matt paper," seeing that, by an unwritten convention, the meaning of that term has gradually become so restricted that paper with a gelatinous surface, rendered dead or matt by artificial means, is now understood when the expression is used. That there should be a tendency to use paper free from gloss is a very satisfactory proof of the spread of artistic feeling. In the early days of photography, when plain salted paper was the chief medium of photographic expression, it must be admitted that there was far less opposition shown by artists of the brush than is unfortunately so often exhibited at the present time. The advent of albumenised paper—made slightly glossy at first, and very glossy after a time—vulgarised the products of the camera, and this, followed by the immense rush for the *carte-de-visite*, which flooded the country with ten thousand inartistic photographs for every good one, brought the art into a disrepute among cultivated outsiders that it is now only gradually recovering from. The growing taste for papers with dead surfaces will undoubtedly have some slight tendency in assisting to bring about a better feeling for the art qualities of photographic pictures.

The present year may be considered as an era in photography. From every quarter new matt paper is springing, and the cry is, "Still they come." There is such a plethora of processes and materials that the photographer may well be excused for shrinking from fixing upon a single style for his staple work, lest he should choose the wrong one. Let us run over the list. We have the old-fashioned plain salted paper, which may now, except for some special purpose, be considered as quite superseded, for under no circumstances when it is used can the same value be obtained from a negative as with modern matt paper; but when we come to drawing-papers, of various degrees of coarseness of surface, we cannot say the same. The walls of our exhibition rooms have shown us that a suitable negative printed on Whatman or other rough paper, presents a difficultly describable effect that is both artistic and attractive. Indeed, granted a few skilful touches upon the negative, it is sometimes difficult to determine whether a picture so executed be a photograph, a sepia, or an Indian ink drawing. When a view has been well selected and a good lighting effect secured, we question whether in the whole range of photographic processes we could obtain such beautiful results. Transparency is given to the shadows and a crispness to the lights that is unattainable by plain, smooth paper or that with matt surface. But in this direction we should greatly deprecate any tendency (and it has undoubtedly shown itself) to disregard considerations of permanency in the finished print.

As, however, this kind of printing would not commend itself for what we may call every-day work for the professional worker in the studio or the landscapist, we naturally now turn to matt paper. First on the list for priority of use must undoubtedly be placed autotype carbon prints. Prints in carbon, squeegeed upon a matt plate, and removed when dry, were produced, perhaps, a score of years ago, before the present name of autotype was adopted, and the delicate matt effect so obtained was most beautiful, and has never been excelled. It certainly was troublesome to execute, for in those days the surface employed to produce the effect was preferably a zinc plate roughened or "grained" by means of a special sand, till the grain was invisible. The metal being soft, these plates needed careful handling, as the slightest scratch or abrasion left a mark which was faithfully reproduced in every print attached to it. For many years the production of such prints bore a diminished proportion to those obtained by the single transfer process. This latter gave a slightly glossy surface half way between plain and albumenised paper, and, latterly, the Company have brought out a support which, by simple development, gives a matt surface with a slight gloss in the shadows, which is by no means inartistic, but naturally deficient in the delicate "egg-shell glaze" of the older kind.

We are thus led on to consider the media available to us since the introduction of gelatino-chloride paper, and which have crowded upon us so thickly of late. It is impossible for us to make invidious distinctions by pointing out any particular make as being superior to the rest; we should not attempt to do so if even there were one so superior. We have only to look at them from the point of view of permanency or otherwise. We think there can be no reason to doubt that they are at least as permanent as albumenised-paper prints, and very probably they will prove to be less liable to fade, if suitable toning and fixing baths be chosen for use. We note, with some trepidation for the future reputation of our art, that very many formulæ are published which in all probability will result in fading prints. It would be a thousand pities if the reputation gained by the supercession of the old combined toning and fixing bath in favour of alkaline toning should be again jeopardised by the use of solutions possessing similar defects. Whatever may become of matt paper in the future, every one should rigidly abstain from using a bath which would tend to unpermanent results.

Finally, let us add a word of warning. In many respects dull-surfaced prints—matt or otherwise—often greatly resemble platinotypes. Now, we can assert, as a matter of fact, that there have been such prints issued to the public under the false representation of their being platinotypes, and, so closely can they at times be made to resemble the latter that it would puzzle

an expert to detect the difference without the use of chemicals What we have to say is that every honest man should do his best to bring to justice such impostors, who, besides disgracing the name of photography, inflict an injury on the rest, and subject them to injurious suspicion. And our last caution must be to the honest workers. For experimenting with various silver paper, take every precaution with stock "over" prints to see that no possible future accidental error may occur. We know this is necessary from some remarks made to us by a professional friend, who said that it was only by accident that he prevented one of his assistants from innocently sending out as a platinotype a picture which he remembered was a silver print.

THE WET-COLLODION PROCESS.

III.—Dissolving the Pyroxyline and Iodising the Collodion.

In connexion with the making of pyroxyline we have been asked to give a formula for mixing the acids for the preparation of soluble cotton which will not necessitate the tentative method of Mr. Hadow, described in the previous article on this subject. Take equal parts of sulphuric acid of sp. gr. = 1·836, and nitric acid sp. gr. = 1·40, and, having mixed them, immerse the cotton as directed in the other cases. It is of consequence that the acids be of the strength indicated.

Collodion is commonly supposed to be a solution of "gun cotton" in sulphuric ether. This, however, applies to the collodion of pre-photographic times. We now know that "gun cotton" is not necessarily suitable for photographic purposes, nor is ether alone the most suitable solvent for the cotton.

What is the best solvent for pyroxyline? It will dissolve, if well prepared, in alcohol alone, and in rectified pyroxylic spirit (wood naphtha); but by far the best solvent and the one giving a smooth flowing and homogeneous film is an admixture of sulphuric ether and alcohol in nearly equal proportions, with a preponderance in favour of the ether.

Let us here pause for a moment to say that the alcohol of ordinary commerce, whether rectified or methylated, is too weak for getting the highest-class collodion from its use. It should be strengthened by the subtraction of some of the water present. As it is considered illegal to treat methylated spirit of wine with a view to the making of it "absolute," we conform to the laws, more especially as absolute alcohol is not necessary to the making of collodion, at any rate we have never found it to be so. But we can fall a little short of this and still be within the permission of the law, while at the same time we shall obtain it of a strength quite sufficient for our purpose.

Get a quantity of carbonate of potash, crush it to a fine powder and dry it in any convenient way, such as by placing it in a clean shovel and holding it over a clear fire for a short time. To the alcohol about to be strengthened, and which is now supposed to be in a clear bottle, add a handful of this and shake up well for a few minutes. Here is what takes place. The carbonate of potash is soluble in water, but is not so in alcohol. In course of a few minutes all the undissolved potash salt sinks to the bottom of the bottle and is covered by a supernatant solution of carbonate of potash solution in water, the water having been abstracted from the alcohol. The alcohol remaining as a supernatant fluid is stronger than it was by the abstraction of the water, which, as a solvent of the potash, now being much heavier, floats below. It only remains to carefully decant the spirit, which, if tested, is now very strong, its water having been abstracted.

This is quite strong enough for every purpose required in the making of collodion. If methylated spirit is wanted to be any stronger, it may be made so by distilling it from lime; but this, we understand, is illegal. Hence we do not advise it, especially as it is not necessary.

The way that we have found to be the most convenient for effecting the separation of the spirit from the potash solution is to have a clear bottle, like a brandy bottle, and with a graver or any hard steel point to drill a small hole as near to the bottom as possible. This will easily be done by using turpentine as a lubricant. Plug up the hole with a splinter of wood, and then nearly fill the bottle with the spirit that is to be operated upon. When the water has united with the potash it can be removed from the alcohol by withdrawing the wooden plug and allowing it to run off.

Some samples of pyroxyline that will not dissolve perfectly in ether do so very readily in a mixture of about four parts of alcohol and six parts of ether. Place eighty grains of the cotton in a sixteen-ounce bottle, and pour over it four ounces of alcohol, afterwards adding six ounces of ether. Cork the bottle and give it a good shake, by which every particle of the cotton should be dissolved. Some have imagined that the collodion is improved by the addition of three or four drops of chloroform to each ounce. We have made some with and some without this addition, and have found no difference between them. Label the bottle "Plain Collodion," and store it away for use as required. It will improve with age, and become as limpid-looking as distilled water.

The iodising of the collodion next claims attention. It is probable that no two makers adopt precisely the same compounds for doing this. Some use iodide of potassium, others that of ammonium, others prefer cadmium, or zinc, while the majority find that a judicious mixture of two or more confer advantages not belonging to either of them singly. So little as two grains of iodide of ammonium, previously dissolved in alcohol, and used for the ounce of collodion, have been known to give excellent results for positives; but for this the plain collodion, which contains eight grains of pyroxyline, would prove too rich, and would have to be diluted fifty per cent. before being iodised. But, along with the iodide, it is found to be much better, for both positives and negatives, that a certain proportion of the bromides be also present. The bromide of potassium is so very insoluble in ether and alcohol that it is better to avoid it altogether in favour of others which are soluble in that menstruum. The cadmium haloids possess the advantage of conferring great stability upon collodion, and we have known a cadmium bromo-iodised collodion remaining quite colourless for many months after being mixed.

For many years we have given preference to an ammonium and cadmium collodion prepared as below, and have found it to answer *every* purpose, being highly sensitive, possessing good fluent properties, and remaining stable for a long period.

Dissolve:—

Iodide of cadmium	65 grains.
Iodide of ammonium	25 „
Bromide of cadmium	19 „
Bromide of ammonium	11 „
Alcohol	5 ounces.

This dissolves easily, and is added to fifteen ounces of plain collodion.

PHOTOMETERS FOR USE IN PRINTING.

II.

Of the different processes available for the production of a graduated scale, we should be guided by the circumstances under which the photometer is chiefly to be used, and especially the class of negatives. In more than one professional establishment we know, the only photometer employed is a sort of "guide" negative, which is placed in a printing frame, and gives the time to all the rest; in other words, the remainder of the printing frames go untouched until the "guide" is found to be done, when they are all examined, and it is comparatively rarely that one of them has to be put out again. In such cases it is necessary to say the negatives are turned out of an almost faultlessly uniform character, the guide being only a fair sample of the bulk.

This plan would, of course, not work where negatives of every degree of density and gradation are produced, nor, indeed, do we imagine it would prove very reliable even if a number of separate plates were taken to represent different types, for where there are variations of density there are sure to be variations in gradation. Given two negatives of equal density in the lights, but possessing different gradations, it would be found next door to impossible to use either one as an accurate guide to the exposure of the other, especially in varying lights. Then, again, in process work such a course would be an utter impossibility, where nothing short of the absolute measurement of the work done would suffice. In the case of two half-tone negatives, similar exposures may possibly give two passable, or, we will say, equally good prints; but if they are printed independently, to get the best result possible with each, then very likely the exposures would be found to be widely different. In the case of process work this is more particularly the case, and what we require in this case, as in all others, is that the photometer shall register the amount of work done that has been found to produce the best result.

Given any particular negative, if we observe closely, we shall find that there is one degree of depth of printing that gives a better result than any other, but, owing to the nature of the subject, the variety of delicate gradations in the high lights, it is extremely difficult to judge accurately just when that point is reached. But there is no chance of mistaking a certain tint on a graded scale, so that, if we ascertain at which tint the best result is obtained, we can substitute the scale for the negative, and, taking the ascertained tint as the "highest light" we have to produce, we may ignore all lower gradations. We are, in fact, substituting, so to say, mechanical measurement for judgment which is apt to be fallible.

Probably no form of scale is at once so easy of construction and so generally efficient as the paper scale, such as is sent out by the Autotype Company at a very moderate price. It is, however, rather difficult to obtain a perfectly suitable paper, at once translucent enough and sufficiently even in texture, and the instrument requires great care in use afterwards in order to protect it from damage, as well as from dirt, which, naturally, will not improve its behaviour. The *papier minéral*, employed for the purpose of working up negatives, answers very well, but the best scale we have succeeded in making from paper was obtained with a more than usually fine sample of the thin waxed paper sold for wrapping purposes.

As regards the form of the instrument, for practical purposes this is immaterial, though, from motives of economy, it is not advisable to have it too large, either in actual area or in number of tints. For all ordinary purposes, a dozen tints will be found ample, and these may each be a quarter of an inch square, and occupy a strip in the centre of a slip of glass four inches wide by an inch broad. The glass is useful in protecting the paper scale from damage, though it is by no means necessary. A convenient plan consists in binding the separate layers of paper to the glass by means of the outer thickness the edges of which are turned over as in mounting a lantern slide. This outer layer, of course, forms part of the scale, and it can be so arranged as to be easily renewable when it becomes dirty by use, and thus considerably extend the "life" of the scale.

Although, perhaps, a little more trouble and, of course, necessitating an acquaintance with carbon printing, an exceedingly convenient method of forming the graduated scale is by means of bichromated gelatine, the sensitive tissue being subjected to gradually increasing exposures to form the steps of the scale. The exposure may be made in the following manner: take a strip of carbon tissue measuring four inches by one inch, and place it behind a piece of cardboard or thin metal having an opening measuring three inches by a quarter of an inch. The duration of the successive exposures will necessarily depend upon the strength of the light and the character of the gradation required, and may vary from a few seconds to several minutes.

Let us suppose that thirty seconds is the difference that is to be between each succeeding pair of exposures; the tissue with its cardboard shield is covered up with the exception of a quarter of an inch of the central aperture, which is then exposed to light for the requisite thirty seconds. The covering is then withdrawn for another quarter of an inch, and a second exposure made, and so on until the whole three inches have been exposed, forming a succession of twelve different depths of tint. The tissue is then developed upon collodionised glass in the ordinary manner, the portion covered by the cardboard shield forming a perfect "safe-edge," and the result, if properly executed, will form one of the neatest scales possible.

In using the commercial tissues, select one of a neutral black colour, if possible, in order to conform to the rule we have laid down with regard to absence of colour. But the most satisfactory scale of any for use with most negatives of modern type is one in which the pigment or colouring matter consists of reduced silver of precisely the same character as that forming the negative image. For this reason, many persons prefer to make their graduated scales by development upon the same kind of plate and with the same developer as those employed in making their negatives; but, before we pass on to that method, we may describe a modification of the so-called carbon process, by which a similar and, in some respects, better result may be obtained. This consists in colouring the gelatine with reduced silver, instead of with Indian ink and suchlike pigments. In our earliest attempts in this direction, made upwards of twenty years ago, pyrogallic acid and other reducing agents were added directly to solutions of gelatine containing various silver salts, either in solution or suspension. The results, however, were anything but satisfactory, as, besides the horrible colour of the mixture, the chemical action of the various ingredients was found to partially insolubilise the gelatine. The following method will, however, prove perfect in every respect.

Select a sample of soluble gelatine such as Nelson's "No. 1 Photographic" or their "Flake," and dissolve it to the strength

of about sixty grains to the ounce, and to each ounce add twenty grains of nitrate of silver, fourteen grains of bromide of potassium, and twenty grains of bichromate of potassium in the order named. The result will be a reddish-brown mixture or emulsion, which forms the sensitive medium. It may be prepared in ordinary gaslight, but both the emulsion and the tissue must be carefully protected from daylight. To prepare the tissue a sheet of paper is damped until perfectly limp, and squeegeed on to a levelled slab of glass, and a moderately thick layer of the emulsion poured on, allowed to set, and then hung up to dry with four strips of wood pinned to the edges. When quite dry it will probably be rather brittle, for which reason great care must be taken in handling it, though, if properly dried on strips of wood, there will not be sufficient "curl" in the tissue to cause much trouble. A little glycerine may be added to the emulsion to counteract the brittleness if it be troublesome.

This tissue is exposed in precisely the same way as the ordinary, only it will probably prove much more rapid. Before development, however, it is well to soak it in a solution of salt instead of plain water, which will discharge the red colour by converting the chromate of silver into chloride, the remainder of the process being the same as with the commercial tissue; but the result will be a scale composed of different thicknesses of bromide of silver. To bring this into condition for use it only now remains to reduce the silver bromide by means of development, using preferably the same developer that is commonly employed in the production of the negatives. In this manner a colourless or rather a neutral-tinted scale is obtained for use with negatives produced by the newer developers, or, in the case of pyro, the slightly yellow or brown tone that generally distinguishes such negatives.

Another very efficient plan when a definite gradation is required, if such be necessary for this purpose, is to employ a modification of the Woodbury process, which, however, does not necessitate any elaborate machinery. Build up the scale by pasting successive layers of paper or tinfoil upon a sheet of plate glass, and when this is dry press it in contact with a sheet of thin gutta percha softened by heat and backed up with another sheet of plate glass. A screw copying-press may be used, or, if not available, sufficient force is obtained by allowing the weight of the body to rest on the two plates placed on a firm table. When cold, the gutta percha will be found to bear a reverse impression of the scale which is used as the printing matrix.

The printing is performed by means of a gelatinous ink, consisting of a strong solution of gelatine—eighty grains to the ounce, suitably coloured, the adjustment of the proportion of colour being the important element in its preparation. The gutta-percha matrix is laid upon a sheet of plate glass, a pool of the ink is poured into the centre, a sheet of transparent celluloid, or thin, even glass, quickly placed upon it, and, over the whole, a second piece of plate glass. Even pressure is then applied by means of the hands until it is seen that the excess of ink has been evenly squeezed away. Keep the pressure on for a minute or two, until the gelatine has set, and in five or ten minutes the celluloid or glass may be separated from the gutta-percha matrix, bearing with it a beautifully graduated scale. The same matrix may be employed with ink of different strength to produce scales of greatly varying printing value. We omitted to state that the gutta-percha matrix should be slightly greased before each printing in order to ensure the gelatine parting from it.

The last method we shall describe is that in which the scale is made directly upon a collodion or gelatine plate; but, as the working of these is sufficiently well known to those who use them, we need not go further than to describe the method of securing the gradation. For this purpose nothing better can be found than the revolving disc, carrying apertures of various sizes, as this enables us to obtain any sort of gradation, either abrupt or gradual. A disc of light wood or stout cardboard is first inscribed with a series of concentric circles, and from each of the zones or bands so formed a varying portion is cut away, each successive aperture bearing a definite relation to the rest. This is caused to revolve in front of a well-illuminated surface, and is then photographed down to the size the scale is required, the result being a series of concentric graduated tints, from which a strip may be cut if desired.

We have spoken of the scales being formed in the shape of narrow strips, but obviously, where a number are required, as will often be the case, it is just as easy to prepare them in a larger size, to be afterwards cut down. Uniformity will be thus secured.

Patent Infringements.—A case of some little interest, now that so many patents are taken out in connexion with photography and other things, was decided last week. An action was brought by the Edison Bell Phonograph Corporation to restrain the Edison Phonograph Company from infringing two patents. "The infringement was the sale and use in England of a phonograph imported from America, which was made in accordance with Mr. Edison's patents." The injunction was granted (in fact the defendants did not defend the case) restraining the infringement with costs. The Judge also directed an inquiry as to the damages sustained by the plaintiffs. Clearly, as the Judge remarked, this is a valid patent; but this, we know, would not prove to be the case with a very large proportion of the patents granted in connexion with photography, if they were similarly contested.

The Chicago Awards.—The balance of the awards at the late World's Fair, about which so much dissatisfaction as to the system proposed to be adopted was expressed by other nations, has been struck. It appears that sixty-three per cent. of them go to other countries, and thirty-seven per cent. only to America. Mr. Thacher, the President of the Awards Bureau, accounts for this seeming reflection on home work by saying that the Special Commissioners selected the exhibits of foreign countries, while Americans exhibited their usual average commodities. (Humph!) It is more than probable that, if the foreign Commissioners had not made the firm stand they did with regard to the system of awarding first proposed, the balance might have been different. Be that as it may, we should have liked to have seen more of the awards for photo-mechanical work come to this country, instead of going to the Continent.

Amateur Photographers on the Frontier.—It is now proved that the two Frenchmen, whose case we have before alluded to, who were arrested some time ago at Kiel with photographic apparatus, negatives, drawings, &c., were not the innocent individuals they represented themselves as being, namely, tourists on a yachting trip, making photographs and drawings for amusement. At their recent trial at Leipsic, where they received severe sentences, they confessed that they intended to hand over to the French Government the results of their work, and that they employed an English yacht to ensure greater protection against molestation. This case of *bonâ fide* "spies" will only tend to make the German officials more vigilant, and particularly after this event with regard to those assuming English

nationality. By the tone of some of the French journals on the sentences passed, one may expect retaliatory vigilance on their side. Anyhow, English amateurs who may be wintering abroad must now be extra-cautious as to where they erect their cameras on the borders of either German or French territory. To be arrested, by either side, as a suspected spy, entails very unpleasant consequences, as some amateurs know to their cost.

Lantern Slides and Colouring.—At two Societies, within the last week or two, the subject of colouring lantern slides has formed a topic for consideration. At the Richmond Camera Club some were shown, the work of Japanese artists, which were considered by those who saw them superior to those produced here; and at the Photographic Society of Ireland Professor Scott gave a lecture on *Colouring Lantern Slides*. In former times they were painted by artists, and not on a photographic basis. When the photograph has to show through the colour, or the colour through the photograph, it is quite a different thing from the artists' working on bare glass, When this was the case the painter had to be an artist, and could command his price. As much was then paid for a single slide as would now purchase a dozen or two. Professor Scott in his lecture advocated the use of aniline colours for the work—by which we presume he meant colours of the coal-tar series generally. These are certainly well suited to the purpose, on account of their extreme brilliancy and transparency—the two most essential qualities for the work. It may be urged that these colours are fugitive; but this may be disregarded, except, perhaps, with two or three of them, when it is considered the short time they are subjected to the light. However perfect a series of photographic slides may be, the introduction of one or two really well-coloured ones always meets with a round of applause at any public exhibition. This is conclusive that good coloured slides are appreciated.

Oxygen in Illuminating Gas.—Referring to our previous paragraph on this subject, there are now more data available with regard to this singular apparent inversion of old ideas. The plan is now in actual operation in Huddersfield, and, at the last meeting of the Southern District Association of Gas Engineers and Managers, Dr. J. T. Thorne gave full particulars of the method—enriching ordinary coal gas by means of oxy-oil gas. His conclusions, in brief, are: First, The addition of oxygen to oil gas, preferably while the latter is still hot, not only increases the illuminating value of the oil gas when employed directly as an illuminant, but also when it is used to enrich other gas. Second, oxy-oil gas is a highly permanent gas, and, when used as an enricher of coal gas, actually increases the stability of that gas. Third, enrichment of coal gas by oxy-oil gas would cost about one-third of a penny per candle per thousand cubic feet. Dr. Thorne's further conclusion is, that this new gas, "oxy-oil," is superior to any process for enriching coal gas. As to what experience tells, that may be seen in *London*, the organ of the London County Council, for November 30. The Huddersfield Corporation have utilised the plan for over two months, with the result of obtaining a steady white flame, affording a better light, with a saving at the rate of 10,700*l.* per annum. Part of this is owing to the increased commercial value and superior readiness of sale of the coke produced under the new conditions. We have not hesitated to refer at length to this matter, and, indeed, any question connected with the utilisation of coal gas for photographic purposes. Our readers may be assured that the last word is by no means yet said in connexion with the use of gas as a photographic illuminant. Some experiments we have on hand in this connexion shall be described when the series are completed.

BRISTOL INTERNATIONAL PHOTOGRAPHIC EXHIBITION.

II.

We resume our notice of the Bristol Photographic Exhibition.

Placed out of their class are a few landscapes which may possibly be overlooked by visitors, as they are in a kind of alcove separating two of the galleries. Of these, *In a Fog—Winter*, by Mr. S. G. Payne, is a really good attempt to obtain fog—we mean in a landscape, not in a plate. Rev. H. B. Hare shows a capital bit, *Landing the Trout*, and Mr. C. Moss is not unsuccessful with *Lowlands*, a view of a sombre heath. The Class (VI.) for Large Instantaneous was only patronised by seven frames of views, of no particularly high order of merit. Mr. A. W. Gottlieb shows an animated scene, *Life on the Sands*; Mr. E. Hawkins a study of two dogs, *Toby and Jack*, good in its way. The same gentleman's *Evening on the Thames* struck us as being faulty in the management of the reflections, a bright light in the sky not showing in the water. The Small Instantaneous (VII.) has twenty-three exhibits. Mr. J. M. C. Grove is represented by twelve studies of *Father Thames*, marked by "breadth of treatment;" Mr. Percy Lewis by some hand-camera studies of farm scenes. Mr. Charles Knight's series of circus studies are excellent examples of quick work, and Mr. J. Kidson Taylor's hand-camera landscape studies are bright, crisp productions, a remark that applies to some charming little cattle pictures which he also shows. Mr. Charles Job, in a series of ploughing, haymaking, &c., studies, is extremely successful, and, though Mr. Gerald Grey's shots at *Goodwood Races* are mostly uninteresting, one, showing a race in progress, the horses standing out against the horizon, is a good example of quick work.

In the Botanical Class (XVIII.) there are some lovely photographs of flowers and fruit, notably by Mr. Robert Frost. The award, however, goes to Mr. J. T. Hopwood for three representations of cherries and strawberries. Here, perhaps, it would be convenient if we refer to the Micrographical and Zoological Classes. In the first-named there are only four exhibits, but they are of great merit, Messrs. R. Kidston, Stanley Kent, and W. I. Chadwick sending splendid examples of popular subjects. We should have liked to have seen this class better patronised, as the field it covers is practically unlimited, while there is no end to objects of purely popular interest, which are suitable for treatment by photo-microscopic means. The medal goes to that enthusiastic photo-micrographer, Mr. W. I. Chadwick, for a series of thirty-five bromide enlargements of micrographic negatives, all excellent in execution, and, moreover, comprehending subjects of a popular kind. The Class for Zoological Subjects (XIX.) is good, but not satisfactory. The domain of animal portraiture offers unlimited opportunities for successful work, which, to be properly accomplished, requires a great deal of study, care, and patience. Nevertheless, the pleasurable charm of good animal photography so well repays the trouble and application it involves, that we should like to add every emphasis to our recommendation to amateurs to cultivate it. The silver medal is secured by Mr. Sandland for some humorous Zoo studies. Cats and dogs form the leading themes handled by the other exhibitors. Mr. L. B. Beard portrays the escapade of a dog who incautiously invades a table whereon sundry solid and liquid comestibles are placed, the result being that doggy's inebriety leads him into a sad state; and Mr. T. B. Sutton follows the adventures of a cat, who burglariously appropriates some fish. A little more care would have made both series intensely funny, instead of which they only convince us that photography has yet much to accomplish before it depicts animal humour as successfully as does Mr. Burton Barber, for instance. *Wild Chamois*, by Mr. Staeuble of Paris, is an interesting picture of its kind.

The Architectural Class (IX.) contains several examples of good exterior work, which, however, are not sufficiently striking to call for comment. Mr. Hemmons' medal series, *South Porch, Yatton Church: Gateway, Whitby Abbey; Porch of St. Stephen, Bristol*, are conscientious specimens of this kind of photography, in which Mr. Harold Baker also excels with with some sympathetic views of *A few Old Buildings*. Mr. Howell shows a capital view of *The Tower Bridge*, and Mr. J. T. Hopwood's large picture of *Fountains Abbey* is a creditable production. The others generally, however, are so good as to render detailed criticism unnecessary.

The Class for Interiors (VIII.) is a good and large one, something like eighty frames being sent in. Mr. H. W. Bennett's silver medal for a view of the *Choir, St. Paul's*, is well earned. Mr. S. G. Payne has a series of twenty-four interiors of country houses, in many of which he has minimised the defect of halation with great skill. He receives a bronze medal, as does Mr. Harold Baker and Mr. G. Hepworth. Excellent work in the class is shown by Messrs. Howell,

Farmer, F. W. Edwards, C. Court Cole, G. T. Harris, H. N. King, W. C. Hemmons, and others. Allied to this Class is that for the Photographic Survey of the Bristol district (Class XX.), undertaken by members of the Bristol Association. There are only four competitors in the class, which, having regard to the abounding wealth of interesting architectural and archæological subjects that Bristol and the surrounding district enjoys, strikes us as matter for surprise and regret. We hope the Bristol Association will in the near future take up this valuable branch of photographic work with greater zest. Still, the four gentlemen who are competing are represented by about thirty frames of exceedingly good and careful work. The silver medal goes to that veteran photographer, Mr. E. Brightman, for a faultless series of cathedral and church subjects taken at Gloucester and Bristol. Mr. W. C. Hemmons runs him pretty closely with a similar series, for which he obtains the bronze medal. The other competitors are Dr. Ormerod and Colonel Senior.

In the Class for Large Marine Subjects (IV.) some diversified efforts, embracing the deeply poetical and the severely practical, will be found. Among the former we noticed some large work by Mr. Worsley Benison, *The Requiem of the Sea*, the remains of a wreck washed up by the remorseless sea; and three other studies of waves, rocks and shore, of an ambitious nature, and showing much artistic feeling. Mr. W. P. Marsh shows one of his favourite subjects, *A Wild Wave*, Mr. A. Debenham and Messrs. West & Sons fine yacht studies, Mr. H. D. Arnott some good Yarmouth views. The silver medal goes to Mr. Lintott for *On the Top of the Tide*, a river scene with a barge in the foreground and the Tower Bridge breaking up the distance, the effect being capital. What a godsend that same Tower Bridge has been to photographers! Mr. F. M. Sutcliffe wins the bronze medal with his fine view of *Whitby Harbour*. Mr. T. M. Brownrigg and Rev. Precentor Main are also worthily represented in the class. Class XIII. (Enlargements) contains many technically good exhibits, but most of them are of comparatively poor account in artistic selection. We note with surprise how well some of Mr. Grove's small fuzzy Thames studies stand amplification without fatally outheroding Herod in the matter of lack of definition.

Mr. Sandland undoubtedly merits the silver medal for his enlargement of polar bears, and Mr. Cadby the bronze for the enlarged figure study, *Reflections*, a graceful child well posed, with the drapery well managed. Prints from the original negatives are shown side by side with the enlarged results. Colonel Senior has some interesting Indian views. We pass from the competitive photographs to notice the Judges' (non-competitive) exhibits, Mr. Payne Jennings being represented by half a dozen Devonshire views, one of them, *Fishing Boats off Brixham*, being as good a thing of its kind as is to be found in the Exhibition, the President of the Society (Mr. Hood Daniel) by a good collection of landscape studies, and Mr. S. P. Jackson by two frames of snap-shot work.

In the Transparency Classes some charming examples of glass positive work are shown. Of the larger varieties, Mr. H. N. King's transparency views in the Royal Palaces, and Mr. Brightman's series of cathedral and other subjects are a feast to the eye. It is a pity that large transparency making is not more decidedly encouraged than it is. Thirty-two sets of lantern slides were sent in for competition, which lack of time obliged us to pass over. We were gratified, however, to notice that nine sets of stereoscopic transparencies were submitted competitively among them, we ascertained by inspection, being some very pleasing examples of this delightful branch of photography. There is also a small loan stereoscopic collection by Messrs. A. W. Westrop and T. Davey.

There is a very instructive general loan collection, among which we noticed a portrait taken by Ponton's pinhole camera, a capital piece of work of its kind, having a quite Cameronian character. Messrs. Elliott & Son, Barnet, are represented by some well-executed examples of carbon printing, and there are several frames illustrative of chromo-collotype in three-colour printing, the negatives for which we were informed were made by the Bristol Hon. Sec., Mr. Bligh Bond, who is devoting much attention to this branch of work. Other contributors to the loan collections are Messrs. Beck (Frena enlargements), F. Hollyer, with some always-welcome and refined platino copies of well-known pictures; R. W. Thomas & Co. (Prints from negatives on Sandell plates); Henry Park (apparatus); Taylor, Taylor & Hobson (standard lens adapters); T. H. Powell, National Camera Co.; W. P. Marsh, and many others. Some special examples of early photographic work are also lent.

There are only two exhibits in the Apparatus Section, but they contain interesting collections of useful and timely apparatus, and, besides, emanate from local sources.

Messrs. Husbands & Sons of St. Augustine's-parade, Bristol, show some well-made landscape cameras (the "Exhibition"); an improved portable stereoscope, having vertical and horizontal adjustment to the eye lenses, constructed for large stereoscopic views made from $7\frac{1}{2} \times 5$ and $8\frac{1}{2} \times 6\frac{1}{2}$ negatives; lenses; dark-room lamps; instantaneous shutters; biunial lantern; mahogany body lantern; &c., &c.

Mr. M. W. Dunscombe shows the Dunscombe camera, stand and lenses; Ross's lenses; Beck's "Frena" cameras; Watson's cameras; "Shuttle" hand camera; "Lysaght" hand camera; "Nalda" hand camera; Blair hand camera and roll films; tele-photo lenses; photo-micro objectives; "Allendale" optical lantern; and other novelties.

ON A SYSTEM OF MEASURING AND NUMBERING THE STOPS OF PHOTOGRAPHIC LENSES.

[Photographic Congress.]

The brightness of the image of an object of given brightness placed at a given distance formed by a lens of a given focal length may be determined by the angular aperture of the pencil of rays diverging from a point of the object and entering the objective. When the object is situated at infinite distance, the intensity of the illumination cannot be determined by the *angular* aperture of a *cone* of rays, but may be found from the *diameter*, D, of the *parallel pencil of rays* proceeding from the object and forming the image, *i.e.*, from the diameter of the *effective pencil* of rays proceeding from the object. The latter case enters chiefly into consideration in photography, and in the following discussion it will be assumed that parallel light enters the objective. We shall also suppose that the effective pencil of rays is concentric with the axis of the objective.

The quantity of light entering the objective has been found to be directly proportional to the square of the diameter of the effective pencil of rays. The diameter of the effective pencil of rays, and therefore also the quantity of light admitted by the objective and forming the image, depends upon the effective diameter of the lenses or the diameter of the central diaphragm.

Every lens forms in itself a stop, and where no special stop is interposed between it and the object, the edge of the lens determines the diameter of the effective pencil of rays. In objectives having no stops, the diameter of the effective pencil of rays would always be the same. In order to obtain certain pictorial effects, it is necessary to provide means for modifying the diameter of the pencil of rays. With this object photographic lenses are fitted with interchangeable or variable stops (Waterhouse, rotating or iris diaphragms), by means of which the aperture may be varied. The position of the stop is governed by the type of the lens; it is not a matter of choice, if the capabilities of the lens are to remain unimpaired.

If we compare objectives of *different focal lengths*, admitting pencils of rays of the same effective diameter, D, we find that the brightness of the image varies in conformity with the following law: The brightness of the image is inversely proportional to the square of the focal lengths of the objectives.

Thus, if the diameter of the effective pencil of rays is denoted by D, and the focal length of the objective by f, then the brightness of the image is proportional to $\frac{D^2}{f^2}$. The ratio $\frac{D}{f}$ is termed the relative rapidity of the objective or of a certain stop belonging to it. The largest stop which yields a well-defined image represents the *maximum relative effective aperture*. With respect to the capacity and quality of the objective, it is *quite immaterial* whether the maximum aperture is determined by the diameter of the lens itself or by the stops appended to the objective. In order that the illumination may be uniform throughout the image from centre to margin, even with the maximum relative aperture, it is desirable to make the diameter of the lenses larger than is actually necessitated by the largest required aperture.

Various objectives, when stopped down in such a manner as to make the relative apertures the same in every case, produce the same illumination in the image and the same depth of definition, the ratio of reduction or magnification being the same. Objectives stopped down to the same degree of relative aperture, and used under precisely similar conditions as to illumination, require therefore the same exposure.

From this the fundamental importance of the relative aperture becomes at once apparent, and hence it may be inferred that it is a more correct plan to graduate the stops in terms of this relative value, *i.e.*, in terms of the relative aperture, than according to any absolute standard.

The question as to whether in the ratio $\frac{D}{f}$ the diameter of the stop may be substituted for that of the efficient pencil has repeatedly been discussed. In many countries this question has been answered in the negative, and correctly so; in England, however, the diameter of the stop still forms the basis of measurement. If there were but one type of photographic objective, more particularly only single lenses whose stops are situated on the side facing the object, there would exist no ambiguity. But, as there is a great variety of different types in use, the desirability of the uniform measurement of the stops compels us to adopt the *diameter* of the *efficient incident pencil* admitted by a given stop as the unit in determining the value of the relative aperture.

With all the doublets and triplets which are known to me, the diameter of the effective pencil is always greater than the diameter of the corresponding stop. The amount of the difference does not depend only upon the type of the objective, but also upon the maximum relative aperture in respect of which the objective is corrected spherically. I have examined a series of the most popular types and found the following data. If the value of the relative apertures $\frac{D}{f}$ is equal to $\frac{1}{20}$, then the ratios between the diameter, d, of the stop and the focal length of the objective in each case are as follows :—

	$\frac{d}{f}$
Aplanat, 1-4·5	1-24·5
Aplanat, 1-8	1-22·6
Antiplanat, 1-4·5	1-25·4
Antiplanat, 1-6	1-21·4
Anastigmat, 1-4·5	1-24
Anastigmat, 1-6·3	1-23·4
Anastigmat, 1-7·2	1-23
Anastigmat, 1-9	1-22·6
Anastigmat, 1-12·5	1-22

English opticians generally ascribe, therefore, too small a relative rapidity to their objectives. In the case of the portrait antiplanat, *e.g.*, the stop of 1-20 relative aperture would be described as 1-25·4; the erroneously ascribed relative rapidity $(\frac{1}{25}:\frac{1}{4})^2$ is, therefore, to the actual rapidity $(\frac{1}{20})^2$ in the ratio of 2 : 3. With other objectives this error is greater or less, and it is only in the case of single lenses with stops placed in front of them that the English system of measuring rapidities is correct.

The inconsistency of this system is obvious, and it can only be avoided by consistently taking the *effective relative aperture* as a measure of the stop with all types, in the manner recommended above.

In certain cases it becomes, however, a practical necessity to indicate the apertures of the stops in terms of some absolute unit, *i.e.*, in parts of the inch, millimetres, &c. This case may arise when one and the same arrangement of stops is intended for use with objectives of different types and various focal lengths, *e.g.*, with central iris shutters, stops for sets of lenses, &c. In such cases it is necessary to calculate for each lens the relative aperture or the number of the stop, or to find these values from tables supplied by the makers.

Now, instead of retaining the actual numerical values of the ratio $\frac{D}{f}$ in expressing the value of the relative aperture, it is more convenient to express D in terms of fractions of the focal length, f, taken as unity. Accordingly, in the ratio $\frac{f}{x}$, x would be the number which indicates how many times the diameter of the effective pencil is contained in the focal length of the objective. This value of $\frac{f}{x}$ is, by the majority of makers, stated on their lenses; unfortunately, there is a great diversity in the gradation of these values, and in the initial value taken as the basis. Generally, the f gradation is such as to make each stop correspond to half the relative rapidity of that represented by the preceding larger, and this manner of disposing the stops appears to be the only plan possessing points of practical utility.

Great difference of opinion prevails, however, in the matter of choosing the initial value. Dr. Stolze and Mr. Dallmeyer proposed $f\text{-}\sqrt{10}$, the Congrès International de Photographie of 1890, proposed f-10, and the majority of English makers have adopted f-4, the value proposed by the Photographic Society of Great Britain (U.S. No), as their basis for the graduation of stops.

These various propositions lead to the following scales of values:

1. Initial value: $f\sqrt{10} = f$-3·16.

f-3·16, f-4·5, f-6·3, f-9, f-12·5, f-18, f-25, f-36, f-50, f-71, f-100.

2. Initial value: f-4 (U.S. No).

f-2·9, f-4, f-5·7, f-8, f-11·3, f-16, f-22·6, f-32, f-45·3, f-64, f-90·5.

3. Initial value: f-10.

f-3·5 f-5, f-7·1, f-10, f-14·1, f-20, f-28·3, f-40, f-56·5, f-80, f-113·1.

None of these scales rest upon a theoretical basis; it is only a question of convenience and utility. The value $f\text{-}\sqrt{10}$ involves a few points of practical significance. Thus f-3·2 may be considered to be the greatest desirable effective aperture for *extra-rapid* portrait lenses; f-6·3 is the limit of extra-rapid instantaneous lenses; f-18 may be taken to represent the minimum aperture for short exposures, and f-100 is generally assumed to be the limit of the possibility of stopping down a lens without impairing definition by the appearance of diffraction phenomena. In fine, the numbers are comparatively convenient, and mostly integers and multiples of 2. The other two series do not possess these advantages, and I am therefore inclined to give preference to the first series.

The indication of the relative aperture of the stop is, however, not sufficient to ensure convenient use of the system of stops; it is, on the contrary, advisable to attach numbers to the stops, indicating in a direct manner the rapidity corresponding to the various stops. In this respect we have two conflicting opinions. Some maintain that the numbers should advance in the ratio of the times of exposure; others prefer numbers which vary directly as the *relative luminosities*. *Per se*, one view has as much claim to acceptance as the other. If, however, we consider general practical wishes, there can be little doubt as to which is the better plan. In the first place, it must be admitted that, in a numerical series, large numbers should be avoided, and, therefore, that those stops which are most generally used, and whose corresponding exposures are suitably indicated by such numbers, should be distinguished by the *smaller numbers*. Finally, it is desirable that these numbers should consist of whole numbers only.

Portrait photographers work chiefly with stops f-6 to f-9, landscape photographers and copyists at f-25 to f-50, and amateurs at f-9 to f-18, and, if we remember that the stops generally used are within the limits f-4·5 and f-71, all requirements would be uniformly considered if we were to take f-18 as our unit. Practically it would be immaterial whether the number varies as the exposures or the luminosities, and we should have the following series :—

1. Numbers varying as the relative luminosities—

Relative aperture	f-4·5	f-6·3	f-9	f-12·5	f-18	f-25	f-36	f-50	f-71
Number of stops	16	8	4	2	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$

2. Numbers varying as the exposures—

Number of stops	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8	16

Irrespective of the ambiguity of the fractions, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, which might, in error, easily be mistaken to refer to the relative aperture, a system of numbering in which integers and fractions are made to enter into comparison is hardly calculated to meet with the approbation of photographers. Fractions should, as far as possible, be entirely avoided. Now the question is: Shall we take a greater or less aperture than f-18 as our unit? In my opinion, there is no difficulty in answering this question. The small stops are those mostly used (landscape, architecture, copies, &c.), and it is particular in the case of the SMALL *stops that it becomes important to have a convenient means of measuring the relative apertures*. With the larger apertures this exigency does not exist in the same degree, inasmuch as these are generally resorted to in instantaneous work, where it is impossible to regulate the exposures within exact limits. In these latter cases it is a simpler plan to compensate errors in over or under exposures by suitably modifying the developer.

From these remarks we conclude that it would be rational to take f-36 or f-50 as our unit, and, in order to minimise the occurrence of fractions, to let the number vary as the relative rapidities, *i.e., inversely as the corresponding exposures*. The remaining two or three fractions may, to avoid ambiguity, be expressed in decimals. Taking f-36 = 1, we obtain the following convenient system :—

Relative aperture	f-4·5	f-6·3	f-9	f-12·5	f-18	f-25	f-36	f-50	f-71
Number of stops (Relative rapidity)	64	32	16	8	4	2	1	0·5	0·25

In primarily considering the wishes of portrait photographers, *f*-9 would have to be taken as the unit, and the numbers would have to advance in the same ratio as the exposures.

The existing systems of numeration are all open to the objection that they involve high numbers, which, moreover, are allotted to the smaller stops mostly used. The system proposed by the Congrès International de Photographie of 1890, according to which *f*-10 is the unit, forms the nearest approach to the system which would realise the wishes which I have expressed. I should be glad to find my remarks act as a further incentive, in the interest of makers and users of photographic lenses, towards the establishment of a universal system of the designation and numeration of stops.

DR. PAUL RUDOLPH.

A PROFESSIONAL TO PROFESSIONALS.

[Abstract of President's Address to Glasgow and West of Scotland Photographic Association.]

I SHOULD like to say a few words to my professional brethren.

We are all feeling the hard times, and one often hears that photography is done. That I do not believe; but it will be done if you think nothing better can be done than fold your hands and call out, "Hard times." No; you must stand to work, see where you are behind, if there are others taking the butter from your bread. If you cannot lead, you surely can, at least, follow. There is never a photograph comes into our hands that something cannot be learned from it, if it should only be what to avoid. When looking round the show-cases of Glasgow, I often feel proud that I belong to such a city, and one of the members of the black art; for in no town do we see a higher standard of good photographic work. Still, there is much to deplore. Photographs in soot and whitewash, with many good characteristics of art feeling; others of the Henry Irving type, without the Henry Irving; others with faces such as one sees in barbers' blocks in their windows.

I remember once a famous photographer showing me the photograph of a lady, and asking me to guess her age. In my innocence I replied, About forty. "Ah, well, you are wrong, Stuart, my boy, that lady is close on seventy!" "Well, the more shame to you," was all I could say I do trust that the time will soon come when the man at the camera will be the photographer and not the retoucher. Many now express themselves as dissatisfied that all the beautiful natural and characteristic markings of the face should be obliterated. Gentlemen, let us have the truth, not the vulgar truth, but some semblance of it. The retoucher's work should never go farther than the toning down of the hardest lines, but not the entire obliteration of them.

There is just one other matter I should like to draw attention to, and I am done. It is that of the young men now starting to learn our art. If you think you will ever be an artist in the best sense of the word, it is not to be brought about without much labour and training. There are so many departments that there is considerable difficulty in advising the exact line to follow. Go to the School of Art at least two nights every week, attend the lectures of, say, Professor Mills, who will give you an insight into the various processes from a chemical and scientific point of view, as also some of the processes of mechanical photography. I hope the time is not far distant when every boy leaving school will have learned chemistry, how to handle tools, as also freehand drawing. The following illustration may serve to emphasise my remarks, and to show you how far back some of the lads of to-day are who make up their minds to study photography as a means of livelihood.

Some time ago a young lad applied to me for a situation as under-assistant. He had been about two years in a photographic studio, and, will you believe it? he had never developed a plate, neither had he toned or fixed a print, nor had he ever made up a developer or toning bath. He could put a piece of paper into a printing frame, watch it and take it out when ready, but beyond this his knowledge of photography was a blank obscurity; and as to scruples and grains they were out of his knowledge, and yet this lad had passed the Sixth Standard. If our future photographers are made of this stuff, what can we expect? I say, young men, you have hard work before you, and it will only be by diligent attention to all that is passing that you will ever come to anything. Study the JOURNAL, and never be without one at least of the many annuals and year-books. It is the custom to hang up Scripture texts in bedrooms. I think it would not be inappropriate for young men in any branch of business, but in photography especially, to write in large letters and hang up in their rooms the motto, "The cream always comes to the top."

JOHN STUART.

ANOTHER PHOTOGRAPHIC PLAYGROUND: THE TRANSYLVANIAN ALPS.*

THERE is no better companion for a traveller than a photographic camera; there are no finer recollections of an accomplished journey, than pictures taken by the traveller himself. They may be styled—as it is the fashion nowadays—topographic records, still they may be beautiful, and, after all, may give more artistic impressions than those more ambitious productions which are handicapped by the shortcomings of our art-science. But I am in danger to fall also, in the craze of the last fashion, into art definition, and I intended to send you, Mr. Editor, a few much more practical lines. Now, take a traveller with his camera; it is the question for him, where to go—Switzerland and Tyrol, the Rhine and Scotland, the seaside and Italy—for the long vacations, tours in Spain, Algiers, Egypt, and so on, offer, no doubt, fine travelling programmes, but they pass over much trodden ground. There are always men in search of novelty, and the latter is more valuable for the traveller who goes with his camera, as the pictures he brings home, will certainly gain through novelty, and may, in many instances, help science and be geographically interesting. To such photographic travellers or travelling photographers I last year pointed out in the ALMANAC Bosnia and Herzegovina as a splendid tour, and this year I wish to direct them again to a mountain chain already a little to the east of Europa, but as easily reached as either the Alpa of Tyrol or Italy, I mean the Carpathian Mountains in the Transylvanian part of Hungary. When once Vienna, this fine capital, is reached, you have a few hours' rail down to Budapest, or by Danube steamer, which is a very fine river journey. Budapest, the beautiful Hungarian capital, with over 500,000 inhabitants, is picturesquely situated on the Danube, and gives, seen from the neighbouring hills, pretty panoramic views. You will find there English photographic goods at Calderoni & Co.'s, opticians, where English is spoken. From Budapest you have express trains to Transylania, with sleeping cars, wagons, restaurants and all, from Vienna, for the cheap rates of the "Zonentarif" at the Hungarian State Railways. It is about 10 florins (18*s.*) first-class fare for the longest distance from Budapest to every direction, therefore the same for Nagy Szeben (in German, Hermanstadt) and Brassó (in German, Kronstadt), both pretty towns at the foot of the mountains.

At Brassó is Mr. Adler, a professional photographer, very kind to amateurs, and you can develop a plate or two to compare your exposures in this country. No doubt, gentlemen amateurs will not abuse his kindness.

The finest excursions from Brassó are those to the Buchech, and to the Königstein. If you are a little—a very little—of a mountaineer, you will go up the summits of both of these mountains, and will enjoy yourself in the finest mountain scenery, in the wildernesses of superb woods, fine rock crags, and the most beautiful panoramic views. There is no difficulty at all, you will only be able to walk on mountains without path for a few hours. Coming from Brassó, you will spend the night on both mountains in club huts built by the Transylvanian Carpathian Club.

From Nagy Szeben, the finest excursion is into the Negoi group, the summit of the Negoi being 8300 feet—the highest peak of the Transylvanian mountains. This part of the chain is of a different geological structure, and therefore the mountains look quite different from those at Brassó. On the Negoi you will find also a well-provided club-hut, wherein to pass the night before the ascent. A series of small mountain lakes and tarns reflect in this group the rocks, the snow fields, or the trees of the splendid forests.

A good guide-book, in German, for these mountains is, *Bielz, Siebenbürgen* (Vienna: Graeser). As mentioned, there is a club like the alpine clubs in the Alps, who built huts for the mountaineer, selected guides with fixed tariffs, publishing his year-books, and always ready to assist travellers. There are sections of the club in nearly all the towns, the direction is at Nagy Szeben, and in E. Sigerus, Esq., the Secretary of the Club, you will find a gentleman always ready to assist you.

Only one thing you will not find, no English travellers. There were a few in former years, Mr. Boner having even written his charming book, *Transylvania* (London: Murray), but in reality the Englishmen who in the last years come to Transylvania are mostly Nimrods, and, as I may now mention, when it happens that you are one of those who like to kill something, there is no better place for you.

But, again, I do not write for these, but for view hunters; and, as we are already in Transylvania, and going on into the mountains, I shall a few words address to the photographer. You are in the midst of mountains, whose summits gain a height of about 8000 feet from the plain, while at

* Received too late for the ALMANAC.

Bragw or Nagy Szeben have only 1500 feet. The mountains are either limestone, with the fantastic formations and the fine colours which are the property of these rocks, or granite, with his fine horns and needle summits. The greatest splendours lay in the forest of gigantic trees, unbroken and untrodden woods, extending over large tracts of the valleys and high up on the mountain sides. Even in the height of the summers, now is lying in the protected parts of the rocky faces of these mountains, and enhance their beauty. The walking days are comparatively short, and you have ample time to photograph. The picturesquely dressed people (Saxon-Germans and Wallachs) will serve you as admirable staffage. In the towns are pretty good hotels, and good shops to provide yourself for the mountains. There you find the club huts, carriages, horses, guides, and porters (the latter important for photographers who have not yet descended to the plate size $1\frac{1}{4} \times 1\frac{1}{4}$) at very cheap rates. A porter a day in the mountains costs about 150 kreuzer = three shillings; horses the same).

And, with all this, few travellers, and no English at all. So it is possible that the Secretary of the Carpathian Club, in his last year's report, still mentioned my photographs, taken twelve years ago, as still the best, and nearly the only to be had from the mountains. You will see by this that still nearly all is left for you. Go, enjoy yourself, and bring home a good number of topographical, artistic (by permission) records of the Transylvanian Alps.

MAURICE DE DÉCHY, Hon. Corr. R.G.S., Odessa.

WINTER WOES AND THEIR REMEDIES.

ONCE again the winter is fairly upon us, with its parties, balls entertainments, to say nothing of the chances of indulging in that most exhilarating of pastimes, skating; once again the festive season is here, and "still we are not happy." Photographers as a body hate the winter, to them Christmas and the New Year convey thoughts of frozen water mains, very few sitters, a bad light to take those who do come, difficulty in getting the prints off, dealers' bills coming in and very little cash to meet them with. It may be true that "all things come to those who wait;" but this adage should not be followed too closely by the photographic profession at this above all seasons. True, winter brings many troubles and trials with it, but the best way is to tackle them as they arise and turn them into money. Over and over again we hear the remark, "Oh, that's a winter negative, you know," uttered in an apologetic tone, as though a winter negative must of very necessity be a bad one; in point of fact, they mostly are poor, but it is not altogether the fault of the weather that such is the case. True, a picture taken with a dense fog between the subject and the lens cannot be expected to turn out a success, but an ordinary winter day's pictures ought, on the whole, to prove undistinguishable from an ordinary summer day's; that is, if the necessary care and precautions are taken. If the studio be left unheated and the sitter be compelled to pose before the lens while half frozen, no satisfactory results will be obtained. If the studio be thoroughly warmed, and the dark room otherwise, failure will still be the result, as the developer will act neither so quickly, nor so vigorously when icy cold. A cold developer means a slow developer and at the same time a thin misty image. To expedite the development most operators are inclined to increase the proportion of ammonia; this certainly quickens the process, but does not add any other good effect. Let those who doubt it try an experiment by taking two negatives under precisely the same conditions, then develop one with the cold developer, with or without additional ammonia, and use for the second a developer which has been kept for some hours in a room where there has been a fire. The difference will be very marked; one will be very plainly "a winter negative," the other, well, try and see for yourself.

Then, again, why will photographers insist upon using the same rapidity of plates in winter as in summer? The difference in cost between ordinary and extreme rapidity is not much, and is more than counterbalanced on a dull day by the number of failures entailed when using a slow plate. It is not in the province of this article to mention any special brand of plate (I think I hear the Editor observe, "No gratuitous advertisements!"); but I have in my mind at the present moment no less than three different makes which are especially suitable for winter work.

Frozen pipes are a nuisance to any householder, but to the photographer they are ten times worse; water for household purposes can be obtained even during the hardest frost, but for photographic purposes once "frozen out" means no development and no toning until the frost gives. Surely, then, it behoves all students of the art-science to have all the pipes in the house carefully covered with hay-bands or list, and the taps in the dark room and toning rooms always turned partially on even when there seems no chance of frost.

In winter the process of printing is necessarily slow, and home-made paper often discolours considerably in the printing frame before the picture is sufficiently dark; this may be easily remedied by putting an old spoiled (untoned) print at the back of the paper, which will then keep white for days, while one not so treated will become perfectly spoiled.

The sudden changes of temperature, which are constantly occurring, often cause breakage of negatives; and, as it is usually the most valuable that go, it is worth while to take every precaution against such accidents. A thick felt backing is by far the best to use, and the pressure on the spring of the frames should never be so strong in winter as in summer.

By far the greatest trouble is the lack of sitters. This can only be surmounted in one way; if you have five pounds to spare, spend it in advertising; if that brings in ten, spend that in the same way. Advertise in any way you like, but advertise. When you are not taking sitters, make special enlargements from the best negatives taken during the last summer. Get a dozen suitable frames and send the completed enlargements home on approval, fix your price moderate and you will find a ready sale; if one or two come back, you need only take out the picture, put another in the same frame and mount, and send that in the same way. Suppose you make fifty enlargements and sell thirty framed complete, the spec would be a good one; as a matter of fact, the proportion unsold will never nearly approach this if care is exercised in selecting the negatives to enlarge. Children and old people sell the best, and I have known cases in which one enlargement made and sent home on spec has led to an order for match pictures of the whole family. Of course, all your enlargements need not be made in the same size or style; due regard must be had to the means and status of the sitter; some would probably take a 12×10 bromide in black and white, while others would be more likely to be pleased with an opal in water colours or a 24×18 bromide or carbon.

Any enlargements you don't sell at once will make good specimens for next season, and will probably be purchased before that season is over.

Introduce and exhibit all the novelties you possibly can during the winter months; next to advertising, novelty is the soul of business, in fact it is a form of advertising.

Finally, however severe the winter, don't be cast down, keep on working all the time and don't talk about "winter pictures."

C. BRANGWIN BARNES.

ON THE PHOTOGRAPHY OF THE LUMINOUS RAYS OF THE SHORTEST WAVE-LENGTHS.*

MY endeavours were henceforth directed to bring into photographic activity the region between the lines Nos. 30 and 32, which hitherto, with the exception of line No. 31, had evinced no reaction to light, whether in my hands or in those of other experimenters. I sought to effect this, in the first place, without reference to graphic completeness, proceeding on the assumption that the previous want of success was due, not to the absence of all radiation, but to the imperfection of the method of observation.

I first strengthened the illumination with energetic short sparks, springing over close in front of the widely open slit, and, with the lenses fully open, I obtained on a Zettnow plate, after exposure for half an hour between the components of the line No. 32, first two marked lines, then —on prolonged exposure on both sides of the same line—a band of action composed of dense groups, which continually extended further with the increase of the illumination.

On an exposure of an hour and a half, the entire aluminium spectrum consisted of an almost continuous band, which ended only beyond the previous boundary of the ultra-violet, about at the wave-length 183 $\mu\mu$. That we have here to do with the spectrum itself, and not with an action of diffused light, was shown by the fluctuating intensities and the marked lines by which the newly acquired region is distinguished. In how far this is to be ascribed to the aluminium or to its impurities, or to the atmosphere, I must leave an open question. But for me, a more important consideration was the fact now ascertained, that the region between the main lines of aluminium, and a slight distance beyond, though hitherto regarded as void of light, displayed a quite unexpected wealth of rays.

Such being the case, it was to be expected that not aluminium alone, but other substances, would admit rays of such strong refrangibility

* Continued from page 770.

This conjecture was actually confirmed when I submitted a series of elements to examination.

I adduce below these spectra in chronological order. In place of a photographic reproduction, which I reserve for a future occasion, I give the main data of the experimental arrangement and the photographic result, in order to furnish some basis as to the energy and the number of the new lines, in as far as they lie beyond the wave-length 188·8 $\mu\mu$.

Among the lines enumerated various impurities may be represented, as I have indicated, at the passages in question. But this affects the here exclusively interesting fact relative to the profusion of rays in the region concerned in a vanishing degree only.

The appended numbers refer to the labels of the plates.

All the proofs were executed without a condenser, with a slit width of 0·040 mm. and of very sensitive plates (Zettnow's). The time of expoenre varied, and is given specially for each spectrum.

Cadmium, No. 2039.—Exposure, six minutes. Twenty-two new lines, two of them beyond 185·2; the most effective (4) in the immediate neighbourhood of the same length, mostly pale and moderately sharp.

Antimony, No. 2040.—Exposure, five minutes. Twenty-eight new lines, three of them beyond 185·2; the most effective (3) near wave-length 182·9. Except the three most refrangible all are distinctly shown, several very intense.

Bismuth, No. 2043.—Exposure, six minutes. Twenty new lines, three beyond 185·2; the most effective at ½ (Nos. 31 to 32). Most of them, especially the three most refrangible, pale and moderately distinct.

Cobalt, No. 2044.—Exposure, six minntes. Eighty-three new lines twelve beyond 185·2; the most effective (9) near No 31 towards No 30.' A large part of the lines intense and sharp; the remainder, including all beyond 185·2, very pale.

Platinum, No. 2045.—Exposure, six minutes. Eighty-one new lines, fourteen beyond 185·2; the most effective (15) nearly uniformly distributed over the spectrum, and surpassing in sharpness all the above-named spectra.

Copper, No. 2046.—Exposure, six minutes. Six new lines, one beyond 185·2; the most effective (2) near No. 30. All, even the palest, sharply drawn.

Lead, No. 2047.—Exposure, seven minutes. Six new lines, one beyond 185·2; the most effective close to the second component of No. 31; all the others very pale and indistinct.

Iron, No. 2048.—Exposure, ten minutes. Seventy-two new lines, four of them beyond 185·2; the most effective (4) between Nos. 31 and 32, but nearer to the former. The four most refrangible scarcely perceptible, the remainder more intense, but the less intense among them also imperfectly defined.

Calcium, No. 2049.—Exposure, seven minutes. Seven new lines, four of them beyond 185·1. Of the three most effective, one coincides with the more strongly deflected component of No. 31, whilst the two others form the extremity of the entire spectrum. The less refracted of these two exceeds in efficiency all the lines situate beyond 185·2 of all the spectra here in question.

Arsenic, No. 2065.—Arrangement of experiment as in the foregoing proofs. Exposure, probably eight minutes. Twenty new lines, six beyond 185. Except these six all strong, but not clearly defined.

Sodium, No. 2103.—Exposure, twenty minutes. A single new line, scarcely deviating perceptibly from the second component of No. 31, moderately clear but slightly intense.

Silver, No. 2107.—Exposure, three minutes. Twenty-eight new lines, six beyond 185·2. All the lines, except a single one situate near No. 31, and on its more refrangible side, very pale and chiefly indistinct.

Gold, on the same plate (No. 2107).—Exposure, seven minutes. Twelve new lines, three beyond 185·2. Of the five most efficient, three lie near No. 30, and a strong double line lies near No. 31, in both cases on the more refrangible side; all the others are very indistinct, even more so than with silver.

Nickel, No. 2108.—Exposure seven and a half minutes. Twenty-six new lines, seven beyond 185·2; of the three most efficient, two are near No. 30 and one a little less refrangible than No. 32. The entire region very pale, but well-defined.

Tin, No. 2111.—Exposure, ten minutes. Eighteen new lines, three beyond 185·2. Except a single line, which lies in the middle between Nos. 31 and 32 and develops an enormous energy, all the lines seem melting away and are pale and very indistinct.

Potassium, No. 2112.—Exposure, five minutes. A single line, of faultless design and great intensity, coinciding exactly with the more refrangible component of No. 31.

Tungsten, No. 2113.—Exposure, ten minutes. Seventy-five new lines, twenty-one beyond 185·2; all nearly uniformly distributed, but forming distinct groups with single well-marked lines. The intensity of this band, so rich in lines, decreases uniformly towards its more refrangible end. The design of the lines is uniformly clear.

Silicon, No. 2114.—Exposure, ten minutes. Eleven new lines, five beyond 185·2; one only intense and sharp, coinciding exactly with the more refrangible component of No. 31.

Chromium, No. 2132.—Exposure, seven minutes. Eleven new lines, only traces beyond 185·2; one only well-marked and coinciding with the more refrangible component of No. 31. All the rest very pale, and most of them perceptible only with difficulty.

Thallium, No. 2133.—Exposure, eight minutes. Eight new lines, three beyond 185·2; the four most efficient form a striking group between Nos. 31 and 32, the components of which decrease in intensity and mutual distance with the wave-length. Here again a line coincides with the repeatedly mentioned component of No. 31; but it is very pale, scarcely more than a trace. The design of the entire proof is very clear even in the more refrangible lines.

Molybdenum, No. 2136.—Exposure, eight minutes. Forty new lines, four beyond 185·2; the six most efficient are between Nos. 30 and 31, all very pale, the most refrangible mere traces, design of all being clear.

Mercury, No. 2139.—Exposure, seven minutes. Twenty-six new lines, nine beyond 185·2; the most efficient of all is close before No. 31; two other lines, likewise very energetic, are close to Nos. 30 and 32. The lines beyond 185·2 are associated as a group of lines, rapidly increasing in intensity, and gradually decreases with the growth of their natural distance. The sharpness of the lines is moderate.

Magnesium, No. 2143—Exposure, seven minutes (width and slit exceptionally only 0·030 m.m). Three new lines are only distinct, coinciding with the more refrangible component of No. 31. Nothing visible beyond 185·2.

Zinc, No. 2144.—Exposure, thirty-two minutes. Seventeen new lines, one beyond 185·2. One of the two most efficient lines again coincides with the more refrangible component of No. 31; the other, more strongly deflected, lies closely to the same component. The entire region appeared very pale.

Hydrocarbon, No. 2152.—Luminous in an electric discharge tube closed with quarts; pressure = a mercurial column of 3 mm. Exposure, twenty-five minutes. Ten new bands, decreasing very regularly in efficacy and intensity with its wave-lengths; the last band appears as a faint shadow between the two components of line No. 32.

Another proof with the same tube (No. 2153) gave, with a double width of slit (0·080 mm.) and two and a half hours' exposure, the entire spectrum stronger, but still very clear, and traces of two new bands beyond 185·2.

All these spectra, I must add, like the spectrum of aluminium, have acted much more feebly in their more refrangible half than in the rest of the ultra-violet. As far as the region of the most refrangible cadmium rays they consist of a deep black band, interrupted at most by single, solarised lines, which stand clear as glass. In the other part, even on the most prolonged exposure, I have never seen such a confluence of the lines, still less solarisation.

As results from the above conspectus, it is common to all the proofs that they develop a greater or less abundance of rays in the most refrangible part of the spectrum, where hitherto only the few lines of aluminium had been known; that most of them overstep the previous limit of the ultra-violet, and, further, that they finish with almost the same wave-length.

I next hoped to attain more by prolonged exposure, and by sparks of still greater energy. I increased the number of the immersed elements, as also the number of the Leyden jars; substituted for the inductorium an influence machine, which, in combination with the Riess battery, gave very energetic sparks; altered the composition of the coating of my plates, increasing the proportion of iodine, so as to heighten the sensibility; sensitised my plates by fuming with ammonia; in short, I sought, by all means, to penetrate further into the ultra-violet. But what I gained was scarcely worth mentioning. In some spectra there was a slight increase in length, but beyond the wave-length, 182 $\mu\mu$, not the trace of a line.

It is a phenomenon universally observed in spectral photography that the photography of greatly enfeebled rays involves extraordinary difficulties, and that exposure, however prolonged, does not yield clear images. I have regularly encountered this evil at the limit of the transparency of the material of the prism: in heavy flint glass at the very beginning of the ultra-violet, in light flint glass near the Frauenhofer line O, and in crown glass near R. It is the same at the limit of the trans

parency of the air, the position of which, as appears sufficiently from the foregoing, depends on the thickness of the stratum of air. That the result, at any rate to a small extent, depends also on the degree of sensitiveness of the photographic plate, is proved by the fact that I obtained the spectrum of the June sun (from my laboratory, about 120 metres above the level of the Baltic), beyond the Frauenhofer line U, upon Zettnow's plates, whilst the same line could not be obtained upon other plates at the same time. Still the photographic result in the most refrangible ultra-violet would have fallen out far better if the light which originates on the refractive phases and in the interior of the prisms and lenses had not regularly illuminated the visual field so strongly that on prolonged exposure the whole plate is coloured more strongly than the spectrum itself. We might, indeed, as I observed in 1888, with the photographic spectrum apparatus of Simony, considerably reduce the diffused light by shortening the slit length to a minimum (0·2 mm.); but even here, on proloned exposure, it overpowered the delicate impression of the most refrangible rays to total invisibility.

The contraction of the length of the slit was the last expedient which had opened up the prospect of better results as long as I was limited to the apparatus employed.

If we collate the results of the proofs obtained with a short focal distance, it follows:—

1. That, on sufficient diminution of the absorption of the rays by the air, nothing further stands in the way of the exploration of the spectral region between the wave-lengths 200 $\mu\mu$ and 185 $\mu\mu$, and that the existing means of observation are fully sufficient.

2. That nearly all the electrodes tried emit photographically effective light beyond the limit of the ultra-violet, as hitherto observed.

The appearance of rays beyond the wave-length 185·2 $\mu\mu$ gave an altered direction to my work; instead of the known spectrum, it now referred to the opening up of the unknown luminous region between the wave-lengths 185·2 $\mu\mu$ and zero.

The following portion of my report treats of the means for this purpose and the present position of the solution of this problem.

The Photograph of the Spectral Region beyond the Wave-length 185·2 $\mu\mu$.

According to the foregoing proofs, the most refrangible rays of aluminium had entirely lost their energy in a stratum of air of seventeen metres in thickness; at two metres of air they had left upon the plate an impression capable of being developed, and at a distance of the spark from the plate a good photograph. Their photographic action and its intensification were not in consequence of a heightened intensity of the spark, but of the diminished resistance which the rays encountered on their way to to the plate. The spark was quite sufficient, but the energy of the rays was defective. When they had passed through a great length of air, their photographic efficacy at its entrance into the silver particles of the plate was no longer strong enough to set up its decomposition to a sufficient degree. The preservation of the energy of the rays was therefore the point upon which a better result must be founded.

In all probability, even at the smallest focal distance which I have employed, the loss of energy of the rays was very considerable, in consequence of various hindrances which they encountered on their way. If this loss could be diminished, further success was in view. That such diminution was possible was beyond all doubt. Even the removal of the air which still intervened between the spark and the plate (though only in a stratum of moderate thickness) promised appreciable advantages. But the air was not the sole obstructive absorbent which the rays encounter on their way. Quartz absorbs the most refrangible rays to a perceptible extent (L. Soret, *Arch. des Sciences Phys. et Nat.*, lxi. 332—334, 1878); also glycerine (W. A. Miller, *Phil. Trans.*, clii. 871, 1862), with which the halves of my quartz prism were corrected; and also gelatine, even in a thin stratum, obstructs them visibly (Soret, *Arch. des Sciences Phys. et Nat.*, III. Period., x. 453-455, 1883).

If these hindrances existed, and if their renewal or their great reduction was possible, a further increase of photographic energy would be secured.

The photographic effect is not merely a function of the energy of the rays—it depends, above all, on the behaviour of the sensitive plate. The more unstable the chemical combination of the sensitive constituents of the coating of the plate, the more its loosening during the action of the rays is assisted ("Sensitiveness," H. W. Vogel, *Handbuch der Photographie*, 4th ed., 1890, pp. 172, 193, 208), the more rapid is its decomposition on exposure. If it were possible to assist in this manner the more refrangible rays, the prospect of success would become more favourable.

Delicate details in a photograph, faint luminous impressions, require a plate quite free from any veil. They become turbid, doubtful, and often disappear again if the ground issues from the developing bath not clear as glass, but covered with a grey layer.

As already mentioned, this case occurred regularly in my proofs on prolonged exposure. The dispersed light from the interior of the apparatus, the cause of this veil on the plates, is composed of rays of all degrees of refrangibility; but only those for which the plate is most sensitive have a veiling action. These, with gelatine plates and spark light, are the rays of less refrangible ultra-violet—those, therefore, which are not wanted for my purposes. If I could keep them out of my apparatus, my proofs would be still further the gainers. Not merely was there secured greater clearness for the more delicate impressions, but the design of the entire proof was improved.

This consideration led to a series of researches which had to precede the resumption of my original work. These preliminary operations consisted:—

1. In ascertaining the influence of all absorbents which come into play in the photographic action of the most refrangible rays of spark light.

2. In the utilisation of the results thus obtained for the creation of better means of observation for the spectral region in question.

The only exception here was glycerine, which could be disregarded, since the double prism of the apparatus works correctly without being cemented together. The glycerine was only to prevent the loss of light occasioned by the reflection which arises on the planes of the two single prisms if left uncemented.

The absorptive behaviour of quartz and gelatine with the most absorptive rays of aluminium has certainly been very carefully determined by Soret. But he has only employed the eyepiece. His results do not, therefore, necessarily agree with those of the photographic plate.

The relations of brightness of the wave-lengths, as ascertained by Soret, according to the fluorescence have always a relative value.

They are certainly comparable among themselves, but not with the relations of sensitiveness of the photographic plate. They are this just as little as the behaviour of one kind of plate can be decisive for the behaviour of another kind. Between the ocular and the photographic method of determining the luminosity, in particular of the ultra-violet rays, there is certainly an internal connexion, that of absorption; but how little decisive this is for the case in question is best proved by the fact, that every substance has its own absorption spectrum. It must be also remarked, in passing, that ocular determinations of luminosity, even when they refer to light of the same quality, afford only a very imperfect guide to the objective luminosity.

It was, therefore, absolutely necessary to re-examine quartz and gelatine in this respect. In the same manner I was restricted to my own resources in determining the absorptive action of the air.

A medium has still to be considered which is much more important for my proofs than the substances just named—the sensitive constituent of the photographic plate, silver bromide. The success of the photograph depended in the first place on the behaviour of this substance. If it was in reality so feebly sensitive to the most refrangible rays as my proofs seemed to indicate, there then came up the further problem, to find a suitable substitute for silver bromide.

The determination of the sensitiveness of silver bromide turned likewise in the first place in an absorption experiment. For it could possess higher sensitiveness only if it absorbed the rays with sufficient energy, preferably in the modification used in photographic dry plates. On the manner of the extinction of the rays, whether photo-chemic or photo-thermic, could be decided only by the photographic behaviour of a silver bromide free from any admixture of foreign constituents. It might appear as if a proof with pure silver bromide would alone suffice for this purpose, and as if a knowledge of the absorption might be dispensed with. But this view is contradicted by certain facts of that part of my preliminary researches concerning the production of a new photographic plate, of which below.

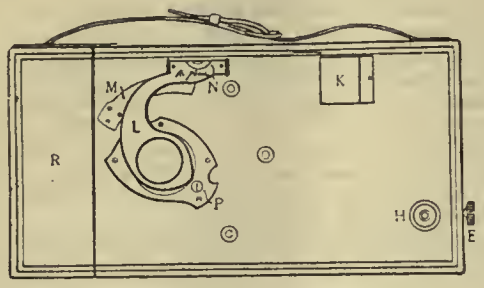
In this manner I might anticipate better results in the region of the smallest wave-lengths than heretofore, but always with the apprehension that the hoped-for rays beyond the limit of activity already reached might indicate a quite different behaviour that those on which my previous experiments were founded. I commenced my preliminary researches with quartz, followed in succession by gelatine, silver bromide, and air.

VICTOR SCHUMANN.

(To be continued.)

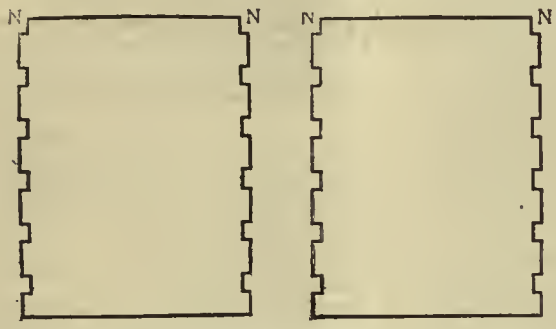
THE NO. 2 FRENA FOR QUARTER-PLATES.

Our former account of the new Frena was necessarily very brief. We now give a detailed account of its construction, aided by diagrams. The first of these shows a side external view of the instrument.



The new size Frena camera is a sure indication that the firm of manufacturers who placed upon the market the first camera for changing cut films do not intend to stand still.

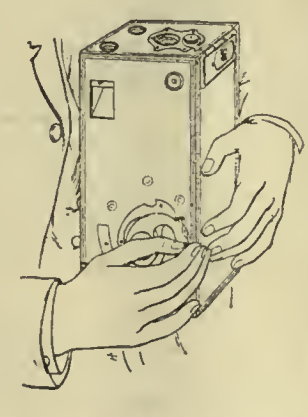
The quarter-plate Frena in every detail has been improved, and, al-



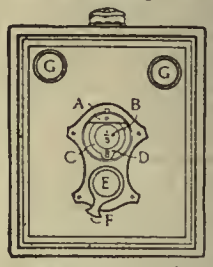
though the lantern-plate size still continues to hold its own, the new size has points which extend its scope of usefulness.

The film-changing mechanism, by which one film is selected from the pack of forty and automatically deposited in the receiving chamber, has been rearranged. Films and card-backings with notched edges are used as in the Frena No. 1, but they are all cut to an exactly identical shape. The alternating notches in the Frena pack, which are necessary to the working of the Frena system, are obtained by packing the consecutive films in opposite directions.

This method of cutting all films and cards of the same shape gives two advantages over the previous system. First, the film and its backing card can be cut together as if they were one backed film. Second, it will be possible to place a larger number than forty films in the camera as soon as the ingenuity of the film-maker has produced a backed film. It will also be readily understood that the mechanism of the camera is rendered by this change even more simple than before.



The chamber which receives the film after exposure is at the back end of the camera, and the Frena is held with its lens end pointing upwards when the film is changed. One motion only, that of turning the handle 180 degrees, and back drops the foremost film of the pack into the receiver, leaving the next ready for exposure.



The lens of No. 2 Frena is a Beck's autograph rapid rectilinear of five-and-a-half-inch focus, and is provided with diagrams, giving the aperture of *f*-8, *f*-11, *f*-16, *f*-22, and *f*-64. The shutter gives accurate exposures of $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{20}$, $\frac{1}{40}$, and $\frac{1}{80}$ of a second, as well as time exposures. It revolves in the diagram slot, and the engraved figures indicate both the speed of the shutter and the stops in use, are read through the lens aperture, and can be rapidly altered. By unscrewing a single knob, the lens, finders, and whole mechanism of the shutter can be laid open to view, and may be easily removed for the purpose of examination or cleaning. The shutter is dependent for the variation of speeds upon no brakes or retarding springs, but always runs at the same speed, the size of the aperture which passes over the lens being varied to give the different exposures. For instantaneous exposures the set-off bolt is pushed in. For time exposures the same set-off bolt is pulled out, which opens the lens until such time as the set-off bolt is again pushed in.

The addition of stops in No. 2 Frena greatly increases the value of the swing back, which, with the smallest aperture, can be used 25 degrees from its normal position and has the advantage over a rising front in that, whatever be the position of the camera, the finder gives an image corresponding with the image on the film which is being exposed, and it also always uses the best corrected portion of the lens.

The No. 2 size Frena, like No. 1, has a fixed focus, and is so carefully adjusted that objects from twenty feet to the horizon are sharply defined on the film with the *f*-11 aperture.

For the purpose of bringing objects nearer than 20 ft. away into focus a set of supplementary lenses are provided, called Frena magnifiers. These form a new and simple method of altering the focus for near objects. One of these can be instantly introduced into the aperture in front of the normal lens, and thus objects as near as 3½ ft. can be photographed, and an absolutely sharp picture is obtained.

The finders are upon a new design. In most finders the mirror is below the ground glass, and the ground glass being thus close to the top of the case, requires very elaborate shields to keep off extraneous light. The images, therefore, on these finders are more brilliant than is usually the case.

The camera is provided with two sockets and a screw, so that a tripod can be used when it is desirable to give time exposures. The whole is neatly covered in leather, and weighs but 4 lbs. when fully charged.

Our Editorial Table.

Photography Indoors and Out.

By Alexander Black.

This book, published by Houghton, Mifflin, & Co., Boston and New York, is essentially one for amateurs, whom it pleasantly informs of much that is known of the early history of photography down to more modern times. In his description of the lenses employed in photography our author is rather weak unless when he acknowledges inspiration from other sources; otherwise, and when left to himself, he gives us Ross's cemented doublet as the orthoscopic lens, and makes Dallmeyer's triple achromatic with a double convex back combination. But it is fair to state that the book is written in a popular style for those ignorant of the art and makes no pretensions to scientific or technical accuracy. In the home gallery, that is when taking portraits, especially those of babies, in a private room, he gives directions for softening the shadows by suspending reflecting screens. He has improvised reflectors for an impromptu window portrait by covering the floor about the sitter with newspapers, hanging newspapers or other white sheets of paper or muslin under the nose of the camera, or holding up other white material opposite the window and just out of range of the portrait. This portion of the book is suggestive, and must prove useful to the inexperienced aspirant after portraiture. We are quite in sympathy with the author when in speaking of flash-light photography he says: "Nothing in home photography is more delightful in the interest and amusement it gives at the time, and in the pleasure it affords in after-years than the picturing of familiar groupings in domestic life, in parlour and in kitchen, at the evening

lamp, at the piano, and at the Christmas tree." He cautions the amateur who uses the hand camera not to expect it to do marvels, to take pictures when or where there is not sufficient light, but to give the plate a fair chance by not setting the shutter for a high speed when there is little light and little movement. This caution is applicable to others than green hands in America. Who has not heard of the button-presser who bestowed a look of pitying contempt upon the experienced veteran who had been exposing four minutes in the interior of Canterbury Cathedral one dull afternoon, with the remark, "I have just taken a snap-shot at the same view, but I only gave it the hundredth part of a second and I hope I shall get a good negative." "I hope you will," dryly remarked the veteran. Ample directions are given for developing the negative, for printing, toning and fixing the proofs, and taken altogether it is an excellent book for a young amateur.

It contains photographic illustrations, which, together with the text portion, are well printed on good paper.

The *Photographic Times* Christmas Number.

We congratulate our contemporary upon having in this Christmas number quite excelled itself. What with landscapes, seascapes, astronomical, *genre* and portrait subjects, it comes in an easy first over anything hitherto attempted in the way of illustrating a magazine selling at fifteen cents (7½*d.*). Of these there are over sixty half-tone pictures, several whole-page ones among them. The text matter, too, is considerably above its average. Among this is an article on Astronomical Photography at the Lick Observatory, by Prof. E. S. Holden, illustrated by sun spots, lunar craters, and by three views of the moon. There is too an article, "The Story of the *Photographic Times*," well illustrated by portraits of past and present editors and contributors. The chapters on the Fathers of Photography is in this number devoted to an appreciative article on Walter B. Woodbury, whose lamented death in 1885 has been recorded in our columns of the period. We notice that the writer mentions him as "the pioneer of balloon photography." It is not detracting from the fame of Mr. Woodbury to say that this honour belongs to H. J. Luff, who had patented this application of photography in this country in 1854, or more specially to M. Nadar, whose patent for photographing from a captive balloon dates from 1858, that of Mr. Woodbury being nineteen years later. This Christmas number reflects the highest credit on the proprietors and all concerned.

Southern Studies.

By A. G. Tagliaferro.

If there ever had been any doubt as to Mr. Tagliaferro's skill as an artist, this fine collection of Southern Studies must effectually dispel any ideas to the contrary. The series of twelve begins with *An Uninvited Guest*, in which a man, whose nationality may be guessed at from his swarthy complexion and the guitar hanging on the wall, while engaged with his dinner becomes aware that he is not alone, but that a young jackdaw, who has escaped from a cage overhead, is occupying himself in actively discussing some viands at the farther end of the table, the rightful occupant surveying the scene with grim interest. In the picture *All's Fair in Love and War* we have two men of the mechanic class playing at cards, one of them oblivious of the fact that the maiden behind him, who is pouring out for them the wine from a flask, is telegraphing to the other by her fingers the nature of the cards held by the opponent. This picture, like the former—nay, like all of the series—displays masterly skill in posing and lighting. In *Forty Winks*, the good father, having finished his tea and fallen asleep in his chair, is about to have his temporary oblivion terminated by the mischievous damsel who, with feather-duster in hand, is leaning over the screen behind, intent upon tickling the nose of the victim of Morpheus. *A Humble Offering:* Here we have a roadside shrine, with an image of the Madonna, to which a peasant-girl is devoutly making an offering of, doubtless, carefully selected flowers. The technique, equally with the art, in these and the others of the series is of a high order of merit. They are all of considerable dimensions, the prints being fourteen inches by eleven and a half inches. They are well printed in photogravure, on India paper, by R. Paulussen, Vienna, by whom they are published, and also at 215, Shaftesbury-avenue, W.C.

News and Notes.

Photographic Club.—January 3, *Clouds*, by Mr. Birt Acres.

West London Photographic Society.—January 2, Technical Meeting—Lantern.

Lewisham Camera Club.—January 5, Demonstration of *The Paget Prize Lantern Slides*, by Mr. S. Herbert Fry.

Mr. Francesco Duran intimates that his address is now "Ravenswood," Trinity-road, Birchfields, Birmingham.

Woodford Photographic Society.—January 4, Members' Lantern Slides. 18, *Platinotype*, by Henry W. Bennett.

Central Photographic Club.—On December 29 Mr. Lamond Howie, of Eccles, will deliver his lecture, accompanied by slides, on *The Passion Play at Oberammergau*, and on the following Friday Mr. Burdick, of Chicago, will give a demonstration of the use of the air brush.

Photography as a Profession.—Here is a case of some interest, as showing the salary sometimes said to be paid to assistants. One day last week, at a London police-court, a photographer, a married man, was charged with robbing his employer, and was sentenced to one month's imprisonment. A detective, who went with the prosecutor to the prisoner's lodgings, said the latter addressed the former as follows: "I shan't work for you again for twelve shillings a week. When I have got a little business on my own account, you turn round on me." If salaries for qualified photographic assistants—and, as the man was commencing business on his own account, it might be assumed he was—have really come down to this, the minimum wage of sixpence per hour for dock labourers, or street scavengers, may be a source of envy to some photographic workers. At only nine hours a day, the remuneration is less than threepence an hour.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 1	Camera Club	Charing Cross-road, W.C.
,, 1	Peterborough	Bedford Coffee House.
,, 1	Richmond	Greyhound Hotel, George-street.
,, 1	South London	Hanover Hall, Hanover-park, S.E.
,, 1	Stereoscopic Club	Brooklands Hotel, Brooklands.
,, 2	Birmingham Photo. Society	Club Room, Colonnade Hotel.
,, 2	Bolton Photo. Society	10, Rushton-street, Bolton.
,, 2	Brixton and Clapham	376, Coldharbour-lane, Brixton.
,, 2	Exeter	City Chambers, Gandy-st., Exeter.
,, 2	Hackney	206, Mare-street, Hackney.
,, 2	Herefordshire	Mansion House, Hereford.
,, 2	Keighley and District	Mechanics' Institute, North-street.
,, 2	Lewes	Fitzroy Library, High-st., Lewes.
,, 2	North London	Canonbury Tower, Islington, N.
,, 2	Oxford Photo. Society	Society's Rooms, 136, High-street.
,, 2	Paisley	9, Ganze-street, Paisley.
,, 2	Rochester	Mathematical School, Rochester.
,, 2	Rotherham	5, Frederick-street, Rotherham.
,, 2	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 2	York	Victoria Hall, Goodramgate, York.
,, 3	Edinburgh Photo. Society	38, Castle-street, Edinburgh.
,, 3	Leytonstone	The Assembly Rooms, High-road.
,, 3	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 3	Southport	The Studio, 15, Cambridge-arcade.
,, 3	Southsea	3, King's-road, Southsea
,, 4	Birmingham Photo. Soc. (An.)	Club Room, Colonnade Hotel.
,, 4	Camera Club	Charing Cross-road, W.C.
,, 4	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 4	Glasgow Photo. Association	Philoso. Soc. Rooms, 207, Bath-st.
,, 4	Glossop Dale	Norfolk-square, Glossop.
,, 4	Hull	71, Prospect-street, Hull.
,, 4	Leeds Photo. Society	Mechanics' Institute, Leeds.
,, 4	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 4	Oldham	The Lyceum, Union-st., Oldham.
,, 4	Tunbridge Wells (Annual)	Mechanics' Inst., Tunbridge Wells.
,, 5	Brighton and Sussex	Librarian's Room, Public Library.
,, 5	Cardiff	Castle Arcade, Cardiff.
,, 5	Central Photographic Club	Coleman's Hotel, Henrietta-st., W.C.
,, 5	Croydon Microscopical	Public Hall, George-street, Croydon
,, 5	Holborn	100, High Holborn, London, W.C.
,, 5	Leamington	Pump Room, Leamington.
,, 5	Maldstone	"The Palace," Maldstone.
,, 5	North Kent	Gravesend.
,, 6	Hull	71 Prospect-street, Hull.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

December 21.—Mr. W. E. Debenham in the chair.

Andresen's Developing and Fixing Cartridges.

Mr. E. A. Leblanc prefaced a short demonstration of Dr. Andresen's preparations by remarking that they were useful for tourists. The metol cartridges could be used for developing bromide paper as well as negatives. Speaking of the new "bars" of acid hypo for fixing purposes, he said they were packed with the powder in the uncompressed form. A great advantage of the bars was, besides their portability, that they dissolved very readily. The tone-fixing cartridges could be used for albumen as well as gelatino-chloride paper, toning in the former case, however, taking somewhat longer. Speaking of metol, he said it was more energetic than pyro, and thus saved time, besides being cleaner with sulphite, the general stain being less.

Several prints were then toned and fixed and a Wratten plate developed successfully, and after a few observations of a conversational nature from members, Mr. Leblanc received a vote of thanks.

The Fountain Air Brush.

Mr. Charles Burdick, of Chicago, demonstrated the new air brush, pointing out that it was of pencil shape, and had not many pieces. It gave a good quality of spray, and great control could be obtained over the amount of colour used. Held close to the work, a fine spray was given; at a greater distance, a broader effect. The quality of the shading was excellent. If the colour were rubbed in or washed on, a close texture was obtained, but this was overcome by the use of the brush, which threw the colour on in little specks, virtually a very fine stipple. The frictional wear of the tool was not two per cent. The reservoir of the brush could be filled with colour, but eight to ten drops were sufficient. It could be used for working up the shadows of an ordinary negative, but not for retouching. In landscape work it would be especially useful. It could also be used for lithographic work or finishing bromide prints. The spray is actuated by air pressure, and the brush is held just as an ordinary pencil is held. Its cost is about 6*l.* 10s. complete. Mr. Burdick gave a practical demonstration of the use of the tool, producing one or two freehand heads and eyes. Several specimens, plain and coloured, were also on view. He said the standard water colours could be used. With an hour's practice, background work could be done by a photographer, but the further use of the tool was a matter of practice.

The Chairman, in moving a vote of thanks to Mr. Burdick, remarked on the fineness of the lines produced by the brush.

Croydon Camera Club.—December 20, the President (Mr. H. Maclean, F.G.S.) in the chair.—An unusually complete and well-arranged lecture was given by Mr. John H. Gear on *Various Methods of Lantern-slide Making*, in which the leading processes were graphically described. As the above will, no doubt, be in due course printed *in extenso*, we shall not attempt a condensation; but attention should be drawn to the admirable way in which, by means of especially prepared slides, the method of slide-making by reduction was illustrated on the screen. Thus, (1) showed the apparatus in position; (2) the same during exposure; and (3 and 4) the procedure necessary for printing in of skies. The discussion, amongst many other points elucidated, elicited that there is much room for improvement in the manner in which slides are shown by many Societies whose status would make one think them to be incapable of any shortcoming in this respect.

Hackney Photographic Society.—December 19, Mr. E. Puttock in the chair.—An entertainment was given to a large gathering, entitled *Chicago Exhibition*, by the Society's Hon. Lanternist (Mr. Albert Rose). A number of slides of excellent quality was shown and proved very interesting, as they gave the audience a good idea of the size of this gigantic exhibition. Members were particularly requested to attend on January 2, when Mr. Burdick, of Chicago, will give a demonstration upon *The Air Brush*, also a demonstration by Mr. Howson on *Matt-surface Paper*.

South London Photographic Society.—December 18, Mr. F. W. Edwards in the chair.—A demonstration was given by Mr. S. H. Fry of making lantern slides on gelatine plates. One good rule, he said, in making slides was to make the exposure suit the developer, and not to alter the latter to meet the exposure. Hydroquinone he recommended as a developer, but, if it was desired to use one of the newer developers, metol was the best for the purpose. The use of an acid fixing bath assisted materially in the production of clear slides. The continued use of one quantity of developer for a number of slides militated against the attainment of the best results. A series of slides made from one negative on Paget slow plates were projected on the screen to show the variety of colour obtained by exposure, and the use of varying quantities of carbonate of ammonia in the developers. A number of slides, exposed, developed, and fixed during the meeting were shown in the lantern. The new lantern awarded to the Society in competition at the Stanley Show was on view. Attendance, forty-eight.

Birmingham Photographic Society.—December 19, Mr. J. T. Mousley in the chair.—The series of one-man exhibitions was continued by Mr. Underwood, who had a large number of prints on view. They comprised all kinds of subjects, while the interiors, perhaps, showed especial skill, the detail being so clearly defined, and no hardness in the shadows. Mr. Underwood also showed a great variety of good tones on gelatino-chloride paper.

Leeds Photographic Society.—A meeting of the newly elected Committee for the ensuing year was held in the Society's Rooms at the Mechanics' Institute on Monday, the 18th inst., for the purpose of electing the officers and settling the syllabus for the year. The officers elected were as follows:—*President:* Mr. J. H. Walker.—*Vice-Presidents:* Messrs. S. A. Warburton and Godfrey Bingley.—*Librarian:* Mr. T. Butterworth.—*Lanternist:* Mr. H. P. Atkinson.—*Treasurer:* Mr. Herbert Denison.—*Secretaries:* Messrs. Herbert Denison and Mr. H. L. P. London. These gentlemen, together with Messrs. B. A. Burrell, F.I.C.; R. Steele; and Dr. E. H. Jacob, M.A., M.D., form the Committee. The Society's Annual Lantern Exhibition, which has hitherto been held in November, has been omitted for the present year, but will be held on January 18 next in the Albert Hall, when a novelty will be introduced in the use of the electric light in the lantern. The syllabus for the coming year comprises many interesting papers and demonstrations on subjects connected with photography.

Lincoln Camera Club.—On the 20th inst. Mr. Howson (of the Britannia Works Company, Ilford) gave a demonstration on *The New Ilford Matt P.O.P.* The lecture was practically the same as given before the Central Photographic Club on the 15th inst., so need not be given in detail here. After describing the paper, Mr. Howson at once proceeded to demonstrate the use of it, showing how different tones, ranging from almost a pure black to sepia and brown, could be obtained with the greatest ease. Judging by the specimens exhibited during the evening, the paper leaves nothing to be desired, such exquisitely soft and beautiful pictures surpass anything before attempted. The members of the Club are to be congratulated upon being first in the provinces to have this most easy and beautiful process demonstrated before them.

Brechin Photographic Association.—December 20, Mr. William Shaw Adamson, of Causton Castle (President), in the chair.—Public Lantern Entertainment.—An audience of about 1000 assembled to hear an illustrated lecture entitled *A Scamper through the States, with a Visit to the Chicago Exhibition.* This was followed by the exhibition of about 100 slides of the members' work, and humorous and effect slides. Mr. James Bruce read the descriptive lecture, and Mr. D. Lamb, late of Lamb's Diorama, presided, with much acceptance, at the lantern. The expenses were defrayed by a collection, which amounted to over 7*l.*

EXHIBITION OPEN.

1893.
Dec. 29–Jan. 22, 1894 *Bristol Triennial International Academy of Arts, Bristol. Hon. Secretary, F. Bligh Bond, 36, Corn-street, Bristol.

* Signifies that there are open classes.

Correspondence.

☞ *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

PHOTOGRAPHIC COPYRIGHT.

To the Editor.

Sir,—In your last number, on page 814, is a paragraph headed "On Things in General," relating to photographic copyright, and which is calculated to mislead the photographic public if not corrected. The law is as follows:—

When a sitting is given to a photographer WITHOUT PAYMENT, the copyright vests in the photographer, for "from the moment when the negative is taken it is the copyright of the photographer." It is true the requirements of the Act are not complete until the work has been registered at Stationers' Hall, but this may be done at any time AFTER publication.

Upon registration, the owner of the copyright is entitled to avail himself of all the statutory remedies against any person reproducing the photograph—that is to say, he may get damages or penalties, an injunction to restrain the producer from using the copyright in any way, and an order for the delivery up of reproductions unlawfully made.

I admit it is advisable to register a copyright picture as soon as possible after the photograph has been approved by the sitter; but I can vouch for the accuracy of my statement, that it may be done at ANY TIME.—I am, yours, &c.,

Joseph J. Elliott.

Talbotype Gallery (Elliott & Fry), 55 and 56, Baker-street, W., December 27, 1893.

[The opinion quoted by Mr. Elliott is that of a gentleman qualified by considerable experience to advise as to the law of copyright as applied to photography.—Ed.]

THE SPEED OF PLATES: A CRITICISM AND A REPLY.

To the Editor.

Sir,—The letter from Messrs. Hurter & Driffield in your last issue calls for some reply from me, although, I think, considering its tone, I should be perfectly justified in leaving it unanswered. I have carefully re-read my paper, and I cannot see any reason to alter anything that I have said. Neither do I see any justification for Messrs. Hurter & Driffield's assertion that I am angry. If any impartial reader can find any thing of a personal or angry nature in my paper, I am ready to withdraw it and to apologise. I have spoken strongly and to the point about Messrs. Hurter & Driffield's work because, in my opinion, some plain speaking was needed, and I think that if any justification were required of the course I took, it is supplied by the personalities of Messrs. Hurter & Driffield's reply. Their position seems to be defined by the old legal gibe: "With a bad case abuse the the plaintiff's attorney." However this may be, kindly permit me to take up the few points raised by them last week. They lay some stress in their opening paragraph on some supposed rules of the Camera Club. I need hardly say that no such rules exist, and if they did they could hardly be supposed to apply to Messrs. Hurter & Driffield. My object in giving the widest publicity to my paper was to give these gentlemen the most open field for their reply. Had I not done so, they would have had most just reason for complaint. I may remark, also, that pressing invitations were sent to them to be present at the meeting of the Camera Club at which my paper was read, both by myself and, I believe, by the Secretary of the Club.

Messrs. Hurter & Driffield's assertion that they can produce two

identical negatives on two different plates does not in the least meet my statement that this cannot always be done. Even granting that it could be done by a *tour de force*, it does not follow that either negative would be the best producible on the plate. Still I think I may safely leave this to the judgment of those who do me the honour to read my paper.

I may do the same with their next statement, viz., their denial that they ever asserted that the ratio of gradation of a perfect positive must be the same as that of the object portrayed. I need only refer to the opening paragraphs of their *Photo-chemical Researches* for proof of this.

The next paragraph of their letter contains a fine example of the logical fallacy *suggestio falsi*. Captain Abney has never abandoned his method of speed determination, although he perfectly agrees that it, and any other method that expresses the speed by a single number, can never be more than a roughly approximate one. I presume, then, that Messrs. Hurter & Driffield will withdraw their statement.

The next paragraph contains the old confusion that I drew attention to in my paper; they seem utterly unable to distinguish between a complete statement and an approximate one. My assertion that the printing value of a negative is through a certain range proportional to the negative logarithm of the exposure is an approximate statement, and is perfectly consistent with the fact that through a greater range the law of error formula fits the curve of a plate. Messrs. Hurter & Driffield are here on the horns of a dilemma, they must either be supposed ignorant of the principles on which approximations are made or must be thought to be confusing the issue.

A similar dilemma arises in the very next paragraph. As I am away from home, I have not before me the copy of the *Camera Club Journal* to which they refer, but I have the unpaged reprint of Captain Abney's paper, and in it I find the following words:—"The curve of error has what is called a singular point, that is, a point where it is neither convex nor concave," &c. If, in the face of this, Messrs. Hurter & Driffield continue to say that "the point of inflexion was not mentioned, and is not meant," there is only one inference to be drawn, and that is that they do not know what a point of inflexion is. At least, if they do, their ideas of scientific honesty differ greatly from mine.

In conclusion, I would say that abuse is not argument, and I fail to see that Messrs. Hurter & Driffield have met a single one of the points raised in my paper; in fact, the very tone of their letter shows that they have felt the force of my arguments. As for the quotations from my paper that they have taken from the context which justified them, and used against me, I can only say that their attitude reminds one of that of the quack medicine vendors, who, in reply to an analyst's declaration that their nostrums contain nothing of any medicinal value, boldly answer, "Our medicine is of so subtle a nature that it defies the most searching analysis."—I am, yours, &c., HARRY M. ELDER.

Brighton, Dec. 20, 1893.

GELATINO-CHLORIDE PAPER.

To the EDITOR.

SIR,—I have had some experience with gelatino-chloride paper, and have had similar experiences with the sulphocyanide bath as your correspondents, "J. H. Smith" and "Scribbler." All the defects they enumerate have been common with me until I acted on the advice given in your issue of (I believe) October 27, viz., to treat the prints after the first washing with a bath of common salt and water before toning.

The effect has been magical, and I may say I find I can now tone with more certainty and equality of results, and without the extravagant waste of gold to which your correspondents refer. Moreover, the prints are best judged by their surface tone, and when just a shade warmer than you intend them to be should be taken out of the bath.

I consider your suggestion the most valuable one that has yet been made in the controversy on the use of the sulphocyanide bath. Perhaps users of this paper will act on your suggestion before they condemn gelatino paper altogether.—I am, yours, &c., G. E. ARNOLD.

Knaresbro'.

To the EDITOR.

SIR,—I trust that no reader of this JOURNAL will accuse me of any desire of "rushing into print," for such is not my wish; but, as so many other workers have written a few remarks on the above subject, let this be my excuse for adding my experience. I may at once state I am not referring to any particular make of paper, for I notice that directly a complaint is made against any particular brand, the manufacturers of the said brand immediately insinuate partiality, trade interests, &c. It is to be lamented that, in almost all complaints made against commercial photographic products, the *manufacturers are never in fault* (?) This, I am sure, prejudices their cause. After all, is not photography in every branch a series of compromises? No part of the art-science is perfect. The same faults which I notice urged against certain brands of paper I maintain apply equally to all brands. With regard to the quantity of gold used in toning, undoubtedly the prints on gelatino-chloride papers may be toned with the same quantity of gold as used in albumenised paper. But what kind of tone do we get? Not such as would be considered a rich purple on an albumenised silver print; therefore, I contend that much more gold is required to bring about a similar result.

Now, as to the assertion in certain instructions issued that the "prints lose little in toning and fixing." This is indeed a delusion and a snare, and the merest tyro in printing will immediately discover his error if he only slightly overprints his proofs. The prints undoubtedly do lose a great deal in after processes of toning, fixing, and washing.

With regard to double tones, it seems that some papers show this defect more than others; but when we consider that the deeper a print is when it leaves the printing-frame, the richer the resulting picture when toned, it seems somewhat a natural consequence that where a print is softened off in vignetting, and the reduction of silver is so much less, that it can hardly take the same tone as in the fully printed parts; this, however, I leave to those better qualified than I am to deal with. I feel sure that, if manufacturers would only meet the users of their wares in a more friendly and impartial spirit, the benefits would be mutual, and the amount of written controversy would be less bitter and unfriendly, and far better employed in an honest endeavour to finally reach that estimable quality—*the truth*.—I am, yours, &c., FREDERICK W. MUNCEY.

Kilburn, London, N.W.

THE BRADFORD CYLINDER ACCIDENT.

To the EDITOR.

SIR,—I fully expected that Mr. W. I. Chadwick's letter, so prominently published in your issue of the 1st inst., would have been answered sooner. As no answer has yet appeared, I would like, with your permission, to reply to some of the statements made in the letter, fearing that they might mislead persons not well acquainted with the facts.

With reference, first of all, to the very sad accident at Bradford, perhaps even Mr. Chadwick will grant that if it tends to create nervousness among the users of gas cylinders, it tends in a hundredfold degree to breed it among persons who fill and distribute them. Therefore, I should very much like to know on what grounds he bases his opinion that "we may expect these explosions much more frequently from now." Has he any grounds, or is it just an "alarmist's" assumption. I should rather anticipate that the result of the accident and the attendant inquiry would be an amount of caution and enlightenment which would still further reduce any risk.

Through the whole of Mr. Chadwick's letter there seems to be an implied censure on the Compressing Companies. How the Bradford accident can be made a peg for such a censure, I do not see. The accident does not appear to have been owing to any neglect of prescribed tests on their part—the cylinder which burst was not even supplied by any of them. Probably, Sir, you have already received a copy of Professor Goodman's report, and will doubtless publish it for the information of your readers. I would commend it to Mr. Chadwick's notice. It verifies completely the fact that cylinders properly made, annealed, and tested, are absolutely safe under all the conditions of ordinary transport and use. It also proves that the best makers of cylinders are perfectly acquainted with the requirements of the trade, and that in spite of Mr. Chadwick's opinion the conditions of safety laid down by the best makers and compressors have been sufficient (see Mr. Howard Lane's letter in *Engineering*, of December 9, and Mr. K. S. Murray's *Handbook on Compressed Oxygen*).

According to Professor Goodman, by whose kind invitation I was present when he made his tests of the Bradford cylinder, the defect of that cylinder lay in the fact that it was constructed of a high carbon steel, too hard and brittle for the purpose, and also that the annealing process, which is necessary to soften and toughen the metal after the manufacture of the cylinder, and which was specially requisite in this case, had been entirely omitted. On these points, in the absence of satisfactory tests, it has been customary to accept the maker's guarantee. It is now proposed that the Compressing Companies should anneal all cylinders themselves, and thus become themselves responsible for the proper ductility as well as for the tensile strength of cylinders. Of course, from a public point of view, this would only shift the responsibility from the makers to other equally interested and fallible persons. Hence the further suggestion for Board of Trade interference. So far as outside interference would secure an independent guarantee that every cylinder which was passed into use had been properly made and tested, without introducing repressive restrictions, I am sure it would be welcomed by the Compressing Companies as much as by the public. Such interference might take the form of Board of Trade inspection, or, what would be perhaps preferable, inspection and insurance by a first-class insurance company, as is the case with boilers.

There are two or three statements in Mr. Chadwick's letter which I believe he has made before, and which have been replied to elsewhere.

There may be imperfections in the management of the Compressing Companies, but I cannot think they are such as he indicates. He speaks about cylinders being over-charged to 130 and 135 atmospheres. Quite possibly. These are not dangerous pressures. They are meant to allow liberally for the cooling, and consequent reduction of pressure, after leaving the compressing pump; and, indeed, incidentally serve as a modified test of the soundness of a cylinder each time it is filled.

Then there is the sensational revelation about "interchangeable adaptors." I do not know what Mr. Chadwick refers to, unless he means certain fittings which have been supplied, from time to time, to customers to enable them to connect old types of fittings with new types of valves. But with the mechanical knowledge he possesses, he should know that it would be possible to make a connecting piece for attaching a coal-gas cylinder to an oxygen compressor, or *vice versâ*, whatever form of valve outlet were adopted. The object of altering the valves and connexions of coal-gas cylinders was to render it impossible for a workman to fill a cylinder *accidentally* with the wrong gas. He can be trusted not to do it intentionally, unless he wishes to commit suicide, and there are easier ways of doing that. I certainly cannot agree with Mr. Chadwick that "the security which was paid for is *gone*." It exists, and is a very real security, I can assure him.

Excuse me, sir, if I refer to another point. I understand Mr. Chadwick to state that, if the Bradford cylinder had burst in the room where the Ilkeston gas-bag explosion occurred, it would have blown out the walls and brought down the roof on the heads of the audience. Now, I do not wish to under-estimate the consequences of a cylinder explosion, but I would like to remark that I visited the scene of the Bradford accident, and, though it occurred in a narrow subway about twelve feet wide and eight feet high, I could not find a mark on the floor or wall to indicate that anything had happened. Indeed, the glass panes of a lamp which hung on the wall not above eight feet from the spot where the cylinder burst were not even fractured. And yet Mr. Chadwick says he is not an alarmist. Well, sir, I don't like to be rude, but I should like to call him one.

Perhaps the term explosion, as applied to the Bradford accident, has caused some confusion of thought. It was not an explosion in the usual sense of the word. An explosion of twenty cubic feet of mixed oxygen and hydrogen gases in a cylinder would be even a more serious thing, and I am glad that the chance of such an occurrence is so satisfactorily remote. Neither did the Bradford cylinder burst owing to an excessive internal pressure. It was strong enough to bear for an indefinite time much greater internal pressure than it did contain, so long as it was not subjected to any severe shock. It was broken by the shock of its fall, because it was brittle; and, of course, when it broke, the expansion of the gas it contained caused the pieces to fly violently apart—just as a charged soda-water bottle would fly apart under similar circumstances.

In conclusion, sir, I must express my surprise that Mr. Chadwick should seize every opportunity to discount the efforts, and discredit the instructions of the Compressing Companies. I might remind him that even a Government inspector would have to study the subject in the light of their experience before he could afford much protection to the public. Cylinders have been filled and distributed many hundreds of thousands of times during the last few years, and the accident at Bradford is the first which is traceable to the failure of one of them. Surely even Mr. Chadwick will admit that those responsible for the growth of this business must have exercised great care and forethought to have developed it with so small a record of accidents. And if he will calculate the reduction of risk which the cylinder system has effected for users of lime-light since cylinders took the place of bags, I think he will acknowledge that lanternists, at any rate, have no cause for complaint. There are lessons to be learnt from the accident at Bradford, but we can learn them without getting into a panic.—Apologising for the length of my letter, I am, yours, &c.,

W. Morton Jackson.

Manchester, December 18, 1893.

Answers to Correspondents.

Bucks.—Without seeing an example or two, and having some details of the system pursued, it is impossible to offer an opinion.

J. Westlake.—The background may be very good as a work of art, and well executed, but it is far too pronounced for photographic use. Scenic backgrounds for portraits should be suggestive rather than pronounced.

D. E. L. A. Y.—Probably press of Christmas orders is the cause. As a rule, the firm are prompt in the execution of orders. We cannot assist in the matter, though we shall be sorry if you lose a profitable commission.

C. J. R.—There is no reason why a metal cast cannot be obtained from a Woodbury relief. Send the relief to a stereotyper, he will supply a metal replica. It will be advisable to send the relief on the glass upon which it is developed.

T. Morris.—The cause of the "sparkling points" in the enamelled prints is simply air bubbles enclosed between the print and the gelatine. The method of procedure is quite right; the only thing necessary to success is greater care in the manipulation, so as to avoid the air bells.

A. Karl (Cologne).—Yellowness is no more general on gelatino-chloride prints made on paper of British make than on that manufactured abroad. It is simply a question of manipulation. We cannot account for your getting whiter prints on one paper than the other. They should be pure in either case.

Churlish.—If the owner of the historic mansion refuses you permission to photograph its interior for publication, we cannot see that you have any cause for complaint. Surely every man has the right to say what he will, and what he will not, permit in his own house. We must decline to publish the letter even if you did not desire your name to be suppressed.

B. B. H. asks if negatives that are developed with a somewhat discoloured pyro developer, and have a yellow colour, are likely to be less permanent than others which are produced with a colourless developer, and have only an indication of a yellow tint.—We see no reason why, other conditions being equal, the negatives should be more permanent in one case than in the other.

G. G. R. asks what is the best mountant for carbon prints, and also for collotype prints with a glazed surface? Any ordinary cement that will secure the prints to the mounts may be employed for pigment prints, as they, unlike those in silver, are not liable to be affected by the mountant. However, nothing is better or more convenient to use than starch paste.

R. Wenman.—None of the developers given in the Almanac for dry plates are of any use with wet collodion. We don't see how this process is to be rendered, as you term it, "less messy." After all, the "messy" rests very much with the manipulator. Some workers get their hands much stained in working, while others, more neat manipulators, scarcely stain their hands at all.

Detector.—It is more than probable that the "fixed focus" lens is not at fault, but that it is "fixed" at the wrong focus for such purposes as you have been employing it. If it is rightly adjusted for outdoor work, it will certainly be wrong for portraits in rooms. The only thing to be done is to have the camera altered, so that the focus of the lens can be adjusted to suit its requirements.

A. N. Blake.—The only suggestion we can make as to your going wrong is that the directions given by the author of the article have not been followed, otherwise the result would have been different. By merely seeing a print, with no other data, it is impossible to say why the failure. Read the last paragraph of the article carefully and try again. Perfection is rarely arrived at in the first essay.

T. Blackman.—The process could not be patented, or, to be more accurate, a valid patent could not be obtained for it. Vignettes with hatched backgrounds were used and patented, and the patent lapsed, and the thing often advocated by us years ago. Do not be deterred from working by any threats. No patents in connexion with this subject have been applied for of late. Simply a case of "bluff."

A. Davies.—In taking up the carbon process as a beginner, we certainly advise you to purchase the tissue ready for use. Although in extreme cases (abnormally thin or dense negatives) an advantage is to be gained by sensitising the tissue for oneself, it is not to be recommended to beginners, inasmuch as they can ensure obtaining it in the best conditions for average purposes as supplied commercially, a state not always secured by a novice when he sensitises for himself.

Death of Mr. P. D. Coghill.—With much regret we have to announce the death of Mr. Peter D. Coghill, the Honorary Secretary of the Northern Photographic and Scientific Association, which meets at Wood Green, N. It was in a large measure due to the energy of Mr. Coghill that the Association was formed, and achieved such rapid success. To his influence was owing the admirable lectures which have lately been delivered by professors of various departments of science. He was a skilful microscopist, and excelled in the production of photographic enlargements of bacilli and similar objects. He was professionally connected with the Royal College of Veterinary Surgeons, to which he came from the laboratory of the Royal College of Surgeons, Edinburgh. He was a genial, talented man, and will be much missed. He was lately seized with influenza, on which pneumonia was said to have been grafted. He died on the 20th inst., at his residence in Hornsey, N.

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MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*January 6, 1893*

THE LANTERN RECORD.

CONTENTS.

THE DILUTION OF OXYGEN.

The suggestion from a correspondent, as given in a communication to the November "Lantern Supplement" that oxygen under pressure, whether in cylinders or in the gas-manufacturers' holders, deteriorates so that it becomes "little more than atmospheric air," met, as it was only reasonable to anticipate it would, with several rejoinders pointing out the extreme unlikelihood, if not impossibility, of any such deterioration taking place. A little reflection indeed must show that, were compressed oxygen likely to be changed, under pressure, very largely into nitrogen—for that is the extraordinary reaction which our correspondent implies takes place—the retailing of compressed oxygen, to say nothing of its employment for illuminating purposes, would be entirely out of the question.

As to any "corrosive influence" being at work on account of the gas being kept for a considerable length of time in the cylinder, we can recall no experiences either of our own or of our correspondents bearing out such a theory. Possibly our correspondent was confusing oxygen with coal gas, the latter undoubtedly when kept for several months in the cylinder being sometimes liable to react on the metal to form various compounds which have a detrimental effect on the lime and the quality of the illuminant. But even this is, we believe, largely governed by the qualities of the hydrogen, tolerably pure varieties of the latter, that is, free from a large excess of hydro-carbons, keeping on the whole very well indeed.

There seems little room for doubt, however, that of the varieties of commercial oxygen now available, some kinds are less pure than others, that is, they are more or less diluted with nitrogen beyond the theoretical standard of five or six per cent. Nitrogen has been termed in this connexion an "inert" gas, but this is an obvious misnomer when it is present in large quantities, inasmuch as in the measure of the amount of nitrogen present so is the illuminating power of the oxy-hydrogen light decreased. Other considerations of an economic nature will also serve to establish the fact, that nitrogen in large quantities is the reverse of inert in a mixture supposed to consist of practically pure oxygen.

This subject of the dilution of oxygen and its consequent effects in lantern work has recently received attention in several quarters. The results of some experiments mentioned by Mr. Grundy of the Royal Naval College, Greenwich at a meeting of the London and Provincial Photographic Association, quite bear out the experience of many who have found commercial oxygens vary in purity. That gentleman stated that he had recently analysed a sample, and found that it contained nearly forty-five per cent. of nitrogen; others had up to fifteen per cent., while another of a special make only contained about eight per cent. In no case had he been able to obtain so low a percentage of nitrogen as five.

If Mr. Grundy's results are typical of the qualities of commercial oxygens in use by lanternists, it is highly desirable that some simple means of ascertaining the purity of the gases with which they are working should be placed within their reach. Such a test should be one which those comparatively ignorant of chemistry and physics should be able to apply; and such a one is that, we conceive, which was promised by Mr. A. Haddon to be given at a future meeting of the Association. Tests of the kind doubtless already exist, but we shall not anticipate Mr. Haddon's promised method, which we are sure will be simplicity itself, and therefore welcome to all lanternists.

LANTERN NOTES AND NEWS.

Adverting to our remarks of last month as to the utilitarian applications of the lantern in practical photography, a recent lantern night of the London and Provincial Photographic Association supplied an apt illustration of our meaning. At that meeting, among the slides shown, were several by Mr. H. E. Davis, which exhibited the peculiarities of the amidol developer in various modifications, as expounded by that gentleman in the course of his able article on the subject in the Almanac just published.

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In the same connexion it will be remembered we spoke of the practicability of projecting upon the screen the negative image while undergoing the process of retouching, in order that an audience might gain some idea of the retoucher's method, especially in regard to the kind of strokes employed to produce various effects. When thus writing we had overlooked the fact that recently partly the same end had been secured in another way, namely, by the projection of untouched images upon cartridge-paper screens, the retouching upon the projected images being accomplished by a stick of charcoal.

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One of the *desiderata* of the lantern which we anticipate will be generally called for in the future will doubtless be the means of obtaining a uniform standard light; so that, given the focus of the objective and similarity of screens, it would be possible for different audiences to see the same set of slides under practically identical conditions. At present this is not often practicable; indeed, as is well known, the character of the light exercises such a remarkable influence over the quality of the pictures shown on the screen, that it is no uncommon thing for a set of slides to be well received when shown by means of one lantern, and to be quite otherwise regarded when exhibited in

another, although, possibly, the conditions of light, condenser, and screen are considered to be tolerably uniform in both cases. Irregularity of illumination is far from being unknown, even in double lanterns. A method of standardising lantern illuminants would be welcomed by all slide-makers.

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THE slides, prepared by the Devon and Cornwall Camera Club, of Plymouth and its environs, where the Photographic Convention of the United Kingdom is to foregather next summer, are to be shown this week before the members of the Photographic Section of the Croydon Microscopical Society. We trust that they will go the round of the principal London and country societies. Would it not be a politic move to send them up to one or two of the Glasgow and Edinburgh societies, in order, if possible, to render nugatory Mr. William Lang's dismal forecast of the number of Scotchmen likely to come south to the Convention?

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WE publish in another part of the Supplement the first report of the Charitable Lantern Society which, during the months of November and December, has given a series of lantern entertainments to the inmates of several London hospitals. We gather that those entertainments were highly appreciated, and we applaud the Society in its kindly mission. It appears, however, that its operations are somewhat restricted by the lack of a sufficiency of apparatus and helpers, for which and to whom we venture to appeal on its behalf. We are confident that many of our readers will be glad to help in the good work, and we ask them to send either offerings of lanterns, fittings, gas bottles, or slides, or of their services, to the Hon. Secretaries, Mr. B. Foulkes-Winks, 2 Pretoria-avenue, Walthamstow, and Mr. F. Simmons, 158 Frances-terrace, Herne Hill, S.E.

PRINTING COLLODION TRANSPARENCIES BY CONTACT.

To many of the users of collodion plates for transparencies and lantern slides the extreme tenderness of the film presents considerable difficulties, owing to the ready manner in which it suffers mechanical injury. This is more especially the case where contact printing is adopted, although, even when used in the camera, these films are liable to suffer from carelessness arising out of our modern familiarity with the tougher gelatine surface. But to the collodion workers of anything over a dozen years ago this delicacy of surface gave no trouble, since they were prepared for it, and consequently took the necessary precautions. A few hints as to the best modes of avoiding the danger may not be out of place, and may be specially useful to makers of lantern slides at the present season.

The injury that takes place in the printing frame is of a twofold nature; it may arise either from over-pressure, or from abrasion, or rubbing of the two surfaces together while in contact. This distinction may seem a trivial one, but it is not really so, for the precautions that will prove effective in the one case will not necessarily do so in the other. The methods of combating the trouble may also be divided into two classes, chemical and mechanical, the former being only available to those who prepare their own plates. This side of the question I will take first.

The most obvious way out of the difficulty is to render the film harder and tougher; but, of course, this can only be done in the course of the preparation of the plate or of the emulsion. Those who prepare their own emulsions may often confer a certain amount of additional toughness on the film by a careful selection of pyroxyline; but, as modern samples of a suitable kind are so few and far between, it is scarcely worth while trusting to that plan. But, by the use of a protective material, either added to the emulsion or applied to the surface of the film, a degree of hardness may be secured which, if it is not equal to that of gelatine, is at least quite sufficient to save the plates from injury under anything like ordinary treatment.

To my own knowledge there are many amateurs who still continue to use unwashed emulsion for transparency purposes, for which it has many advantages that the washed emulsion does not possess, amongst them being the possibility of applying a protective or preservative coating such as I have alluded to. This need not interfere in any way with the general character of the emulsion, or affect its working in the slightest degree; it is not, in fact, a "preservative" in the sense in which the term used to be employed, *i.e.*, a substance which, while it kept the pores of the collodion open and permeable to an aqueous developer, as well as to a less degree "preserving" the sensitive film from atmospheric influences, had usually also a more or less important action upon the working of the sensitive material. In our present case we require no such chemical action, as the emulsion, so far as its working properties are concerned, should be complete in itself, the preservative consisting of a substance practically inert chemically, but forming a varnish-like coating on the surface of the collodion.

Of the materials applicable to this purpose only two or three need be mentioned, though many of the old preservatives may be used. Tannin may be taken first, as this, while forming a protective coating, may also have an appreciable or even a very decided action upon the sensitiveness of the emulsion, as well as upon the colour of the image. For this reason it may be in some cases objectionable. For the benefit of those who decide to use it, I may say that the strength of solution should be fifteen grains to the ounce of water, and the same quantity of best *English* loaf sugar may be added with advantage. The solution must be perfectly clear and bright before use, and as even nowadays a sample of tannin is occasionally met with that will not filter bright, and only becomes so after many days' keeping, I may add a rapid method of clearing the solution.

This consists in adding to the tannin solution a small quantity—say, from one to two drachms to each pint—of albumen previously mixed with its own volume of water, and shaking the whole vigorously for a minute or so in a bottle of much larger capacity than the quantity of liquid. Upon allowing this to settle, the coagulated albumen will carry down with it all the turbidity; or the solution may be at once filtered, and will pass perfectly clear and bright.

The best preservative, however, in my own opinion, is albumen, because, while it is practically without influence on the working of the emulsion, it gives a beautifully hard coating, which is easily removed in the course of development owing to its solubility in water, and especially in alkaline solutions. The strength of the solution may be about one to three or four, or say the whites of four eggs made up to a pint with water. The method of mixing is important in order to obtain a clear solution. If the eggs be beaten and then diluted, the solution will be of an opalescent character, with a quantity of fibrinous particles held in suspension. The latter may be filtered out, but the turbidity will only disappear after many days' keeping, when the solution will have lost some of its value as a protective agent.

If, however, ten or fifteen drops of ammonia be added to the albumen in a capacious jar or glass measure, and the requisite quantity of water be added, and then gently stirred until the whole is thoroughly mixed, the solution may be at once filtered through bibulous paper, and will pass perfectly clear and bright and ready for immediate use.

Gelatine may be used instead of albumen if preferred, and will be cheaper, but it is not so easily removed, if that be a desirable point, as I think it should; and it requires to be applied hot, the plates being warmed also. Any good white gelatine may be used, and the strength should be about ten grains to the ounce of water, very carefully filtered before use.

Any of these solutions may be applied to the plate after the soluble nitrates have been thoroughly removed by washing, a small quantity being first flowed over the surface, and thrown away or returned to a separate vessel to be refiltered; a second quantity should then be poured on and allowed to remain for about half a minute, when it is poured off, to be refiltered before being again used, and the plate reared up on edge to dry. In the case of gelatine, the solution itself should be warm, and the plate, just before its application, should be dipped for a moment into a vessel of hot water in order to avoid chilling the gelatine, which would conduce to irregularity of coating.

I anticipate, however, that the great majority of those who prepare their own plates—even of those who make the emulsions themselves—use the washed emulsion, the convenience of which is undoubted. Here the preservative solution is useless, although the application of the preservative is still possible by dissolving it in the emulsion itself. If the latter is in perfect condition, there need be no fear of injuring

its working properties or of materially affecting the character of the results. In years gone by preservatives, or "organifiers," were commonly added to washed emulsions, in the vain hope of imparting qualities they did not originally possess, but the advantages of such additions, or any change of a chemical nature they produced, were, I fancy, more imaginary than real. Their mechanical action, however, cannot be disputed; in fact, it is a very easy matter to overdo the thing and render the films so hard that they will not develop.

Here, again, tannin proves a useful agent where but a slight hardening of the film is required, and it will be found also a most convenient one on account of its ready solubility both in the collodion and in water. It may be added to the emulsion in the proportion of from three to five grains to each ounce. Though before solution it presents a powdery and somewhat crystalline appearance, it dries up to a smooth varnish-like film, and gives to the collodion surface a hardness it does not possess alone.

Balsam of tolu is another useful addition for the same purpose, and in the same proportion as tannin. It gives greater hardness, but it is far less easily soluble, and consequently renders a longer application of alcohol to the film before development absolutely necessary. The alcohol, too, may with advantage be used undiluted, instead of mixed with water. This point attended to, no trouble will be experienced from want of penetration of the developer.

W. B. Bolton.

LANTERN MEMS.

There is so much already known about the optical lantern and its manipulation, that it is difficult to give information that shall be of service to the "old hand" at operating; at the same time, many who are not *au fait* may find, now and then, a hint in these paragraphs that are useful. They are, as a rule, the results of queries asked by lanternists during the month, or items of novelty or interest.

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A popular error, or one I have found to exist in several instances when compressed gas and automatic regulators have been used, is to leave the taps of jets turned on, as one did when the gas was used direct from the cylinder, and regulate the light by the screw valve of the cylinder. This plan is altogether wrong, for it neutralises the value of the regulator. The course to adopt is exactly the same as if the large gas-bags of old were employed, viz., to have all taps of apparatus turned off, then turn on the valve of cylinders (half a turn or so), and turn on the hydrogen tap a little, light it, and after lime cylinder is warm turn on the oxygen slowly, then more hydrogen, and again more oxygen alternately, until the best light is obtained without hissing or roaring.

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The conditions in respect of the use of compressed gases from cylinders and that from bags is so opposite, that the jets constructed for the latter are not nearly so good as the modern ones for the compressed gas system. With bags, the key-note of experts was, "A free way," without obstruction of any kind, in the jets, pipes, or india-rubber tubing, which was preferred large. Now it is found necessary to interpose something in the mixing chamber of jets that shall cause the gases to intermingle, and so either alternate discs and gauze, or particles of pumice, are fitted under the nozzle, so as to stop back or check the flow for the moment, to ensure proper mixing.

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This will be understood when the difference of working pressure is considered, for the maximum with the bags usually represented ten or twelve inches of water pressure, while that from the regulator or gas cylinder is about thirty-six inches of water pressure. As this extra pressure, properly utilised, means an increased light, it is natural that operators should desire to avail themselves of it. A jet with a good mixing chamber and coned nozzle, or one with a long, swan-like neck, can be used with a larger nipple without noise, and consequently a better light obtained.

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The incandescent "focus" electric light lamps have now been in operation four years, and I recently heard from one professor who finds this system of demonstration so satisfactory that for ordinary class work he never thinks of using any other source of light for his optical lantern; and, moreover, where the electric light is laid on, and only ordinary photographs or temporarily prepared transparent dingrams or formulæ required to be shown, it is quite powerful enough, requires no special attention after once setting, and the light is switched on and off the lantern, or the class room darkened or lighted at will.

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When one reflects how readily the whole system of electric lighting is controlled in such places as the Royal Institution, the Society of Arts, and our large theatres, one can only hope that the day will soon come when the generation and distribution of electricity will enable every private householder to take advantage of the current at no greater cost to himself than the same amount of illumination derived from gas now costs.

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A little bird whispers there is to be a new and simple arc lamp placed on the market shortly that will answer nearly as well, if not quite, for all lantern purposes, as the comparatively expensive ones that have, during the past few years, proved successful in the higher class of optical projections.

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Those who saw and were delighted with Muybridge's Zoopraxiscope should not fail to "put a penny in the slot" of the machines at the Electric Wonder Exhibition in the Strand, near Bedford-street. The remarkably natural movements of the various figures showing ladies dancing, horses jumping, men vaulting, cavalrymen trotting, infantry marching, &c., as seen visually through an eyepiece (in some cases aided by magnifying lenses), only makes one desire more to see this principle of Anschütz's Tachyscope developed so as to be optically projected on a large scale.

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There is, no doubt, a splendid field open to photographers and lanternists in the way of perpetuating and reproducing lifelike movements, and, if our scientific men and mechanicians set their brains and hands to work, possibly before very long, an instrument will be designed and constructed that can be used in the ordinary optical lantern to show photographic moving figures, to the delight of the audience far in excess of that created by the old zoetrope, or wheel of life, and the chorentoscope, which, however, are both pleasing and interesting still in their way.

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The modified form of zoetrope has some of the designs from life, and being reproduced on a film instead of glass are not likely to break. The necessity of photographing these figures small, on account of the number to be included in the three-inch circle, renders them a little less effective perhaps than if they could be larger, but they are, nevertheless, very entertaining; besides which, the mechanical slide and designs are sold at a moderate price. If one could preserve the successive motions of the figure moving with about half the number of separate reproductions of the design, they could then be larger, for now there are something like twenty-four figures of, for instance, the hoarhound running, to illustrate the movement in its entirety, and showing apparent progression.

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Something on Mr. Muybridge's plan would do capitally, for he could alter it at will by the slotted disc used with the disc having on it the photographic designs, and make the figures apparently progress or go through their movements in one position, or make a retrograde movement by having a similar number of slots to designs, or one more or one less. If Mr. Muybridge could now see his way to let some good house in the optical world reproduce his patent apparatus, I feel sure it would not only develop a new field of work for photographers, but also make a distinct novelty for many entertainers.

G. R. Baker.

ON THE VENTILATION OF OPTICAL LANTERNS.

Perhaps at no former time has the optical lantern been so largely taken advantage of for the purpose of illustrating lectures as at present. The extraordinary increase of photographic societies has

brought out so many amateur lecturers in nearly all large towns and cities, until it may be said they are as plentiful as blackberries. With this addition has come some new features in the way of lecturing, or, as some choose to term it, lantern entertainments.

For a long time it was generally considered that the proper duration of time for a lecture or entertainment to occupy was from one hour to one hour and a half, less than this being looked upon as insufficient to satisfy an exacting audience; while, if the longer period was exceeded, the audience began to tire, and show signs of impatience on the score of having too much of a good thing. To fill up such a period of time, a subject embracing somewhere from sixty to eighty slides was considered sufficient in the way of illustrating a lecture, so as to permit of a well-arranged description to each representation, or slide shown. With such a number of pictures to put through a lamp in such a space of time, and working into the hands, or to the call of a lecturer of experience (who knows how essential to success it is to frame his remarks so as to give a convenient time on each slide), an operator used to find the manipulation of a biunial lamp a work of pleasure, and had no difficulty to dissolve off and on from top to bottom. Somewhat recently however, out of the ranks of so many amateurs who consider they know all about lecturing and the working of a lamp, "but who, in reality, would cut a sorry figure were they called upon to officiate at the jets," has sprung up a number of those who entirely ignore the necessity of giving an operator a sufficiency of time on each slide before they call for the next; and hence it is now by no means an uncommon occurrence to find lectures embracing a series of two hundred slides over a space of close on two hours' duration.

The outcome of this is that a new method of working a double lamp has come into vogue, and now, instead of the old practice of a somewhat slow method of dissolving, it has become necessary by experienced operators to resort to the expediency of keeping both lamps full on, and making the change from one picture to another by means of the hand and the cap of the lens, the hand being slowly moved across the lamp that is showing, and finally blinding off by placing the cap on the lens. By this means a great many slides can be run through a double lamp in the course of an hour and a half or two hours. Of course, the method means the consumption of a much larger quantity of gas, but nowadays it is cheap, and an extra quantity is seldom grudged. The method works exceedingly well where a large number of pictures have to be shown; but it has one great drawback, viz., the excessive heat generated by both jets burning full on simultaneously for such a great length of time, and therefore, in course of a short period, a lamp of the modern type gets pretty well knocked up, not to speak of the damage to condensers and slides.

Opticians, as a rule, are never slow at keeping pace with the times, and, in the near future, we are likely to see more attention paid to the ventilation of biunial lamps, for that much may be done in the way of causing a continuous flow of air to pass in and out of a lamp when being so used is already a *fait accompli*.

Quite recently I had the pleasure of inspecting a lamp on the premises of that veteran optician, Mr. M. Edwards, of 200, Sauchiehall-street, Glasgow, so long the senior partner of the business firm of James White. In this matter Mr. Edwards is likely to be the pioneer of a new system of ventilating optical lanterns. Being anxious to test personally the efficiency of the ventilating arrangements as applied to this lantern, Mr. Hassard, the manager of the firm, at once placed the lamp at my disposal, and made the fullest arrangements for a severe test. I have seen this lamp burning two blow-through jets continuously for two hours straight away, and at no time could it be said that the heat was excessive, but, on the contrary, showed a marked improvement over the common form of lamps. Mr. Hassard speaks in glowing terms of the comfort of working with such as against his experience with what he terms other furnaces.

In outward appearance and size this lamp differs but slightly in form from an ordinary biunial lantern; it is supplied with doors at both sides, and the top compartment is entirely separated from the bottom by means of a metal plate, which cuts the lamps into two chambers, *i.e.*, a metal plate divides the lantern in the centre. The ventilation is derived by the insertion of gutters running the entire length of the lamp. These gutters are light tight, but the bottom one takes in air, and by the top one passes it out in a heated form.

The top gutter on the bottom lamp is placed just below the dividing plate, and the heated air from the bottom jet is thus carried away outside the lamp, and never gets into the top lamp at all. Any one placing the palm of the hand up against the outside of this gutter would be surprised to feel the amount of heated air which is thrown out by means of it.

Immediately above the dividing plate of the top lamp is a similar intake gutter, and this is constantly taking in cool air, tending in a wonderful degree to keep the top lamp cool, the heated air passing out by another gutter and by the ordinary top of the lamp.

This arrangement works most admirably, and seems a distinct step in advance in the matter of ventilating optical lanterns.

T. N. Armstrong.

ETHER SATURATORS.

Mr. E. Purton who, in a letter published on page 24 of the Lantern Supplement for December 2, speaks of "snapping and hissing" as "troubles with which all users of the ether light are, unfortunately, only too conversant," and describes a single tube saturator as an improvement upon forms in use, may be informed that a single tube saturator, the construction of which I patented five years ago, was used in illustrating all of the lectures at the Franklin Institute for two years, during which time not a single "snap" occurred, and the smoothness and reliability of the light was so remarkable that the lantern service received special official commendation.

The gas passage in the instrument described by Mr. Purton is no longer than would be possible with my own much simpler construction in a tube of the same diameter and is therefore distinctly retrograde, because more complicated and expensive. The absence of means for removing the filling to dry it out occasionally is also a fatal defect if anything but purified light petroleum ether is to be used in it.

F. E. Ives.

CHARITABLE LANTERN ENTERTAINMENT SOCIETY.

This Society, which was inaugurated last October for the purpose of giving free lantern entertainments to the inmates of our hospitals and similar institutions, has recently given entertainments at the following London hospitals:—

November 15, Temperance Hospital, Hampstead-road, N.W. (Women's Ward; Men's Ward). November 26, Victoria Hospital for Children, Chelsea (Girls' Ward). November 30, North East London Hospital for Children, Hackney. December 3, Victoria Hospital for Children (Boys' Ward). December 9, Children's Hospital, Great Ormond-street. December 12, Paddington Infirmary (Female Ward). December 15, North East Hospital for Children.

In every case the entertainments were very successful and much appreciated, a request for another "show" later on usually following the conclusion of each. As a rule a little music is given between the different sets of slides. The society gives, thus early in its career, two to four entertainments each week at London hospitals, and has dates fixed for infirmaries and ragged schools, and it is intended to generally extend the scheme in similar directions, but at present it is somewhat hampered in its work owing to lack of sufficient apparatus and workers. Two biunial lanterns and fittings and oxygen gas bottles are urgently needed, as well as slides.

In laying this first report of the Society before the public it is hoped that those readers who sympathise with the objects of the Society will do what they can to assist it, either by becoming members or making a donation to the funds, or by the gift of apparatus, or the loan of slides.

The joint secretaries are: Mr. B. Foulkes Winks, 2, Pretoria-avenue, Walthamstow; and Mr. F. Simmons, 158, Frances-terrace, Herne-hill Hill, S.E., to either of whom communications should be addressed.

MR. W. I. CHADWICK ON "LANTERN EXPERIMENTS."

Before the South Manchester Photographic Society, on Monday, December 26th, Mr. Chadwick read a paper and gave a demonstration of the capabilities of the optical lantern, which instrument, Mr. Chadwick said, was now recognised by all science teachers as one of the most valuable at their command. But, of the thousands possessed by amateurs for private and home use, few were ever used for any other purpose than showing slides on a screen. "We may entertain our friends at home with a miscellaneous collection of slides—holiday reminiscences, or wanderings in a foreign land—and when our store of slides has been exhausted there are scores of thousands of others to be obtained by purchase or hire. Indeed, so many are there, of all places and all subjects, that it is not surprising to hear of people becoming confused with the variety when looking through some trader's catalogues, and in not a few cases people had been known to become quite demoralised in their selection, and to finally decide upon, say, five or six dozen comic slides.

A Ragged-school Entertainment.

"Not very long ago the superintendent of a ragged school called upon

me, and I promised to give a lantern exhibition at his school. We had some talk about the class of audience and the nature of the entertainment. 'Bring plenty of comic slides, something to laugh at,' said he. But I had my own ideas about that, and persuaded him to leave the selection to me. When the time arrived I found that my audience consisted of about 300 to 400 boys and girls, from twelve to twenty years of age. I told the superintendent and some of his committee who were present that I intended to test the taste of the boys and girls, and to educate them, if possible, to a higher standard, and I started with 'Half an Hour at the Seaside,' a popular scientific lecture.

"'Half an Hour at the Seaside.'

"The slides were very pretty pictures, and I talked to them about the seashore, the clouds, and the sky, the salt water and the seaweeds, the pebbles and the shells, cockles, mussels, the crab and shrimp, and so on; and then we went to sea in a fishing smack, and, after landing our fish, we saw it being sold by auction at Grimsby Docks, then packed in boxes, and finally we found ourselves at the Manchester Wholesale Fish Market. I then told my audience that the next few pictures would speak for themselves. They were of two distinct kinds, and would be shown two of each kind together alternately. The first two were most beautiful photographs of snow and frost, the second two comic pictures, followed by two statuary slides, and then came two more comic, some things to laugh at, but nobody did laugh. I further explained that they could have plenty of either kind, and it was for them to say which they liked best, the pretty pictures or the comic. They decided by an overwhelming and almost deafening majority in favour of the pretty pictures and 'more seaside.'

"'More Seaside."

"Then I gave 'Dick's Dive in a Duck-pond,' and concluded the exhibition with a few photographs of trotting horses and other animals in motion, shown by a wheel-of-life adapted to the lantern, and I have every reason to remember that audience as a most appreciative one. When all was over I asked the Superintendent what he thought. Here, I said, I have given two short scientific lectures, shown over eighty scientific slides, and only six comic slides, which latter were not appreciated. Now this is a lesson that might be carried away in hundreds of cases. Science need not be dry, nor uninteresting, nor difficult to understand. On the contrary, it could by aid of the lantern, be made a source of endless entertainment and instruction, and the lantern, when properly constructed, lends itself to almost every branch of science. By it experiments and demonstrations to our friends at home may be conducted with far less expenditure in apparatus and material than by any other method. It would be out of the scope of the present communication to enumerate the home experiments that may be performed even with an oil-burning lantern and a few accessories that are easily made or purchased for a few shillings.

Books on Optical Projection.

"But, How to begin? Well, there are plenty of books published on the subject of optical projection, and a new one, just published, *Sunshine*, by Amy Johnson, L.L.A., F.R.A.S., is a delightful lantern book, comprising a series of about forty popular experimental lectures on science delivered to young people, with special considerations for optical projections. Indeed, there is a section of the book devoted to lantern projection, with practical hints and home experiments. Another charming little book is *Soap Bubbles and the Forces which Mould them*, by Professor C. V. Boys, F.R.S. This book also contains a section of practical hints to the lanternist for making and projecting those interesting and fascinating playthings of our boyhood, soap bubbles. The author also describes other experiments, 'so wonderful and yet so simple that, if they had been performed a few hundred years ago, the rash person who showed them might have run a serious risk of being burnt alive.' Lastly, *Science at Home*, a pamphlet by the late W. B. Woodbury, is recommended as containing a number of beautiful lantern experiments, all of which may be easily performed in our own family circles by the merest tyro.

The Lantern Itself.

"Respecting the lantern itself, much might be said in favour of limelight, though for home use a good oil lamp—one that does not smell or burn like a roaring furnace—is very convenient, and answers most purposes if the screen be not too large. A good opaque screen, about four feet six inches square, was generally large enough for home use with an oil lamp; but in a large room—still using the oil lamp—a translucent screen of about the same size would be better; and it might be worth while to mention that only a few days ago a most successful exhibition was given to an audience of over 200 people on such a screen—three feet six inches square—with an oil lamp, and it will be seen that had the pictures been projected to seven feet by the same luminant, the illumination would only have been one-fourth, because seven feet square is four times the area of three feet six inches. By using compressed oxygen in cylinders, as now supplied commercially, there is practically no danger in using the limelight, and it might truly be said to be as safe, or safer, than a paraffin lamp."

Various Experiments.

Mr. Chadwick then proceeded to exhibit a number of experiments. A wire stand was made to support a thin metal plate in a horizontal position (edgeways to the condenser), and under it was placed a spirit lamp. In a few seconds the plate became quite hot, and then a single drop of water was allowed to fall upon the hot plate. The drop of water at once assumed the spheroidal form, and on the screen it could be seen separated from the plate by a film of vapour. The spirit lamp was now removed, and as the plate cooled the drop of water burst into steam and was gone. This beautiful experiment illustrated a frequent cause of steam boiler explosions. From suddenly letting off steam the water in the boiler assumes the spheroidal form, and a thin film separates the water from the boiler, which latter rapidly heats. The engine-driver or the fireman, thinking his water is getting low, pumps in cold water. He thus cools the boiler, destroys the spheroidal form, and the accumulated heat, suddenly converted into steam, bursts the boiler. A long focus lens is best for showing this experiment. The same experiment is often seen in the kitchen, when cold water is put into a hot frying-pan, and the water runs about in 'blobs.' This was followed by experiments illustrating the retention of images on the retina by pieces of perforated card placed in the lantern. White spots were seen on a dark screen. After a minute the light from the lantern was shut off, and the screen dimly lighted from a gas bracket in the room. The audience saw the spots now reversed and quite black on a white screen. When a photographic negative of a portrait was projected on the white screen and looked at for a minute, the portrait was not always recognisable, but directly the light was shut off the image was 'seen' as a positive and at once recognised As some one once said, 'You see it when you don't see it, and then you do.' A number of experiments in colour were next performed, producing the complementaries, followed by some most interesting optical, chemical cohesion, and adhesion experiments. By what is known as the vertical attachment applied to a lantern other experiments were produced, including the motion of camphor upon the surface of water. A number of thin shavings of camphor were delivered to the water surface and projected on the screen, when they were seen, much magnified, rotating and twirling about in manner extremely interesting, but not unaccountable, for the motions of camphor are now well understood by scientists. It was also shown that camphor was not the only substance that produced similar motions under similar conditions. The lecture was brought to a close by a number of ingenious mechanical arrangements. A chameleon was made to show changes of colour; primary colours produced white light; and, by a wheel of life adapted to the lantern, the motions of trotting horses, birds on the wing, and other animals in motion were shown upon the screen.

A VARNISH FOR COLLODION LANTERN SLIDES.

A correspondent writes: I have been making a series of experiments to find out the best varnish for collodion lantern slides. I have tried nearly all the published formulæ, including Mr. Armstrong's acetic solution of gelatine, but the best one which I have used is as follows:—

Tunny's impervious varnish	1½ ounce.
(This is a saturated solution of amber in chloroform.)	
Pure benzol	1½ "
Gum damar	¼ "

When dissolved, to be filtered through cotton wool.

This varnish runs on the plate as freely as collodion does, without the tendency to coat your fingers and back of the plates like most other varnishes which I have tried. It dries hard with a gentle heat, and is not tacky, and it renders the film quite bright and glass-like.

LANTERN SLIDES BY THE WET-COLLODION PROCESS.

[Holborn Camera Club.]

Processes for the production of lantern transparencies are almost as numerous and varied as those for positive paper prints.

When we come to reckon up the various adaptations of collodion, with the bath and in emulsion, with the numerous variations in gelatine (as in

commercial lantern plates, carbon tissue), and the photo-mechanica methods (as in Woodbury and Stannotype), even setting aside these latter processes which, owing to their mechanical element, are beyond the ordinary worker's capacity—disregarding these, we may safely assert that there is as great a field for choice of process as in paper printing.

It is not my intention to-night to open a discussion on the merits or demerits of either one of these processes as compared with another, but I shall endeavour to demonstrate one of them here before you—a process that has stood that most severe of all tests, the test of time, one which, as I will endeavour to show you, can be made to something like answer to the will of the operator. It is the wet-collodion process, pure and simple.

Perhaps you may say, Not much of the latter; but I certainly think that, with reasonable and proper care taken in the various operations, and a fair knowledge as to the properties of the chemicals employed, it will be found simple enough; and, as to the quality of results obtainable by its aid, I don't think much need be said, for the characteristic qualities of a good collodion slide are familiar to most of you, qualities which have long since become standards.

Before commencing my demonstration it will, perhaps, be well for me to give you a rough outline of the process and the chemicals employed, so that you may be better able to follow the method of procedure when I come to demonstrate its working.

Cleaning the Glass Plate.

The first thing to be considered is *the glass plate and its cleaning.*

Assuming that old glass (such as spoiled lantern plates) is to be employed, the first thing to be done is to remove the films, and this can readily be accomplished by the aid of hot water and soda. After this operation it is well to weed out the scratched glass, which should be rejected.

The selected plates are now put one by one into an earthenware jar of hydrochloric acid and water, about one part acid to three parts water, and in this they should be allowed to remain at least twenty-four hours.

It is a good plan to make this jar of acid a receptacle for glass for future use, to be drawn upon as required.

To ensure its perfect cleaning, each plate, before the acid is rinsed from it, should be laid on a piece of rough flannel (such as house flannel) on a flat surface, and both sides subjected to a vigorous rubbing with a pad of the same kind of material. It can now be well rinsed under the tap, and, having ascertained by means of the finger nail which is the polished side, place it in a rack to drain, putting that side in a certain direction for future guidance.

The Substratum.

Having gone through the batch, they are now ready for coating with a substratum of albumen. This is made up of

The white of	1 egg.
Water	1 quart.
Ammonia	5 drops.

which must be beat up to ensure perfect desiccation of the albumen, and then filtered.

After draining, and while still wet, this preparation is flowed over the polished sides of the plates, and they are again racked to dry, care being taken to place the albumenised surfaces in one direction, for, if this operation is properly performed, it is very difficult to distinguish one side of the glass from the other.

Dust being the greatest enemy to successful working of the wet-collodion process, very great care is needed to guard against it, and at this stage (a drying cupboard not being at hand) the precaution necessary is that the rack be carefully and completely covered over with tissue paper, and the place on which it stands well wiped with a damp cloth.

The drying should be done as quickly as possible, that is to say, within an hour or two. It is even convenient at times to use an oven for this purpose, so that it can be done in a few minutes when plates are wanted quickly.

Coating the Plate.

The plates are now ready for use, and can either be packed film to film or stored away in grooved boxes until required.

The next operation being coating with collodion and sensatising, which has to be performed in the dark room, and here I would say by all means have plenty of light. This sounds paradoxical; but, as photographers are becoming used to this seeming absurdity, I need not excuse it here, especially as it is sound advice, but as oft disregarded as given.

Before, however, saying anything about the operation of coating the plate, we have to consider the very important question of the collodion to be employed. My advice is, to begin with, Buy it. You may be led on to make it at some future time, but this is best for a start under any circumstances. Either Mawson's or Thomas's plain collodion are good and reliable.

Before use, these, of course, have to be iodised—that is, iodide and bromide salts, usually of ammonium and cadmium, are mixed with it. These salts being acted upon in the film by the silver bath are converted into iodide and bromide of silver, thereby making the plate sensitive to white light.

A suitable iodised collodion for transparency work from a negative o medium density is made as follows:—

Ammonium iodide	3 grains.
Cadmium iodide	½ grain.
Ammonium bromide	2½ grains.
Plain collodion	1 ounce.

This should be made up several days before use, and will keep good for perhaps a couple of months. Upon first mixing it will probably go to cherry colour, but will become paler in a day or so, straw colour indicating its fit condition.

Coating the plate is much easier demonstrated than explained, so I shall say but little upon it further than that it is done in exactly the same way as varnishing (without, of course, warming the plate), and is as easy to perform.

I might, however, mention one or two of the precautions generally used in connexion with this important operation. (1) Pour the collodion from a bottle with a broad lip. (2) Do not have the bottle more than half full. (3) In pouring hold it so that the lip nearly touches the surface of the plate, and (4) pour as little more than enough to go over the surface of the plate as possible. A separate bottle should be used to receive the drainings from the plate, for the same reason as in varnishing a negative.

When the collodion ceases to drip from the corner of the plate (which, by the way, should not be rested in the mouth of the bottle), the plate should be brought to nearly a horizontal position and slightly rocked till the film is set by the evaporation of the ether. The time required for this will, of course, vary according to the temperature of the room, say, from half to one minute.

Sensitising.

The plate is now ready for sensitising, and the silver bath for this purpose is made as follows:—

Nitrate of silver (recrystallised)	1 ounce.
Distilled water	12 ounces.
Potassium iodide	1½ grains.

This should be kept in a clear glass bottle and well sunned before being brought into use, or, in other words, exposed to sunlight for some hours. This will cause any impurities in the form of organic matter to precipitate, so that same can be filtered out, which must be done.

The bath has now to be made slightly acid, if not so already, and this can easily be ascertained by testing with blue litmus paper, which should slightly redden in about one minute. If it does not, add two drops of pure nitric acid to the bath. The bath improves with age for this kind of work, and can be strengthened when required by the addition of a forty grain solution of silver nitrate. The strength of the bath itself should not exceed this.

Sensitising the plate is the next operation, and this will take from three minutes in summer to five minutes in winter. With regard to apparatus, I would here recommend that the dipper be a broad glass one, so that the plate on immersion can be freely moved about for the first minute or so without the chance of its falling off. This movement is absolutely necessary to prevent uneven sensitising.

The plate should be withdrawn slowly, drained on a pad of clean blotting-paper, and the superfluous solution wiped off the back. It is now ready for the dark slide, into which it should be put in a nearly vertical position, the corner from which the collodion was drained being downwards.

I might here mention that this particular corner must always be kept down, that is to say, during the sensitising and draining of the plate after exposure till development.

About exposure I do not intend to say much, as it is such a thing of circumstance; but, as a guide, I might say thirty seconds will be found about right for a negative of medium density, using stop *f*-8 at mid-day this time of the year, that is against a clear sky, reducing from half-plate, and using the collodion as I have given.

Development, &c.

With regard to developers and development a volume might be written, but I think the present case will be better met by my giving you but one formula and a few hints on working than by going deeply into this very

controversial matter, especially as my purpose this evening is more to demonstrate than talk.

The developer which I shall give you is the one I am about to use to-night. It is made as follows:—

Ammonia sulphate of iron	15 grains.
Glacial acetic acid	15 minims.
Water	1 ounce.
Alcohol	*quant. suff.*

This compound salt of iron and ammonia keeps well, made up, and gives a very fine, rich, and transparent deposit—qualities so essential for this work.

In developing, the plate is held in the hand, as in coating with collodion. I might almost say that this itself is a coating operation in which you eventually wash the coating off again.

About a drachm of developer is sufficient to cover the plate, and this should be flowed from side to side by gentle rocking, and without letting any go over. This, of course, will require a little practice at first. To cause the developer to flow freely over the plate it is necessary to add a drop or two of alcohol an ounce to it. This will have to be increased as the bath gets older.

When the image has attained sufficient density by transmitted light (by which it should be viewed during development), wash off the developer without delay, and after a good rinsing fix in a bath of—

Cyanide of potassium	25 grains.
Water	1 ounce.

Being a deadly poison, this, of course, has to be used with great caution. The method I adopt is, I think, a good one. The cyanide pour out into a lantern plate (dry) developing dish and immerse the plate in a metal holder, which grips it by the edges, and in this holder I subsequently wash the plate under the tap after fixing is completed, so that I have no need to touch the cyanide with my fingers at all.

Fixing is complete in a few seconds, after which the plate must be washed immediately, or delicate detail may be eaten away.

If the tone of the resulting picture be not to your liking, it can be toned to a simple black in a bath consisting of—

Chloroplatinite of potassium	2 grains.
Water	5 ounces.
Nitric acid	5 drops.

I think I have detailed to you a fair outline of this process, so will now, with your kind permission, do my best to demonstrate something of what I have been telling you, filling in details here omitted as I proceed.

You will see even from this outline that there are no instructions on the box with the wet-collodion process. Nevertheless, with careful working, perseverance, and Captain Abney's Instruction-book, all of which are indispensable, it will be found by no means so difficult to master as a good many have been led to suppose. J. F. Stavens.

RECENT NOVELTIES IN LANTERN APPARATUS.

The Blackfriars Photographic Company, of Surrey-row, are represented in lanterniana by a variety of lanterns, extending from the cheap tin variety, which may be had complete at a cost calculated to accommodate the most exiguous purses, through various grades of quality, to the most handsome and serviceable single and double mahogany-body instruments, suitable for either oil or limelight. The Company, who are agents for Griffiths' lantern slide making camera, also include slides and accessories of all kinds in their lantern department.

We have received the Lantern Catalogue of Mr. W. I. Chadwick, of Manchester. Therein the lanternist will find particularised a considerable variety of lanterns, details as to cylinders, regulators, gauges, objectives, condensers, carriers, lantern-slide accessories, saturators, oxygen generators, screens, desks, tripods—and, in fact, the entire paraphernalia of the modern optical lantern, selected with the skill and judgment which we are entitled to expect from Mr. Chadwick's long practical acquaintance with all that concerns the lantern. In addition to the lantern proper, the lantern microscope and polariscope, and apparatus for scientific projections generally are dealt with. To the purchaser, Chadwick's catalogue should be a useful guide; to the student, a fund of information, as it includes reprints of many of Mr. Chadwick's lantern papers.

LANTERN-SLIDE MAKING IN FOOCHOW.

At a recent meeting of the Foochow Camera Club, Mr. Menearini, the Hon. Secretary, gave a lecture on this subject, in the course of which he said:—Lantern shows, or, as commonly called, "magic lantern exhibitions," have become so very popular, that I thought a demonstration of how these entertainments were made would be interesting to you. I have therefore come forward not as an inventor of some "Menearini patent," but simply as a narrator of what I have learnt myself of this fascinating pastime from books, periodicals, and a little experience.

We all remember our younger days, when to be taken by our parents to a magic lantern show was as great a treat as to be given a piece of "butter-scotch." How many times have we gazed delighted on those large pictures, shown us on a white sheet, and wondered how they were done, and what a respectful admiration we had for that man who could show us such wonderful things? Well, now, any one, with but little work, can produce those "magic pictures."

Great are the advantages of a "lantern show;" it delights and instructs the juveniles more than at first thought would seem. And so much am I convinced that it does instruct that, if I should have it in my power, I should make it compulsory for every schoolmaster to have a magic lantern, and give, at least once a week, an exhibition, showing some of the superior slides which can be purchased on any subject required at a very small cost. By further explaining the subjects, geography, natural history, astronomy, &c., could be taught, and be impressed more on young minds than by hours of poring over books, which, in many cases, are not understood, and which are repeated as by parrots.

Very much has certainly been done in this line; scientists and public speakers have been convinced of the enormous advantages there are in using the lantern to illustrate their papers. What would require a long explanation, and then would not convey to the mind a perfect idea of the subject, with the aid of a magic lantern and a photographic lantern slide, can be shown to a large audience one hundred times larger than nature, and with all its details.

Photography has been rendered so very simple that I cannot understand how every man or woman having a spare moment does not make his or her own pictures. How many are the occasions when, if you had been able to take a photograph, you would have had pictures of places dear to you, and which are bound to bring agreeable recollections in days to come.

For a comparatively small sum you can purchase an outfit, and surely you can always find a kind friend who could explain the mysteries of this most entertaining and useful of pastimes? and I can assure you that, although it is many years since I dedicated my spare moments to photography, still I find there is such a fascination when watching the exposed plate being developed, especially if the negative has been correctly exposed, and the development proceeds gradually and the result is a good brilliant negative, I know not how to express the intense satisfaction it produces.

But I observe I have deviated considerably from the object of my theme. I shall now come to the point.

Of course, the principal thing you must have for slide-making is a good negative; this can be of any size desired, but should be, to give good results, clear, crisp, and full of detail.

There are two ways to produce lantern slides, one is by contact—that is, the film side of your negative and the film side of the lantern plate are placed back to back in a printing frame, and exposed either to day or lamplight. Usually for this kind of work the negatives are on quarter plates; but I have seen lantern slides made from other sized plates when only part of the negative was required.

The other way is the most used, and this is by reduction with a copying camera. Better results are given in this form.

Most complicated and expensive apparatus are catalogued by home manufacturers, but, as you may see, my only appliance is simplicity itself. A board, four feet long by twelve inches wide, to this is screwed on perpendicularly another board eighteen inches high, which has an aperture large enough to hold a negative. Opposite this I place the same camera I usually take my photographs with. This is an "Optimus" full-plate, long-focus instrument, to which I attach a Voigtländer rapid wide-angle Euryscope, using a required size carrier in my dark slide.

Having determined on the focussing screen the proper distance between the negative and the lens, I firmly screw the camera on the board, marking the place, and so am saved the trouble of readjusting the camera every time it is required.

I prefer doing my slides in the evening when I am at leisure. The plates I use are Ilford Special lantern plates. I find these and the same manufacturers' white labelled dry plates the best suited for our climate. Wet-collodion lantern plates are preferred by some, and certainly they possess their charms; but dry plates have the advantage to be ready prepared, economising much time, and are so cheap (one shilling a box of a dozen plates) that I do not think it worth while messing about as in old days with collodion, silver baths, &c.

The exposure varies, of course, according to the density of the negative, the light, &c., but the average exposure is about two minutes by lamplight.

To develop, any of the recognised formulæ can be used, my advice being to use the developer specially recommended on the box by the maker. I personally use Ilford hydroquinone developer, and I am very satisfied with it.

After developing and washing, a few minutes in an alum solution hardens the film and clears somewhat the high lights. Do not make the hypo bath too strong, and wash finally for about half an hour.

The slides can be finished by toning with either gold, platinum, or

nranium nitrate, but this is not necessary if the exposure and development are correct. Clouds are printed in whilst exposure is carried on, but are very difficult to work. When the plate is dry it is mounted with a cover glass, placing a lantern mask between the two glasses, and binding them together with specially prepared lantern slide binding strips.

The magic lantern, or, as it is more pompously called, "the optical lantern," can be lighted either with kerosine oil, oxyhydrogen limelight, or by the new Aëro Carbon Incandescent lamp. The picture is better shown on a white wall, but fairly good results can be shown through a thin shirting screen, as I shall presently do myself, showing you first practically how to make a lantern slide, with the flashlight picture made by our esteemed Vice-President, Mr. Rentzsch, and then, after exposing the resulting slide through my lantern, I shall follow on with other slides, some of my own making, others purchased from home makers.

SHIPPING ON THE SCREEN.

Last month, Mr. John Adamson, jun., says the *Yachtsman*, so favourably known to all readers of the *Yachtsman* through the instrumentality of his splendid photographic yachting pictures, lectured in the Queen's Rooms, Glasgow, on "The Rise and Progress of Shipbuilding on the Clyde," for the behoof of the funds of the local branch of the Royal National Lifeboat Institution. The lecture was illustrated by means of something like 201 beautifully prepared transparencies. Many of these were made from negatives of his own, which have now become famous far and near—that is, direct negatives—while others were prepared from copies of carefully kept and faithfully cherished old pictures and prints kindly placed at Mr. Adamson's disposal for the purpose by our leading ship and yacht builders and owners. Shown on a very large screen, and illuminated by a very powerful limelight, they made as interesting objects of the kind as the eye could well rest on, while Mr. Adamson's neat and apposite remarks as the views passed before the audience, supplied all the information necessary for the purpose in the most agreeable manner.

The Clyde folks are very proud of their splendid river-steamer service and all pertaining to it, and this seems to be well-known to Mr. Adamson, for he showed an almost unique collection of views, setting forth their history from the time of the *Comet* and *Industry*—the latter built nearly eighty years ago, at Fairlie, by the father of Mr. William Fife, sen.—to the *Columba* and *Lord of the Isles* of the present day. Great attention was also paid to the ocean greyhounds, both past and present, and few hits of the entertainment seemed to take better than the exhibition of some most perfect views of some of the sumptuous interiors of the marine palaces of the present moment. Mr. Adamson is very strong also in pictures of the huge sailing ships which the Clyde builders have been so busily engaged turning out recently. Several views of one of these—the negatives concerning which were taken when the ship was bowling briskly to sea under full sail some fifteen miles westward of Ailsa Craig—indicated a veritable triumph of the photographer's art. The yachting pictures were simply delightful, and our entertainer is to be complimented on his selection in this department.

Lord Provost Bell, one of Clyde's most accomplished and popular yachtsmen, presided, and earnestly and eloquently he pleaded the cause of the Lifeboat Institution, showing, as he went along, that Glasgow, while a generous giver in connexion with many things, did not subscribe nearly so liberally as she ought to this good cause.

The attendance was flatteringly large, and amongst the goodly gathering were to be seen many of our foremost men, both in shipping and yachting circles; and Mr. James A. Small (a leading Clyde Corinthian), the Hon. Secretary of the Glasgow branch of the R. N. L. I., must have been very pleased at the success which attended the entertainment designed and carried out for the benefit of the cause he loves so well.

Lantern Queries.

A. Rix.—Spent limes are useless.

V. Thring.—Reflectors are not often used for the purpose.

Alfred Peel.—The electric lantern we then described was asbestos-lined.

L. Arbour.—Mr. R. R. Beard of Alscot Road, Bermondsey, would probably be able to make you a lantern to a special pattern.

Seneca.—The position of the light in relation to the condenser can easily be ascertained by practical experiment.

C. Primmer.—You mean, no doubt, a vertical attachment. Apply to a lantern optician.

W. A. Rawson.—Celluloid slides can only be shown by means of a suitable holder or carrier.

Doubt.—Light the hydrogen jet to warm the lime and the lantern before admitting the oxygen.

Lime.—Hard limes for mixed jets and soft limes for blow-through jets are generally employed.

F. Peters.—Possibly your dealer would be able to supply you with coloured lantern masks and binders.

A. J. Fuller.—Better consult your local gasfitter, who would probably be able to supply you with what is required.

S. R. Fenwick.—Yes; printing-out lantern-slide plates are articles of commerce. The Paget Prize Plate Company supply them.

Exchange.—Yes, we shall be pleased to throw open the columns of the Supplement to announcements of articles for exchange in connexion with the lantern.

Oxide.—The only "impurity" likely to be present in the oxygen is nitrogen—which means that you would be burning a mixture of oxygen and atmospheric air. See leader on the subject elsewhere.

Collo.—Yes; the wet collodion process is still extensively employed in the production of commercial lantern slides. Possibly Mr. J. F. Stevens's paper in the present Supplement will meet your desire to know how it is worked.

M. Smiley.—There is certainly no advantage in the use of a seven-inch condenser for showing lantern slides on the screen; but if, as you say, you propose using the same optical system for both projection and enlarging, by all means select the larger condenser.

L. Neighbour.—Special tests for the flatness of field of the objective are unnecessary for the expert professional photographer, who can tell by a glance at the image on the screen whether the objective defines as well as he requires.

Ilex.—The slides may be masked down to a very great extent—a picture of, say, an inch square being quite large enough for projection under the circumstances you mention. The outside dimensions of the plate—that is, $3\frac{1}{4} \times 3\frac{1}{4}$—is the only arbitrary size in connexion with lantern slides.

Rev. P. N. W.—A complete exhibition with an oil lantern and, say, one hundred to two hundred slides of general subjects might be arranged for with the nearest lantern dealer for probably about two pounds. The limelight might be possibly double the amount, but all would of course depend on circumstances. Write to a selection of the firms whose announcements you will find on the outer pages of the Supplement.

We have received the price-list of Messrs. S. & J. Mitchell, of Blackburn. Therein the lanternist and those organizing lantern entertainments will find information of much value.

Messrs. Sharp & Hitchmough, of Liverpool, have submitted to us samples of their "Opaque Lantern Screens," which are prepared with a special flexible waterproof material, perfectly white and opaque. They are cheap, and should answer the purpose admirably.

The agency for the Askew oil lantern, one of the remarkable features of which — as many of the members of the Photographic Society of Great Britain, the Photographic Club, and London and Provincial Photographic Association will remember — was the extreme celerity with which it could be set up in readiness for the first slide, the feat being accomplished by Mr. Askew on one occasion in less than five minutes, has passed into the hands of Messrs. Newton & Co., of Fleet-street.

The Charitable Lantern Entertainment Society meets on the second Thursday in each month at 186 Aldersgate-street (Y. M. C. A.). The following are the officers:—*Vice-Presidents:* J. T. Helby, Esq.; Rev. F. E. White, M.A.; Walter Chetwin, Esq.; Rev. S. F. Bridge, M.A., Surrogate; William Roberts, Esq.; Edward Woodger, Esq., M.R.C.V.S.; William Dixon, Esq.—*Committee:* Messrs. S. G. S. Dicker, G. N. Foot, J. H. Noel-Cox, A. H. Benham, H. Granville Dicker.—*Hon. Secretaries:* Frederick Simmons, 158 Frances-terrace, Herne Hill, S.E.; B. Foulkes-Winks, 2 Pretoria-avenue, Walthamstow, Essex.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*February* 3, 1893

THE LANTERN RECORD.

CONTENTS.

THE SHAPES OF LANTERN-SLIDE MASKS.

The effective appearance of a lantern slide on the screen is so largely dependent upon the exact shape which the picture itself is permitted to have, that we are surprised that this point, unimportant though it may at first sight appear, does not engage the thought and the attention of slide-makers more than is the case. We use the phrase "permitted to have" designedly, because not only is it evident to us that, in numerous instances, a picture is spoiled by the unsuitable shape of the mask, but that those shapes are chosen a great deal at hap-hazard, while we are inclined to think that frequently the picture is selected to suit the mask instead of the mask being chosen to harmonise with the picture, as mounts and frames are.

The shapes of slide-masks in use include the circle, the square, the oval, the vertical and horizontal oblong, the cushion, and the dome. The openings of these shapes vary somewhat in size, especially the purely symmetrical sizes. Indeed, the variation in the sizes of the openings is so great that occasionally, when looking at a slide on the screen and noting the proportions of the mask to the image, we are reminded of the immortal Falstaff's remark as to the halfpenny-worth of bread and the intolerable quantity of sack. And this without reference to the question whether the slide be made by reduction or not.

Certainly large masks are useful as concealing the uninteresting or non-pictorial margins of a slide, but, taken in relation to the full dimensions of the plate, they are an obvious sign of weakness. The shape of opening most generally employed is, perhaps, the complete circle, which, however, to our thinking, is not the most suitable shape to give a lantern picture, inasmuch as one is not conscious of looking at a landscape, a building, a street scene, or, indeed, any view in circular form. Painters seldom paint their pictures in circles, and circular illustrations are not common, so that the slide-maker has little or no artistic support on his side for circular masks.

In looking at a large number of slides on a screen, we have heard people affirm that their eyes are less strained the more the screen is illuminated, and this, if generally the case, would seem to indicate that square or cushion shapes, with the largest possible openings, are the better for common use. As a rule, we should say that, for this and other reasons, the more of a picture that could be shown the better. It may be urged that the use of different-sized masks, permitting of the deletion of uninteresting or inartistic portions of a slide, is a positive advantage. This is undoubtedly so in contact work; but by other methods of exposing the lantern plate the subject can be selectively treated, so that unsuitable parts thereof need not be included in the slide, and masking down obviated. Hence the circular opening need not be a *sine-quâ-non*.

The same objections to circular openings appear to us to apply to the upright oval, although, used horizontally, it accords more with the way in which a view is naturally seen. For landscapes the horizontal oblong accords with the common usage as to the shape of views, and to this, as well as to the upright oblong, the square, and the cushion, there can be little objection. We, however, reiterate our opinion that large openings are, where obtainable, to be preferred to small in the interests of audiences, especially popular audiences, to whom plenty of illuminated screen area is, we have noticed, more acceptable than much-masked-down pictures.

Naturally we are far from saying that, where the use of a circle instead of a square can save a good slide which may have some marginal defect, it should not be used; on the contrary, this strikes us as a legitimate use for such shaped openings. But defects at the edges of a slide are not more frequent than central defects, hence we consider that the circle is used more from want of thought as to its suitability for the purpose. The dome is a shape which we seldom see used by artists and illustrators; and for lantern slides, and, as regards what we should call naturalness of effect as applied to the shape of a screen picture, we might class it with the cushion, the circle, and the oval as merely assuring variety of effect. Whether this is a *desideratum* is open to question. Speaking from our own experience, we should give preference to purely rectangular openings, as fulfilling every artistic requirement and selected with due regard to the composition of the picture. This would imply that the slide-maker, when making his slide, should pay some regard to the shape that would best suit it on the screen instead of, as at present is chiefly the case, leaving that point to be settled at the moment of mounting it.

LANTERN NOTES AND NEWS.

We are often asked for a quick and simple method of preparing an illustration—say, a writing or drawing—for the lantern, without the necessity of having to copy it, and make a lantern slide. We have given the method before, but for the information of recent inquirers we here repeat it. Coat thin glass with benzole varnish to which a few drops of indiarubber solution have been added. The film dries transparent, but it admits of the finest writing being made on it by means of a steel pen and India ink. By superposing the coated glass plain side on to an engraving or picture, an accurate copy of the outline may be made in a few minutes. This plan was originally published by the late W. B. Woodbury.

Instances have recently come to our knowledge where, at lantern exhibitions, slides have been shown which were made from negatives not taken by the individuals who had prepared the slides. We believe it is generally understood that, where lantern slides are shown, the exhibitor, by the fact of the case, is also supposed to be responsible for the negatives. But where this is not so the fact, in our opinion, should always be stated, otherwise great risk of not unreasonable charges of sailing under false colours is run. Lantern-slide making is a fine art, of which the production of suitable negatives for the purpose is certainly not the least important part; and therefore, independently of other considerations, the author of a negative has a clear moral right to recognition by name where a slide made from his negative by somebody else is shown.

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Mr. Howard Benham is apparently the owner of several skeletons which he has turned to account by grouping them in amusing attitudes, such as boxing, taking tea, singing, &c., and photographing them. Lantern slides from his negatives were shown at one of the Photographic Club's ever-delightful lantern nights a few weeks ago, and we well remember the mirth and amusement they caused. Singular to relate, when they were afterwards shown at the London and Provincial Photographic Association, they did not raise many smiles, and on Wednesday week, when they formed part of the programme at the Photographic Club's Annual Ladies' Entertainment, they (unless we were greatly deceived) scarcely gave unmixed delight to a majority of the many ladies present.

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By the way, at the entertainment in question, the accomplished pianist, Mr. Kepps, as the slides were projected on to the screen, kept up a running accompaniment of music in unison, as far as was possible, with the nature of the subject. Thus, when some views of Newhaven Fishwives were shown, "Caller Herrin" was played, and so on. Messrs. E. W. Parfitt and R. R. Beard worked the triple lantern used on the occasion with the skill we should expect from the conjunction of a clever amateur lanterniist with a skilful professional.

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Small tracings on paper or linen are occasionally utilised for projection in the optical lantern, and it may be useful to some to know how paper suitable for the purpose may be prepared. Stout tissue paper is brushed over with a mixture of equal parts of mastic varnish and oil of turpentine, and hung up to dry spontaneously. Canada balsam, thinned by turpentine, also answers the same purpose.

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To those lanternists who make their own oxygen by the chlorate method, the following hints for obtaining it chlorine free, which were recommended some years since by a contributor to the Almanac, Mr. W. F. K. Stock, may be of service:—1. The mixture should be finely ground. 2. Not more than one-tenth of manganese dioxide should be used. 3. The gas is made to come off not faster than six feet in twenty minutes. 4. Two wash-bottles of forty ounces capacity each are used. 5. An ounce and a half of dry hypo to be dissolved in the water in each bottle. Mr. Stock said that an old fixing bath, somewhat diluted, could be used for the latter purpose.

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In connexion with the foregoing hints, recent analyses of commercial oxygen in cylinders have proved that gross frauds or culpable carelessness are habitually practised at the expense of lanternists by some of those who retail compressed oxygen, so that, unless some improvement takes place in commercial gases, we shall not be surprised if lanternists find it worth their while to prepare their own oxygen more largely than is the case at present. Our report of the meeting of the London and Provincial Photographic Association, at which Messrs. Grundy and Haddon's paper on the estimation of oxygen was given, contains a great deal of instructive reading, which we hope will not be without profit to those who have been indulging in the system of adulteration which those gentlemen exposed in the course of their demonstration.

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As illustrating the strange ideas which prevail in some minds as to the manipulation of compressed gases in lantern entertainments, Mr. Birt Acres tells us that not long since, being about to give a display with the lantern in the country, the Secretary of the Society informed him that one of the cylinders to be used contained a mixture of hydrogen and oxygen, and asked, most unconcernedly, whether it mattered? Mr. Acres said (no doubt grimly enough) that it did not matter at all, so long as the cylinder were taken into the open air and the contents thereof set free, which we believe was done. Perhaps it would be well, as Mr. Acres suggested to us, if lanternists about to give entertainments in strange places, and with gases provided for them there, always took means to test cylinders and bags for the nature of their contents before turning the gases into the jets.

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Why do not amateur slide-makers take more notice of the minute defects which so often appear in their slides, and endeavour to remove them ere encountering the "fierce light which beats upon" a screen? An enormous proportion of the great many lantern slides we have recently sat under would have been all the better if the negatives from which they had been made had had their imperfections touched out, a remark which also applies to the slides themselves. Recently, at a lantern exhibition where Mr. Redmond Barrett was present with us, that gentleman waxed eloquent over the wide field for the friendly offices of the retoucher which the slides shown presented.

NEUHAUSS' LANTERN WITH PETROLEUM LIGHT AND ALCOHOL CONDENSERS.

Most commercial lanterns, says Ki-Non in *L'Amateur Photographe*, are defective on account of the exiguous dimensions of the condensers. They only illuminate an image three inches in diameter, while the alcohol condensers invented by M. Neuhauss, having a diameter of six and a half inches, project a much larger positive. A pair of lenses of that dimension would cost at least fifty francs, and often have surface defects, without mentioning the greenish colour of the glass, which absorbs a great deal of the light. M. Neuhauss makes his condenser as follows:—To a curved glass vessel of six inches diameter he secures a plate of glass by means of an alcohol-resisting cement (such as the "Crystal Palace" cement), and makes an opening in the curved glass in order to fill the vessel with alcohol, reclosing the opening with a piece of gummed taffeta, which admits of the escape of the gas formed by the changes of atmosphere, and also prevents the loss of liquid during the movement of the condenser.

M. Neuhauss prefers alcohol to water on account of its higher index of refraction, which approaches to that of the glass; besides, the alcohol keeps clear, and does not form air-bubbles even at a high temperature. With water the bubbles adhere to the sides of the glass and absorb a great deal of the light. Besides the two alcohol condensers, he employs a small plano-convex condenser, placed near the lamp so as to shorten the focus of the former, and augment the brilliancy of the light. To avoid the heating of the alcohol the condensers are placed in a box, and the plano-convex lens is secured to the near side of the lamp. Experience has shown that the temperature of the alcohol is only increased a few degrees even after the lantern has been several hours in use. An ordinary petroleum lamp with a reflector suffices, and for objective a portrait lens.

M. Neuhauss recommends for the screen one of paper of the kind used for copper-plate printing, which he prefers to cotton or calico screens. He adds that the whole lantern might be put together very cheaply, as, with the exception of a suitable case and a few sundries, the amateur already possesses the two most important parts of the system—the objective and the petroleum lamp.

Although there is no novelty in the construction of the condensers "invented" by M. Neuhauss, perhaps the few particulars of them here given may be of service to those desiring to make such for themselves.

LANTERN MEMS.

The new railway rates are at present affecting lanternists in the matter of charges for carriage altogether out of proportion to the weight and value of the steel gas cylinders conveyed by the railway companies, and it is a curious anomaly, that if sent by goods train a forty-foot cylinder incurs the minimum charge of 5*s*. for carriage

and 5*s.* for delivery, in all 10*s.* for any distance, as against 3*s.* 3*d.* for the same size cylinder sent by passenger train, even if the journey is 200 miles. In another instance the rates for a cylinder were 1*s.* 8*d.* only by passenger, and 5*s.* for goods (without delivery).

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It is sincerely to be hoped that some modification will soon be made in the new rates, for the compressed-gas system has "caught on" to such an extent that it is no longer a luxury to the few, but indispensable to the majority of scientists, lecturers, and entertainers, and, if the railway companies do not arrive at a reasonable "mean" of charges, it will be incumbent on those primarily interested to take up the case and make a collective or representative protest, or present a memorial setting forth the advantages to the community at large and the encouragement of commerce the more extended use of compressed gas is, while prohibitory rates will seriously hamper development and be suicidal as regards their own interests.

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The comparatively high price of chlorate of potash gives the companies who produce oxygen gas by the patent process a distinct advantage at the present time, and which is not likely to be modified if the cost of carriage is only reasonable; but if forty feet of gas, costing 8*s.* 4*d.* retail, is to be charged 10*s.* for carriage, the advantages of invention and the development of the compressed-gas industry are likely to be crippled, for the cost of distribution of the gas from the centres (works or agents) will be more than the gas itself—in fact, in the case mentioned, makes the total cost 5½*d.* per foot, without reckoning the return of empties.

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Fortunately, a loop-hole is left, and if all who send cylinders by rail will for the present label them to go by "passenger train" the high charge will be avoided. At the worst, however, the consumer will not be paying so much as he used to in the early days of compressed gas; but, as it is a retrograde step, it must be, if possible, altered at all hazards.

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This little difficulty with the railway rates sets one thinking as to what could be done if, by some such arbitrary action of the railway companies, compressed gas was not available in the country, and one's thoughts naturally revert to the various methods of using oxygen after making it from (for amateurs) the simplest of all plans—viz., heating chlorate of potash and oxide of manganese. Gas bags are far too cumbersome, inconvenient, and risky, ever to be reinstated, if they can possibly be left where they are—"shelved."

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Now is the time for designing a simple gas-compressing machine which should be capable of filling our cylinders to a reasonable pressure—say, thirty to fifty atmospheres—and which any one could use, and which did not require steam or other power beyond manual. If one had a cylinder holding twenty-five feet of gas at 120 atmospheres, he would, at thirty atmospheres, have six feet available for an entertainment, and, if a forty-feet size, then ten feet of gas at thirty atmospheres' pressure.

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This machine would be invaluable in the colonies, India, and out-of-the-way places, and also for institutions at home, where assistance is at hand and the necessary time could be devoted to the preparation and compression of the gas, but for the ordinary, and, to a large extent, new class of lanternist that have sprung into existence since the introduction of *cheap* compressed gas; nothing short of the purchase of ready-compressed gas at a reasonable price, delivered by rail or carrier at their houses or place of entertainment, will suffice.

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If operators find the limes discoloured after using compressed coal gas, they may know that the gas is not so pure as it should be. The impurity is due to the chemical action on the inside of the cylinder, which produces a reddish rust or deposit, and this, when very bad, is driven through the jet on to the lime. It will sometimes cake in the nipple of the jet and clog it up. Should there be any signs of discolouration, instructions had best be given, when the cylinder is sent to be refilled, to have it "burnt out" before the fresh lot of gas is compressed in it. It is a good plan, on receipt of a cylinder of gas—especially hydrogen—to turn the cylinder upside down, and open the valve of the cylinder for a second, so as to let the gas drive out any water; of course, the key must only be turned on a quarter of a turn, and off again *at once*.

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Beard's small-size automatic regulators have now been on the market four years, and they enjoy at the present time a unique reputation for satisfactory working. That they are consistent in their action, and are reliable, may be understood when it is stated that, of over 4000 sold, and in most cases continually used, only about one per cent. have ever failed, and these in most cases from causes outside the control of the inventor. In one instance the whole of the working part was choked up with dirt or mud, presumably from the fact that the cylinder had been stood head downwards, and, when the regulator was fixed in afterwards, care had not been taken to wipe it or get the dirt out. If the same plan was adopted in this case as mentioned in previous paragraph *before* fixing on the regulator or connexions, the dirt would have been blown out where it could not do any harm.

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From time to time during manufacture, and as the result of experiment, certain little improvements are invariably made in inventions, and this regulator is not an exception to the rule, for the levers of lazy-tong pattern connecting the top of bellows with the eccentrics that close the valve are now considerably improved and made stronger, and with almost mathematical accuracy. In its construction it has also the merit of being easily inspected by unscrewing the cover.

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Regarding the bellows of these regulators, users must remember that everything has a certain life, and, as the bellows are made of indiarubber, *some day* they will get weak and want renewing. I would advise all who have had regulators over two years to order through their optician or the agent who supplied them a reserve bellows for each regulator, so as to have by them, in case of the one in use hardening or perishing from the action of the gases used or the temperature and climate to which they are exposed. If in any doubt about the old one, on inspecting it by removing cover, have it replaced at once with a new bellows, for the cost is a trifling matter, something like two shillings each, while the feeling of security thus obtained more than compensates for the trouble and expense.

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Opaque screens are getting more and more into favour, and where they are placed permanently in a suitable position nothing could be more convenient than the roller and lathe plan, as employed for the drop scenes at theatres, the roller being, of course, at the bottom. The whiteness, opacity, and smoothness of these screens enhance the beauty and brilliancy of the photograph or picture projected on them to a considerable extent.

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The mahogany-cased opaque screens recently introduced, in which the top of the box is nicely made in two parts, form when turned up the upright and support for the screen. It is most convenient for small and moderate sizes; the former, from four feet to six feet, are made with spring rollers, and the latter, up to twelve feet pull up by means of cords and pulleys, the former being fastened to catches low down on the outside of the supports. The screen is stretched quite firm by a wind-up handle, and the same handle, when the cords are free, wind the screen down (round the roller) into the box.

G. R. Baker.

LANTERN SLIDE METHODS.

[Hoboken Camera Club.]

[Since her return to the United States, Miss Catharine Weed Barnes has, we believe, made a large number of lantern slides from her English negatives, and is exhibiting them before various Societies. The following paper, which she read a few months ago, will therefore be of interest as indicating her method of working.—Ed.]

There is a solid substratum of common sense in the prevailing favour with which lantern slides are received. They have become

an almost essential requisite in these days to any lecturer whose words admit of being made more impressive by adding the evidence of sight to that of hearing. Strangely enough, people will believe their eyes who doubt their ears. This fact being conceded, it remains for me to give some faint idea to-night of the great stature to which this work has grown, what it can be made to mean, and a little—only a little—about how it is done. The old idea of the magic lantern impresses those who give little thought to camera work with an almost absolute conviction of its being a kind of trick, really sleight-of-hand or magic. And when they are told that lantern-slide work is a well-defined and not over and above easy branch of photography, requiring constantly growing experience and thoughtful care to accomplish good results, they smile indulgently, if they do not actually say they doubt your statement. One of the strongest reasons for slides being so popular is that so many more people can thus enjoy a picture than when it is in the form of a print, and still more that, with great care and trouble, it may be, one can sometimes obtain from a poor printing negative a respectable slide. This in many cases is valuable, as from it, if made by reduction and properly strengthened, a good negative of any size can be made. The objection that such negatives are usually blurred and indistinct in outline can be largely overcome by making the image on the slide as small as is consistent with clearness, focussing as sharply as possible, timing very carefully, and using special pains in development. The advantage is that, if such a negative is broken or injured, another can be quickly made from the slide, and where it is difficult to photograph the object over again—always best when that can be done—a camerist need not be at the risk of losing a valuable picture. This often means much trouble, but not necessarily great expense, and to lazy, trust-to-luck photographers who seem to expect their pictures to appear, like that described by Sam Weller, with "the frame and glass on complete, with a hook at the end to hang it up by, and all in two minutes and a quarter," I have nothing to say. It is always the workers who are most anxious to learn, and trouble to them is of little consequence when aiming at good results. In a recent volume by A. R. Dresser, the distinguished English slide-maker, he strongly advocates making slides in a copying camera, and it is gratifying to have my own opinion confirmed by such an able worker, for I do not like contact slides as a general thing. He goes to the extent of recommending the process even with negatives as small as three and a quarter inches square. Some of the advantages in this way of making slides are that you can overcome defects in the negative, leave out any part if wished, enlarge or reduce as desired, and, what always seems miraculous to the uninitiated, make an exposure, develop the plate, and make a slide from the wet negative in a very short space of time, which is, of course, impossible by contact. It is not necessary to have an elaborate outfit if you only have a good short focus lens, but you must supplement it with a greater output of brain force to devise expedients for overcoming deficiencies in the camera, &c. In visiting a celebrated slide-maker's workroom lately, I was ashamed of my own expensive apparatus when examining the simple means he used. An old, discarded wet-plate camera, slightly altered, an ingenious arrangement for using any size negative, and a fine lens—the whole was simplicity itself, and yet his slides are known wherever photography is—and that is saying a great deal. A somewhat similar apparatus is described in Mr. Dresser's book. I fully agree with the latter in laying stress on the position of the apparatus in the room, and noting accurately the actinic force of the light at the time. It is not understood by some how much exposure is hastened when snow has fallen, and how very useful is a ground glass behind the negative, or the reason for placing the negative film side to the lens (otherwise the image on the slide would be facing the wrong way), or the absolute necessity for having the front of the camera square with the negative —in other words, how very easy it is to fail and then blame instruments, chemicals, maker or dealer, and not the worker. One special object of blame is the plate, and each camerist has his favourite one, not that it is necessarily in itself the best, but with it he accomplishes the best work. It is, however, with some workers a case of Love me, love my plate, and your judgment is sharply questioned if you are not able to do so. On my saying to a friend once that I did not like a certain make of plates, as the slides were too black and white, the statement was positively, very positively, questioned, and I was obliged to explain in detail that, whatever my informant's experience was, mine differed from it.

English plates are much slower than our own, four or five times as long an exposure being requisite, which seems to bear out the theory that in slide work rapidity is undesirable, as the average of English slides are remarkably fine. As a rule, theirs are denser than ours, but the shadows are generally clear. The American size, $3\frac{1}{4} \times 4$, has been adopted by some English plate-makers, but the majority of their plates are inconvenient for our lanterns, being both for plates and cover-glass square, solid, very substantial, and apparently made with a glorious disregard of whether they suited any slide-carriers but English ones. We claim our way is more convenient, as it allows title and name of maker to be placed prominently on the cover-glass, and gives more latitude in matting. We also mount our slides differently from foreign workers, and it would save much trouble if some general agreement could be arranged in these and other photographic matters. I spoke recently in Brooklyn on certain slide developers. It does not matter much which one is used if it is used intelligently; each has good qualities, but those are the best which are simple as to formula, cleanly in working, and reliable in action. I do not like the caustic alkalies, as they are too severe on the film and utterly preclude anything like prolonged development, so essential to a good slide. With eikonogen, my favourite developer, I use carbonate of potash, saturate solution, and sulphite of soda in the eiko, which seems to keep well, if it does darken a little. The suggestion was recently made to me of using the new developer, rodinal, otherwise para-amidophenol, as an accelerator in eikonogen, and it was a success. Let me urge putting acid sulphite in the hypo bath, and always have a dish with saturated alum and a little sulphuric acid near it. Keep the bromide bottle "convanient," but not too much so, and use a dropper in the cork. See that for all solutions and washings either distilled or, at least, well-filtered water is used. It is my custom to keep a piece of muslin, filled with absorbent cotton, tied over the rose sprinkler on my faucet, and it requires renewing every few days, as it gets black with sediment. In cold weather the water from the pipes should be warmed before use, else the chill will seriously retard development. In my dark room is a gas-stove, and I generally, in winter, heat water and put a little in the developer, but only just enough to slightly raise the temperature, remembering one sad experience when I saw the whole film slip off the plate. Over-timing, development only for detail and subsequent intensifyings, keeping the lights pure and the shadows clear, by judicious use of the alum bath mentioned, will give an interesting variety of tones, which is a relief from the monotony of the usual colour of slides. Uranium and other salts are also employed in gaining variety of tones, but hand-painted slides must be exceptionally well done to be even tolerable. It is a curious fact that some pictures show much better as slides than as prints, especially where there are good distance effects; and at a recent exhibition a competitor who showed slides and prints from one set of negatives, received a prize for the former in preference to the latter. During my proposed photographic trip to England and Scotland this spring and summer, when I expect to attend the annual Convention at Edinburgh, I shall make a study of the English method of work, and try to ascertain its true inwardness. But there is no earthly reason why, with proper patience and perseverence, any one who can make a good negative should not make a good slide. If prevented from using a copying camera, he certainly can make them by contact in any ordinary printing frame, but should back his plate with dark material, as frames generally are lined with white canton flannel. I would then advise their being made by gas, magnesium, or electric light, which can be readily controlled. Some workers prefer artificial light in any case. Many of the societies provide facilities for this work, and I constantly wonder that it is not more widely taken up; but it is sadly evident that in every society a few members do the most of this work. While the claim is made still, and very positively, that a wet-plate slide is the only true one, all others being unworthy of consideration, yet high authorities all over the country are beginning to believe that just as good effects can be gained with dry ones. I do not offer those shown to-night as examples to be followed in every particular, but as illustrating certain artistic and technical points. The amateur, however, after going through all stages of the slide fever with ready-made plates, sometimes becomes fired with an ambition to coat his own plates. There are several ways of doing this, and all, though not expensive, are more or less troublesome; but the genuine camerist devoted to his work never knows when to give up and, as I can testify, never likes to own a positive defeat. It is a source of regret to me that I am prevented by urgent editorial duties from using my own emulsion closet. At present it is occasionally used to dry carbon tissue, and then only at intervals. I cannot understand those good people who wonder what there is in photography to make its devotees so very devoted, when discoveries and improvements are being made almost every day in its already wide field. Perhaps this is the more strongly impressed on me from the fact that so many instruments, chemicals, &c., are sent to an editor for testing, and the various photographic periodicals, foreign and American, fairly bewilder the novice with the extent to which the work is being carried. One very tempting path is in the direction of different printing methods, experimenting with new printing surfaces and developers, and here is where there is boundless capacity for im-

provement, while with slides there is less variety in the material used, but a great deal in how it is manipulated. Success is, however, impossible, unless one thoroughly believes that what he is doing is worthy of his best energies, no matter what the line of endeavour, but that blindly sticking to it will never accomplish anything really valuable. What is required is steady, wide-open-eyed perseverance and cultivation, not merely of one's artistic and technical vision, but a perpetual post-graduate course in accurate reasoning. The scales and weights on one's shelves then become something more than senseless machines, and are as symbols of the wonderful balance and delicate adjustment of the human brain. You will only get from photography that which you give it; but one can give a great deal, and, if you make yourself believe that in it no art is possible, you will certainly never find any. He who seeks will find. To succeed, you must read intelligently, study carefully, believe it is worth while to give your best attention to camera work and then translate your study into practice, watching critically every step and cutting places for your feet as do the climbers on the Alpine glaciers. No sudden flights of inspiration will carry you very far, although inspiration is needed sometimes to keep up one's courage. I wish to urge at the same time the never being satisfied with one's work. Avoid that as you would a pestilence; it is fatal to further progress. Your satisfaction will be like that of the five little green peas in Hans Christian Andersen's story, whose own tiny pod was all the world to them. While measuring yourself against others and learning to realise your own shortcomings, you will often find, by the great law of compensations, an unexpected balance on the credit side of your account, but it must be fairly earned. This talk has not been intended for a strictly scientific one, but only to show these of you who have paid little, if any, attention to this subject, that it is worth being well considered for the sake of the future before it and what can be made of it. Such associations as the Lantern Slide Interchange are doing much in this country and abroad to disseminate a great amount of knowledge, scientific, artistic, and historical. The work can be made a valuable adjunct in educational training if used to instruct as well as amuse. It is fascinating work, and from personal experience I recommend it to all camerists, men and women, believing there should be no sex in photography, that each should bear the burden and heat of the dark room, do the same work throughout, share equal criticism, and receive the same reward.

CATHARINE WEED BARNES.

THE LANTERN SLIDE AND ITS RELATIONS TO ART.

[Photographic Section of the American Institute.]

THE subject which I shall treat this evening will be, in the main, the relation of art to the lantern slide. That there may be no misunderstanding of what I may say, or misinterpretation of terms used, I will, in the first place, define, as fully as seems to me needful, what I mean by the term artistic in relation to, and bearings on, the subject.

"A DEFINITION OF THE TERM ART IN RELATION TO THE LANTERN SLIDE."

I shall try to avoid assuming a dogmatic position by asserting that my way is the only way; that all who may differ from me are ignorant and idietic.

The fact is, that the interpretation of the word art is very flexible, and becomes quite apparent when we attempt to compare it with the interpretation of the word science. In the latter we must have certainty by demonstration. In art, the element of certainty can hardly be said to exist, except in the minds of the advocates or leaders of certain schools. Modern art, in civilised countries is, in the main, the product of educated and cultured sentiment, and sometimes, when at its best, compares unfavourably with the artistic work of so-called Pagan nations.

In metallurgy the Japanese surpass, in artistic work, that of any European nation or people, but in landscape drawing they are as conspicuous as a failure as they are a success with metals, pottery, porcelains, and textile fabrics. This is due to their ignorance of a scientific principle in nature, which is the arbitrary law of linear perspective; and this is about the only point where science and art clasp hands.

It seems to me that, in defining art, it should, as a rule, be done in general, rather than in specific terms. There can be no specific rule for colouring a landscape. A rule which would dictate to every landscape artist precisely the same pigments, or compounds of pigments, to be used invariably in colouring specific parts of the same view, would be impracticable.

The reason why this is impracticable is because one of nature's immutable laws forbids it. Nature seems to possess the omnipotent capacity of producing infinite variety in the same species, and she exercises this power to the fullest extent in her production of the optic nerve in the human being with sensation and perception. No two artists see or depict with precisely the same colours the same view.

The methods of each are as distinct from the other as their handwriting, and is as difficult to counterfeit. The artist who succeeds in representing form and colour as the cultured majority see it, becomes the popular artist.

The senses which respond most readily to the allurements of art are seeing and hearing. Such artistic effects are usually distinguished as "fine arts," to separate them from the "mechanical and useful arts." The sense of seeing is the one involved mainly in the subject before us this evening. What charms the tympanum, is the harmonious blending of atmospheric waves.

"THE SENSE OF SEEING."

At the present time I am not trying to interest you through the avenue of sensation, and am making no effort to produce pleasurable artistic sensations by draping my thoughts in eloquent language, and presenting them through an expert elocutionist, which would produce artistic effect, but shall address myself to the sense of seeing, which sense is the result of waves of a much more subtle agent than the atmospheric waves, and the sensation of colour is largely the result of the blending of these ethereal waves, and whether the effect on the nerves be one of pleasure or pain depends upon whether the blending be harmonious or inharmonious, the same as results to the sense of hearing when musical notes fall upon the ear, and whether the sensation be pleasurable or painful will depend upon the fact of whether the atmospheric waves unite harmoniously or discordantly.

I hold that anything which produces unpleasant or disagreeable sensations cannot be artistic, and further, that which produces pleasurable sensations without producing weariness is the most artistic.

POPULAR LANTERN SLIDES AND THE OPTIC NERVE.

There may be artistic sensations produced by a loud clanging and banging of musical instruments, but the senses soon tire of it and seek relief. The popular and orthodox lantern slide has just the effect on my optic nerve which noisy music has on the nerves of my ear, and under an hour's strain my optics become tired and rebel. This should not be so. The fault is of long standing and originated in the early days of photography in consequence of certain notions entertained by professional photographers. Artists of that time treated photography with ridicule and contempt; a petty warfare was kept up between the artist and the professional photographer. The photographer who could make a photographic picture became inflated with exaggerated notions of his importance, and just in the degree of popular favour awarded to photography the artist's jealousy was increased and expressed.

"CLEAR GLASS A FATAL DOGMA."

The mistake which the early producers of lantern slides made was the ignoring and ruling atmosphere from the slide—absolutely clear glass was the fatal dogma. This was purely a photographic notion and unartistic to the last degree. Aerial perspective is almost, if not quite, as potential and necessary in a landscape painting as linear perspective. The supreme effort of a landscape artist is to reproduce nature, and to do this he must paint atmosphere. No photographer can make a perfect negative of an out-of-door view without photographing atmosphere; the longer the distance photographed the more atmosphere. If a negative should have atmosphere represented in order to be perfect, it follows that a lantern slide made from such a negative to represent it should represent *all* the atmosphere in the negative. If this be so, it follows that a dry plate which will make a *good* negative will, with the same careful manipulation, make a good lantern slide. This seems quite a rational theory, although it is radically heterodox. Yet dogmatic notions, whether antique or modern, have to, in the long run, submit to modification and change when assailed by *demonstrated facts;* and the slides which I shall exhibit this evening will mainly be for the purpose of demonstrating the correctness of the theory just advanced. These slides have been made, as a rule, on the most sensitive plates in the market. Special plates usually used I shall only exhibit for the purpose of illustrating the point at issue.

I will not deny that there may be cases where a very thin negative without much contrast is used that a special plate would succeed better than a quick plate; but my way would be to strengthen the negative and use the quick plate. The modern lantern slide has become one of the most useful products of photography, and in its adoption to illustrate lectures almost a necessity.

There is scarcely a limit to its use in this field, and it frequently happens that the viewing of slides used on such occasion produce more pain than pleasure because of defects in their production.

"LANTERN-SLIDE MAKING A HEALTHY MENTAL EXERCISE."

The amateur photographer of the present is a devotee of the lantern slide; after becoming able to make a respectably good negative his effort

is to make with it a good slide, and I would not say a word to discourage him or her. Working at any photographic problem, in my opinion, is healthy mental exercise. It necessitates contact with scientific problems, which creates a thirst for more light, and inspires a longing and desire to become more familiar with nature and her methods. The negative and the positive are alluring lights that beckon the student on; torches that illumine the way; prophetic voices that promise reward for diligent labour and patient toil. They are nature's representatives and they bring you in close communion with some of her mysteries, and you are led to realise that just out of your reach nature conceals a golden key with which you could unlock some of her secret chambers if obtained; and she points to the past and shows that the ones who have obtained the magical keys have been the diligent ones, who by toil have earned the privilege of culling a few jewels from her great storehouse. I believe there is nothing better for the ethical and intellectual growth than to become interested in scientific and artistic studies. I would not say a word which would tend to cool the ardour or enthusiasm of the investigator of nature, but would use my influence, as far as possible, to inspire and encourage.

The wonderful advance made in the present century causes the question to be frequently asked, in reference to the future, whether we have not obtained about all of nature's most valuable secrets; and if there is any probability that the next century will, in any respect, be as wonderful as the one that is passing away. From my point of observation my answer would be that we have just commenced; we have not as yet learned the first letters of the alphabet which tells of the possibilities and powers of human reason, and have not even entered the vestibule of the great temple of knowledge.

There is everything to encourage those who are enamoured with the investigation of the great problems that surround us on every hand. What we know when compared with the unknown, is like a few grains of sand compared with the sand on the shores of all the seas and oceans—so to the young or to the old I would say, *go on*, an infinite field is before you.

HENRY J. NEWTON.

MOUNTING LANTERN SLIDES.

[The Beacon.]

WHY is it that while everything else in connexion with photography has been advancing and improving, almost revolutionising, the mounting of lantern slides is carried on to-day exactly as it was some thirty years ago, when the method of mounting each slide in a separate wooden frame was discarded, that is, discarded so far as photographic slides were concerned, for I believe that the finer variety of hand-painted sets are still framed? The present form of mounting, when skilfully done, and before the paste begins to give way, certainly looks well, and the mounter who makes a trade of it is able to do it skilfully; but the amateur who only mounts a few now and then rarely makes a neat job, and is anything but an amateur in the true sense of the word, and would rather make two than mount one any day.

I believe that the disagreeabilities incident to the present method of mounting, rather than any difficulties in the way of making good slides, deter many from turning their attention to that most delightful branch of photographic work, and my object in this article is to urge the adoption, not of a new method, but of one that has been again and again proposed, but rarely adopted—one that will, when we get used to it, look as well as the present method, be much more convenient in various ways, and at the same time as simple as putting a letter into an envelope. It is one also that only needs to be generally seen to be universally adopted, and I have a strong hope that it will soon be so, as several of the British dealers in lantern material have at length seen their way to make and supply the mounts or wrappers, a step likely soon to be followed by those on this side. But we need not wait for that, as the cutting of what I would fain term the modern mount is such a simple matter that any one can do it for himself.

The material and tools necessary for the making of the mounts is some thinnish, tough paper—white writing, or "manila," will do—a pair of scissors and a slide cover. Paper of a white or light shade is best, as the slides so covered are easily seen in dim light, and suitable for writing on. The paper is first cut into pieces of $4\frac{5}{8} \times 3\frac{5}{8}$ inches, and then the clear or opening is cut of any desired size or shape. This is probably most easily done by folding the paper across the middle twice, first in the direction of its length and then of its breadth. This slide cover is employed as a straight edge, laid on the folded corner so as to permit two straight pencil lines to be drawn, making, with the two folded edges, a square, either upright or horizontal, of just half the size of the opening desired. Two straight cuts along the lines, stopping of course at the point where they join, will give, when the paper is unfolded, the desired opening; or, if rounded corners, cushion shape, be preferred, they are easily made by making the cut continuous, simply turning the scissors round the corner, cutting the while. Before unfolding the paper, it is well to snip off the four open corners, diagonally across from the folded corner, so that, when the flaps are folded over, the joints will have a mitred appearance.

On opening the paper thus cut—and two or three dozen might have been made in the time it has taken to explain it—a compound mat and binder will be found ready for use. It is only necessary to paste it, lay the slide and its cover, without anything between, in the centre, and fold over and rub down the flaps. A single trial will show how easy it is to both cut the compound binder and apply it, and after one or two trials, with a tithe of the trouble, to mount as neatly and more conveniently than in the ordinary way.

I have mounted slides in this way for years, and they were admired by all who saw them; but fashions, like facts, are stubborn things, and ill to ding. But, according to the wise man, there is a time for all things, and perhaps the time for the combined mount has at last arrived.

JAMES ROSS.

PRINTING-OUT LANTERN SLIDES.

[Manchester Amateur Photographic Society.]

A FEW words from one who has put to the test the latest addition to the many inventions for the benefit of the amateur may not be out of place. I understand that print-out plates have been manufactured before, but for some cause or other (which I have not been able to ascertain) they were either not a success or were not sufficiently taken up to warrant their continued manufacture.

Some nine months ago the present writer and Mr. Lees of this Society had a conversation as to the possibility of coating a lantern plate with the same emulsion as chloride printing-out paper, the outcome of which conversation was that I wrote a letter to Mr. Howson, of the Ilford Company, pointing out the advantages to amateurs to be obtained from a lantern plate so coated.

In reply that gentleman pointed out that the course suggested was impracticable, and that all advantages claimed for such a plate could be obtained by using the Alpha lantern plate.

It is now, by the enterprise of the well-known Paget Prize Plate Company, not only proved to be not impracticable, but actually an accomplished fact, and my friends may judge of the enthusiasm with which I got hold of a sample of the new plates to put their capabilities to the test.

On proceeding to open my first box, I must confess to a feeling of fear that there was too much white light knocking about, and I very nervously looked around—by force of habit, I suppose—to see that everything was safe. Of course, this was totally unnecessary, as the emulsion is so slow that the plates may be treated just exactly as if they were chloride paper; in fact, the only difference between the two is, that with an ordinary printing frame the lantern plate must not be disturbed, but should be judged by looking on the back instead of on the front, as with paper.

This difficulty, however, will soon be removed, as the same company have in course of manufacture a printing frame specially designed for printing these plates and print-out opals.

The plate is very transparent; so much so, in fact, that you have to resort to the old dodge of breathing on it, to ascertain which is the correct side.

In the printing frame, in this December light, it takes a fearfully long time to print, even when printed in the sun, which, it is interesting to learn, it is advisable to do.

In the comparatively short time I have experimented with the plates, I find they must be printed more deeply than paper.

They come out of the printing frame a bright red, something like a correctly exposed and developed alpha plate, the high lights having a bluish cast.

Two formulæ are given for toning: one a combined bath, for which the plates must not be previously washed; and the other, a bath, followed by fixing, before which the plates should be put in running water for fifteen minutes, to prevent uneven toning.

I preferred the second of these for simplicity, as follows:—

Sulpho-cyanide ammonium	30 grains.
Chloride gold	2½ grains.
Water	16 ounces.

Fixing—

Hypo	3 ounces.
Water	1 pint.

Toning proceeds very evenly, and may be stopped at any time when judged to be a satisfactory tone by looking through the plate.

It must not be forgotten that these plates are intended for warm tones, and I am not sure that a deep black can be obtained; but of that we shall soon learn.

There can be no doubt that the path of the amateur will be made considerably smoother by this new candidate for our favour, and I can confidently recommend our members to give them a trial.

I see a decided advantage in a printing-out plate, for the facilities it offers for printing in clouds, all that is necessary being to print the landscape, and then cut out a paper mask to cover same during the printing in of a cloud; we shall thus gain in two ways:—(1) our results will be more certain, wrong exposures being practically done away with; and (2) the same plate will do for landscape and cloud.

The dark room and its accompanying disadvantages entirely removed, and other advantages which such a plate must possess prompts me to prophesy a great future for the Paget printing-out lantern plate, and a greater addition to the already numerous ranks of good lantern-slide makers. W. H. Shirley.

FARM LIFE ON THE SCREEN.

The Edinburgh Photographic Society held their first popular evening for the session on Friday evening, January 27, in Queen-street Hall. Mr. J. C. Oliphant, Vice-President, occupied the chair, and, in addressing the meeting, said the audience would have the advantage of seeing among others on the screen—on a much larger scale—the picture which had so deservedly gained the silver medal at their recent Exhibition. The lecturer, Mr. James Patrick, of Comiston-road, read the paper which had been prepared by his sister, Jessie Patrick Lindlay, the well-known authoress, which was entitled "Round about the Farm," and which comprised about sixty views taken during the currency of last year, from early spring to mid-winter, of the scenery, with the picturesque backgrounds of the Pentland Hills, and the surroundings of Swanston village and farm, one of those cosy old-world clachans where thatched cottages and homely kail-yards yet exist, almost within "a mile o' Edinburgh town." The pictures were of the highest class indeed, in artistic choice of subject, in the introduction of dogs, horses, cattle and sheep, still life and figures; they displayed that true power of seeing and selecting subjects which is not so widely diffused as is the capacity of making a good negative and the transparency therefrom.

A departure was also made from the usual, or rather a reversion to what used to be the usual, method of showing the pictures by keeping each subject on the screen continuously during the sometimes lengthy description and necessary annotations on the various subjects. The pictures were all untouched in negative or transparency, and the aerial effects happily caught, save in one solitary instance, where to a sunset subject there had been printed in a morning "mackerel" sky of a kind rarely or never seen in the very early part of the day. One of the most difficult of the series, the autumn portion, rendered the stack-yards and straw with a truth of local colour that was almost deceptive. The winter scenes were also exceptionally fine, and some of them, with the dense loading of snow, gave a fine idea of the heavy fall. The Council had for the first time in the Society's history imposed a charge for admission; but, contrary to expectation, the large hall was quite comfortably filled. Several appropriate songs were sung during the evening, and, as indicative of their quality, were called for again.

At the close of the lecture, which was throughout deservedly cheered, Mr. J. Barclay, Secretary, in the name of the Society, heartily thanked Mr. Patrick and the ladies and gentlemen who had contributed to carry through so very pleasant an evening. The lantern was worked admirably and without a hitch.

ZOOPRAXOGRAPHY ON THE SCREEN AT THE CHICAGO EXHIBITION.

We have received the following official communication:—

By invitation of the Fine Arts Commission of the World's Columbian Exposition, Mr. Eadweard Muybridge will give at intervals, from May to October, 1893, in the Zoopraxographical Hall of the Exposition, a series of lectures on the *Science of Animal Locomotion*, especially in its relation to *Design in Art*.

These lectures will be given under the auspices of the United States Government Bureau of Education, and will be based on the elaborate work—*Animal Locomotion*—containing the results of the electro-photographic investigation of the movements of animals, made by Mr. Muybridge for the University of Pennsylvania.

From the investigations of Mr. Muybridge—which were commenced in 1872—originated the science of *Zoopraxography*, and lectures and demonstrations on this subject have been given by the author at nearly all the principal institutions of science, art, and education in the United States and in Europe.

It is a subject of the most profound importance to the scientist and the artist, and has been universally recognised as of the greatest interest to the general public.

Although it is probable that the present series of lectures may not be unworthy the attention of the philosopher, they will be free from technicalities, and adapted not merely for the instruction, but also for the entertainment of popular and juvenile audiences.

The illustrations will comprise a selection of consecutive phases of movements by men, women, children, horses, dogs, cats, wild animals, and birds, photographed while they were running, jumping, boxing, dancing, galloping, trotting, kicking, flying, or engaged in other muscular exercises. They will be projected by the electric light on a large screen, and, after an analysis, the successive phases will be combined, and put in motion with the semblance of actual life by the zoopraxiscope.

The differences between a true and a false impression of animal movements will be demonstrated by illuminated projections of the works of many eminent painters and sculptors of ancient and modern times.

LANTERN SLIDES OF NORTH WALES.

Before the Putney Photographic Society, on January 23, Dr. J. F. Farrar in the chair, Mr. John A. Hodges, President of the West London Photographic Society, read his lecture (illustrated by lantern slides) on *Rambles with a Camera in North Wales* to those members and their friends—about one hundred—who were present. No doubt this large attendance was mainly due to the pleasing recollections of his lecture on *North Devon* given before the Society last year. Mr. Hodges' graphic powers of description, marked enthusiasm for Welsh scenery, together with his quiet, dry humour, were thoroughly appreciated by an attentive audience. It is quite unnecessary to say that the hundred slides illustrating his remarks were of the best quality, showing true artistic feeling as well as perfect technique. For the information of any brother photographers who may wish to do good work in Wales the following particulars of the route taken by Mr. Hodges may be acceptable:—Start from Llangollen, and follow the course of the Dee, past Bala, to Dolgelly; thence, down the estuary of the Nawddach, to the sea at Barmouth, continuing the journey by the Cambrian Railway to Harlech and Portmadoc. Leave the train there, and proceed by coach to Beddgelert, changing there into the Bettws-y-Coed coach. From that quaint and picturesque village go by the North-Western Railway to Conway, Penmaenmawr, Bangor, and Carnarvon. By taking this route no doubt much of the finest and most beautiful scenery in North Wales could be visited in a tolerably short trip of about a week or ten days.

MOUNTING PASTE FOR LANTERN SLIDES.

For attaching lantern slide bindings to the glass nothing is better than bichromated paste, which is used for attaching paper to glass in the manufacture of electric instruments, and which is a most useful paste for many purposes in damp climates. It is made as follows:—

Flour	2 teaspoonfuls.
Water	4 ounces.
Bichromate of potash	5 grains.

The flour must be rubbed to a smooth paste with the water, then placed in a saucepan over the fire and kept stirred until it boils. Add the bichromate slowly, stirring all the time; then stand to cool.

This paste must be kept in the dark, and used as soon as possible. Soak the paper in it, and attach to the glass, then place in direct sunlight for a day. This sets up a chemical change in the bichromate, and renders the paste insoluble.—*Journal of the Photographic Society of Japan.*

MAGNESIUM FOR LANTERN SLIDES.

[Minneapolis Camera Club.]

There is certainly no better or more pleasing way of showing our work than by the use of the stereopticon and lantern slides.

A proof of this is that an announcement of a lantern exhibition will nearly always draw a good-sized audience, and it is almost actually necessary nowadays for a lecturer to make use of this means of illustrating his ideas.

A number of our members have never made lantern slides. They have probably never investigated the process far enough to see how exceedingly simple it is, and I will endeavour to show you this evening one of the methods used. Lantern slides are made either by "contact" or by "reduction" from the negative by means of the camera.

The contact plan is most generally adopted by amateurs because of the ease with which it is done, and also from the fact that it can be done a night. This plan is all very well when you have small negatives; but, even with 4 × 5, it would be better in the majority of cases to make the slide by reduction, and with large negatives this is absolutely necessary. The ordinary way of making slides by reduction is to place the negative (film side toward the camera) in a north window, with a piece of ground glass behind it; then put a lantern plate in your plate-holder, and, after getting the proper-sized image on your focussing screen, make the exposure, and develop the same as if made by contact.

An advantage obtained in reducing is that a soft slide may be made from a harsh negative, and by proper exposure and development a good slide may be made from a negative so thin and flat, that it will not yield a passable silver print. Another reason is that it is practically impossible to get perfect contact in a printing frame with the ordinary lantern plates, while by copying in the camera it is a very easy matter to make the slides absolutely sharp. But in order to make slides by reduction we must have daylight—at least, that is the general supposition. Not many amateurs—in this city, at least—have much time to devote to this kind of work in daylight, and I will demonstrate to you this evening how I make slides by reduction at night, using magnesium ribbon for illumination. I have constructed a frame consisting of two uprights with two grooves on the inside. The uprights are just far enough apart so that a glass ten inches wide will slide between them, and they are twelve inches high. In one groove I slide a 10 × 12 ground glass, and in the other I place the negative. If it is 10 × 12, it just fits; if it is smaller, I put the lower end in the groove at the bottom of the frame, and lower a strip that slides in the side grooves down until it reaches the top of the negative. I place this frame on the table, and draw the camera stand up facing it. After once adjusting the height, it is hardly ever necessary to change it for the same-sized negatives. I then focus as usual, using a candle behind the ground glass to illuminate the negative. When everything is ready, I cut off from three to six inches of magnesium ribbon, according to the density of the negative, and hold it in a pair of pliers, light it at the candle, and pass it rapidly back and forth behind the ground glass and negative. The secret of success in this is to be rapid and give the whole negative equal illumination.

I made a few failures in this before I succeeded in getting the negative evenly illuminated, but after a few trials it is very easy.

A. L. Eidemiller.

SLIDE MAKING BY REDUCTION.

Before the Croydon Camera Club, on January 30, Mr. Gay Wilkinson gave a lecturette, with demonstrations, to a numerous gathering of members on *Slide Making by Reduction*. Apart from the engaging readiness with which the lecturer made clear all doubtful points raised by inquiring auditors, the proceedings were chiefly notable for the primitive character of the appliances used in obtaining those brilliant results for which Mr. Wilkinson is so distinguished, and by his demonstration of how, with very simple manipulatory means, he obtains the much-to-be-desired skies in his slides.

Lantern Queries.

B. Simpson.—An article on lantern slides by printing out appears in another part of the Supplement.

W. Tressle.—Why not use a saturator? This will do away with the use of cylinders and bags altogether.

A. Pryce.—A table in the current Almanac supplies the information requisite for calculating the distances. You do not state the length of the hall.

P. C. R.—Possibly through condensation of moisture upon the condensers or objective. Always let both be warmed before commencing the entertainment.

S. Welsh.—The samples of cover-glasses sent are slightly yellow, and are, therefore, hardly suitable for the purpose. The more colourless they are the better.

E. L.—Gas cylinders are made by the Projectile Company. They, however, only supply wholesale. The valving is done by the gas compressers.

Binoxide.—It is considerably over twenty years since electricity was employed for lantern illumination. Mr. Browning introduced a lamp of that nature in 1868.

Mica.—Yes, mica plates are now available for lantern-slide supports—they might be used for pictures by the carbon process. They are, however, rather expensive.

Gas.—Certainly not more than five feet of oxygen an hour should be necessary for your double lantern, and thus a twenty-feet bottle should last for two evenings' entertainment of two hours each.

J. F. Young.—The addresses of the Hon. Secretaries of the Charitable Lantern Entertainment Society will be found in the last Supplement in which you will learn all particulars of the Society's objects.

Beginner.—The slide sent is not clear enough in the lights for projection purposes, while the detail in the shadows is not sufficient. Join a Society, and endeavour to learn what is required from the examples shown.

C. Winsrone.—By using an alum trough to absorb the heat rays, the inhabitants of your various samples of pond water will not receive their quietus so quickly, and thus you will be able to keep them moving about a little longer.

Mark Layland.—Hydrogen or common house gas is so easily obtainable, that it is rarely worth one's while to generate it for one's self. However, as you ask us "merely as a matter of curiosity, and not because you intend trying it," how it may be obtained, we reply: By the old experimental zinc-sulphuric-acid method.

Di-chroic.—Special tinters for imparting sunset or moonlight effects to slides may be obtained of lantern dealers. Usually, they include a selection of colours, and are made to fit on the lantern front. The coloured effects with the limelight as seen on the stage are produced in a somewhat analogous manner.

N. Ormish (Liverpool).—The gas to be rendered suitable for lantern purposes should be enriched by a hydrocarbon, which may be effected by allowing the hydrogen to pass through a metal vessel holding some fibrous substance saturated with naphtha, turpentine, or benzole. Two flames so enriched will form a light of great brilliancy. There is not, so far as we are aware, any commercial appliance of this nature on the market; but, having given you the necessary conditions, any gas-fitter would be able to work out a suitable plan from this description.

We have received the new Lantern Catalogue of Messrs. Archer & Sons, of 43-49, Lord-street, Liverpool. It is a complete and comprehensive guide for purchasers of lanterns and their numerous accessories, various kinds of singles, biunials, and triples being described and illustrated. Special prominence is given to the "Ideal" single, which has met with great success among lanternists. Some of its advantages are that it has interchangeable lenses, and will show either in the smallest room at home or across the largest hall, being equally suitable for the drawing-room, schoolroom, lecture-hall, or microscopic, scientific, and experimental work, also for photographic enlarging. The body is of polished mahogany, lined with iron, and thoroughly ventilated. There are walnut-panelled doors both sides, fitted with brass shutter sight-holes. The front is connected with the slide stage by means of a leather bellows, same as on a photographic camera, which is much better than the usual brass tubes, because (1) it is lighter, (2) more portable, (3) cheaper, (4) easier to extend to and fro. This allows the use of lenses from the shortest to the longest range, so that pictures can be shown either close to the sheet or across the largest halls. The whole of the front removes clear away for the use of scientific apparatus. The bellows front is worked by a rack running the whole length of the lantern (in addition to the short rack on the object lenses). The object lenses are mounted in cylindrical tubes, which slide in the rack mount, so that they can be changed from one foci to another in an instant. They are fitted with double pinions, flashing shutter, and groove for tinted glasses. The rack front is mounted on a loose wooden board, so that photographers can use their own lenses for enlarging. At the end of the Catalogue, which omits details and prices of nothing required by lanternists for ordinary as well as scientific projection purposes, will be found useful directions for working lamps and lanterns, cylinder notes, hints on mixed jets, the lantern microscope, &c. Messrs. Archer have the advantage of practical acquaintance with the lantern. Incidentally we learn from their Catalogue that they supply a special biunial to the Sunlight Soap Works for projecting a picture ninety-two feet from the screen, the lenses being capable of showing at a distance of 200 feet if required.

Exchange Column.

Exchange magnesium clockwork lamp for burning ribbon for lantern slides.—Address J. B. Stokes, New-road, Southampton.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*March* 3, 1893

THE LANTERN RECORD.

CONTENTS.

ANNOUNCEMENT.

Last autumn, when we instituted this Monthly Lantern Supplement to The British Journal of Photography, it was our intention to restrict its appearance to the winter months, but the remarkable appreciation which this new feature has obtained from readers and advertisers alike has decided us to make it a permanent addition to the Journal, so that we have now the pleasure to announce that a Lantern Supplement will appear with The British Journal of Photography on the first Friday of every month throughout the year, without intermission.

There are other, and perhaps equally important, reasons for this step. Observation has shown us that while, among photographic societies and at public entertainments the optical lantern during the summer months is not so largely availed of as in the winter, its uses for enlarging by photographers generally, for projection purposes among many sections of modern scientists, as well as for private and individual employment in regards too numerous to specify here, are so slightly diminished as to confirm our opinion that the lantern and its cognates, with all the manifold points of practical and theoretical interest appertaining to them, are entitled to unremitting recognition and discussion at our hands. Mechanical, scientific and artistic progress in lantern work may be expected to produce constant development at all seasons of the year, which would assuredly suffer if it did not find early representation in these pages.

We take this opportunity of removing a misconception which has arisen in regard to the "Lantern Supplement." It was, as we have previously pointed out, projected a considerable time ago, but circumstances delayed its appearance until last October, when its immediate success not only provoked imitation but instigated our contemporaries to devote more attention to lantern matters than they had hitherto done. The "Lantern Record," therefore, may claim to have stimulated increased interest in lantern work—an interest which it will be its aim in future to sustain, support, and augment.

A VISIT TO BRIN'S OXYGEN WORKS.

A Talk with Mr. Kenneth S. Murray on Oxygen.

Recent discussions and experiments relating to the purity of the oxygen commercially supplied for limelight purposes have invested the subject with great interest in the lantern world, not only as concerns the methods by which it is prepared, but also as to the sources whence it emanates and may be obtained. We have, therefore, thought that some brief account and details of the method by which oxygen is produced on a large scale would be welcome to our readers. It must be remembered that, although this gas is in very large demand for lantern illumination, it has several other uses and applications of an extensive nature—medical, theatrical, industrial, &c.—which combine to render its production necessary on a scale far in excess of what is required in photography, so that oxygen-making at the present time ranks as quite an important industry.

Oxygen, by the chlorate method, is commercially produced to a limited extent, and we believe that other systems are in actual or imminent use, but it is tolerably safe to assume that a preponderating percentage of the gas employed by lanternists is prepared by the barium process. This is the patented process of the Brin Company, which Company has several offshoots in the north of England and Scotland, and to the London works of which we recently paid a visit. Here, under the attentive guidance of Mr. Kenneth S. Murray, the engineer and manager of the Company, we were enabled to gain a very good idea of the elegant system by which the air we breathe is made to part with its oxygen for the wants and uses of art, science, and industry.

The Barium Process.

The chemical text-books (*Fownes*, p. 364, tenth edition, *passim*) inform us that Boussingault, a French chemist, proposed to utilise the property which barium oxide, when heated, has of obsorbing oxygen from the air, so passing into the dioxide, and of yielding up the absorbed oxygen at a higher temperature, for the inexpensive preparation of oxygen on a large scale; but, inasmuch as the barium monoxide gradually lost its power of absorption, the idea seems not to have passed permanently beyond the stage of a laboratory experiment. Messrs. Brin, however, improved upon Boussingault by purifying the air before it was brought into contact with the barium, and by admitting the air under pressure, and exhausting the oxygen under a vacuum. This also allowed of a uniform temperature being employed in the peroxidation and deoxidation of the barium.

The principles involved in the preparation of oxygen by this method are, therefore, exceedingly easy to grasp, and it is in their application to the exigencies of commercial production

that the Brin Company have succeeded in perfecting some highly ingenious machinery, which we saw in operation on Friday last. Properly to appreciate and describe such machinery one needs the acumen of an engineer, and very considerable space, and we must, therefore, herein content ourselves by imparting simply a popular idea of it as we saw it in action. The machinery room, engineer's shops, cylinder-testing department, the compressors, gasholders, furnaces, complete a large installation at Horseferry-road.

The Machinery at Work.

The routine of the process begins with the pumping in of air from the atmosphere, which is passed into a large receiver containing caustic lime, and thence into a second and smaller receiver (of caustic soda), the latter, to quote Mr. Murray, acting as a check on the former in the removal of moisture and carbonic acid from the air. The purified air is then passed into large pumps, where it undergoes slight compression, and finally passes through a chamber for filtering out solid particles, and a distributor placed on top of the furnace, into the retorts. The large furnaces are built at an angle with the horizontal, and contain on each side twelve inclined retorts, of cast iron, of six and a half inches internal diameter, one inch thick and about ten feet long. These hold between 2000 and 3000 pounds of barium in small lumps. A temperature of about 1300° Fahr. is obtained by the admission of primary and secondary air into a coke furnace, the carbonic oxide found being burnt into carbonic acid in the combustion chambers. By means of wall-holes in the sides of the furnaces one sees the retorts at a dull red heat. The heated barium abstracts the oxygen from the purified air, and the free nitrogen escapes up through an automatic valve, whence it passes out into the atmosphere. At the end of five minutes an automatic reversing gear reverses the working, a vacuum is created in the retorts, the air and impure oxygen in the connecting pipes are blown away, and the oxygen passes back through the pipes to a comparatively distant part of the works into the gasholder, which has a capacity of 2000 feet.

In another five minutes the reversing gear is again automatically converted, air passes into the purifiers, as before, thence to the pumps and retorts, and so on, for every five minutes of the day and night, Sundays as well as week days, all the year round. The maximum volume of gas capable of being drawn off can thus be seen to be very large. At the time of our visit only one of the furnaces and one set of retorts were at work. As showing the longevity of the barium oxide, Mr. Murray told us that in some of the retorts they were still using barium which was first employed in 1886, when the Brin syndicate started working the process. After a time the barium is prone to cohesion, when it has to be taken out and broken up.

From the moment when the air is pumped into the purifiers until the pure oxygen leaves the compressor the process is practically automatic, save and except such attention as even automatic machinery must have. Of special value is this, in that, when the air and impure oxygen are blown out of the pipes, the egress of atmospheric air is prevented. In atmospheric air there are, by weight, 23·1 parts of oxygen to 76·9 of nitrogen, and by the Brin process about fifteen parts by weight of the oxygen are taken up by the barium monoxide.

Compressing the Gas and Filling the Cylinders.

The gas from the storage holder passes directly into the compressor. This is of a three-stage type—that is, it has three cylinders, each compressing the gas to a different pressure and is driven by engine power. The gas from the holder passes into a cylinder, in which it is brought to a pressure of eight atmospheres, from thence it proceeds to a second cylinder, where it is further compressed to thirty-two, and finally to a third cylinder, where it is brought to 125 atmospheres. Water is taken up by the gas as it passes into the cylinders for which it acts as a lubricant. It is, however, separated by gravity from the compressed gas before the latter is led into the storage cylinders. The gas, while undergoing compression, is cooled by the compressing cylinders being surrounded by water.

The working capacity of the compressor which we saw in operation is 1000 cubic feet of gas per hour compressed to 120 atmospheres. Here were all sizes of the ordinary storage cylinders being filled by an *employé*, for whose guidance a most stringent set of rules to be observed as regards the working of the compressor, and the Company's test stamp on the cylinders he has to fill, is conspicuously placed; equal rigidness marks the rules which govern the reception of cylinders, from customers, to be filled.

Testing the Cylinders.

The cylinders are tested by the hydraulic method to a pressure of, we believe, about two tons to the square inch, or double the highest pressure the compressed gas with which they are filled is likely to exert on them. Briefly, the testing method consists of holding the unvalved cylinder, inverted, at the top of a well several feet deep, in a collar of indiarubber against an outer surface of water. The hydraulic pressure is then exerted by the usual means, and the expansion of the metal cylinder is registered and read on a recording scale the indicator of which is forced up by the displacement of the water surrounding the cylinder. If upon relaxing the pressure the indicator fails to return to its approximate zero point, the cylinder has permanently expanded and has not stood the test. Hard by, in the same shed, is a small hospital, containing a few cylinders which have failed under the test. All the cylinders are valved on the premises, the lubricant employed being graphite and plumbago.

The Purity of Oxygen.

At our request Mr. Murray allowed a test to be applied to a small quantity of oxygen taken from the bulk actually in the gas holder while we were present at the works. For this test the Hempel method (which our readers will find described in Messrs. Haddon and Grundy's recent paper on the "Estimation of Oxygen") is habitually used. On this occasion the sample of gas drawn from the holder showed, according to the test, that oxygen was present in it to a percentage of 93·4. Mr. Murray informed us that his Company did not profess to supply a gas containing less than seven per cent. of nitrogen, and that the latter was seldom present in a greater proportion than as here indicated. The supply of gas containing a lower percentage of nitrogen than seven or eight—absolutely pure oxygen in fine—would, we understood, add immensely to its cost.

Most lanternists will agree with Mr. Murray and with ourselves that a gas containing only some seven or eight per cent. of nitrogen is everything that is required for projection purposes. Some idea of the large volume of gas sent out from the Horseferry-road Works may be had when we say that the average weekly output is about 35,000 feet, or, annually, 2,820,000 feet.

The Illuminating Powers of Diluted Oxygen.

The frequent supposition that the illuminating powers of oxygen are necessarily much affected by its dilution with a

large volume of nitrogen, appear to have been contra-indicated by the results of some experiments which Mr. Murray made with a sample of gas other than Brin's, containing nitrogen to the extent of forty per cent., and one of their own preparation, having only some seven or eight per cent. Two lanterns were used, the conditions equalised, discs thrown side by side, and other experiments made, with the result that Mr. Murray found himself unable to detect much, if any difference in the brilliancy of the light given off by the aid of the diluted oxygen as against their own gas. The consumption of the former was, however, much quicker than that of the latter, so that the real loss by the use of heavily diluted oxygen would appear to have more to do with the depletion of the lanternist's pocket than with the degradation of his pictures on the screen.

Oxygen, unfortunately, cannot be identified by its trade-mark, and, therefore, when having one's cylinders filled for one by an agent, it is impossible for one "to see that we get" nitrogen-free oxygen. It appears that some of the Brin Company's agents have recently been supplying gases containing large percentages of nitrogen, with the result that the Company have got an undeserved blame in the matter. Mr. Murray, however, philosophically remarked that Brin's had only suffered a little temporary harm, all their agents having come back to them.

We were disagreeably surprised to learn from Mr. Murray that many cylinders sent back for refilling contain oil, &c. By what we could gather from our courteous guide, we have no difficulty in perceiving that the business of an oxygen-maker and compressor carries with it rather above the average number of small troubles, which require sleepless vigilance to obviate and overcome. Mr. Murray is at present supervising the laying down of additional oxygen-producing plant at Huddersfield, Manchester, and Stoke.

LANTERN NOTES AND NEWS.

A CORRESPONDENT inquires if the Lantern Society is still in existence. Not having for many months received any communication from the Secretary, we presume that the Society is no longer doing active work in connexion with lantern matters.

* * * * *

THE slides to illustrate places to be visited during the Photographic Convention of the United Kingdom, to be held at Plymouth in the week commencing July 3 next, are now going the round among the London societies. Mr. Hansford Worth, the Hon. Secretary of the Devon and Cornwall Camera Club, asks for further applications for the loan of them.

* * * * *

MR. WALTER TYLER, of Waterloo-road, for whom, as the "Universal Provider" of Lanternland, we entertain a respect not unmixed with awe, intends to visit the Chicago Exhibition in the course of the summer. No doubt during his stay he will keep an eye on lantern matters in the States, with a view of picking up any unconsidered trifles in the way of novelties for next season.

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THAT is, if there *are* any lantern "novelties" to be met with in America. From what we can gather by a study of the literature of the subject, our friends across the water are somewhat behind us here in lantern-slide work, quantitatively and qualitatively, the same remark holding good with regard to the lantern and its accessories.

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ON February 14, Mr. F. W. Hindley showed his now well-known series of Irish slides at the Shoreditch Tabernacle. As illustrations of life and character in remote parts of the Green Isle, these slides are both instructive and humorous. To generalise from the bootless condition of many of the figure subjects—men, women, and children—in Mr. Hindley's slides, one is warranted in supposing that the trade of the bootmaker in some districts of the distressful country is hardly less precarious than agriculture.

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APROPOS of Mr. G. R. Baker's remarks in the last "Lantern Record" on the subject of the cost of transmitting gas cylinders under the new railway rates, we heard of a case where a ten-foot bottle, which, under the old rates, cost one shilling and threepence for carriage from London to Hastings, was, since the first of January last, charged five shillings and sixpence, an increase of nearly 300 per cent.! The consignee protested against the charge, to the Railway Company, who have asked him to let the matter "stand over," which means, no doubt, that the Company, like other companies have had to do, will revert to the old rates.

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THE other day Mr. T. Edgar Pemberton delivered, in the Court Theatre, an anecdotal narrative, entitled, "The Story of the English Stage," before an audience of distinguished actors and actresses. The lecture, we read, was illustrated by a number of portraits of leading actors and actresses from the time of Shakespeare to the present day, which served Mr. Pemberton as the text for a rapid running commentary. "Some of these screen pictures," adds our authority, "were excellent, but a few were marred by the insufficient size of the sheet upon which they were thrown by the lantern, and others were indifferently focussed." When a non-technical reporter is moved to write thus of a lantern-slide display, we must conclude that it was not so skilfully managed as it might have been. As an adjunct to a lecture, good slides and a well-manipulated lantern ensure half its success; poor slides and incompetent lantern management, even to a non-technical audience, detracts to a like degree from the sum of pleasure or profit derivable.

A USEFUL VARNISH FOR NEGATIVES OR TRANSPARENCIES.

IN the course of an article in the December number of the "Record" on "Lantern Slides," I alluded to the use of a varnish composed of celluloid dissolved in amyl acetate, but since that article was written I have succeeded in making a superior varnish from ordinary pyroxyline, dispensing altogether with the amyl acetate, which is not always easy to procure.

The advantage of celluloid varnish over ordinary collodion is that it sets and dries more slowly and gives a more even film, owing to the absence of the extremely volatile ether which is necessary to effect the solution of pyroxyline. Celluloid itself, consisting of pyroxyline in combination with camphor, is more or less soluble in alcohol either methylated or pure, especially if the liquid be heated, but I have not been able to prepare a satisfactory varnish in this manner, partly on account of the imperfect solvent action, though chiefly because the film when dry is opalescent.

The ordinary sheet celluloid employed at the present time as a support for negative films, if digested in common methylated spirit, slowly swells and gradually dissolves, forming a faintly opalescent solution which flows fairly well over glass, but does not give a very even film. The addition of a very small proportion of ether both aids the solution and improves the character of the film as regards uniformity; but, unfortunately, it dries perfectly white and opaque, and the only purpose to which such a preparation could be put would be to form a dead black varnish for wood or brass work, for which it answers remarkably well, requiring no heat on its application.

It occurred to me that, by using ordinary pyroxyline in conjunction with camphor, the solvent action of plain alcohol might be utilised with, perhaps, better results than above stated. Accordingly, camphor was dissolved in methylated spirit, and to this solution pyroxyline was then added. At first it showed no signs of dissolving, but after some little time it began to swell, and became transparent, and eventually dissolved entirely, forming a bright, clear solution, that flowed easily and smoothly over the glass, and dried with perfect transparency, though very slowly, unless assisted by heat. Compared with a coating of plain collodion, however, I could find no great

advantage as a protective agent, while I think the collodion gave a decidedly more even film, though, when examined side by side when dry, there was not much to choose between the two.

The proportions of camphor and pyroxyline employed were one to four, the camphor being first dissolved in a small quantity of spirit in which the gun-cotton was digested until it was reduced to a viscid mass, after which more alcohol was added, until the quantity of pyroxyline was about five grains to the ounce of liquid. The pyroxyline was Hopkin & Williams' ordinary, which, when dissolved in ether and alcohol, forms a beautifully clear and structureless collodion.

Not being satisfied so far with the result attained, I cast about for a better solvent that could be readily obtained of fairly uniform quality; many solvents offer themselves, but they possess no advantages over acetate of amyl, if indeed they are as good. I remembered, however, some years ago experimenting with methylic alcohol, or rather commercial wood naphtha, as a substitute for ordinary alcohol or methylated spirit in the preparation of collodion; indeed, it was claimed at the time that wood naphtha was, in itself, a perfect solvent of pyroxyline without the assistance of ether.

Whether *pure* methyl alcohol does really constitute a perfect solvent or not I cannot say, but it is certain that the crude article known in commerce as "wood naphtha" will dissolve some kinds of pyroxyline entirely and easily, though others are only partially acted upon, while, again, different samples of the liquid itself exhibit varying solvent powers. The truth is, probably, that the solvent action depends in a great measure on the impurities contained in the commercial naphtha, amongst which are acetone and methyl acetate. The former is well known to be a solvent of pyroxyline, and the latter, judging by the behaviour of the corresponding acetates of ethyl and amyl, may with equal certainty be placed in the same category.

Used alone as a substitute for methylated spirit, the wood-naphtha did not prove, on trial, to answer the purpose much, if at all, better than the spirit in conjunction with camphor. But when a small quantity of camphor was just dissolved in the wood-naphtha, it was converted into an admirable solvent, acting with the particular sample of pyroxyline I have referred to both quickly and perfectly. With other kinds of pyroxyline, as well as papyroxline of the so-called "high temperature" kind, that I happened to have about, it worked equally well as a solvent, but the results were not available for varnishing purposes, owing to a certain amount of opalescence due entirely to the pyroxyline.

The same proportion of camphor—or perhaps a little less—to pyroxyline as that mentioned previously answers perfectly, and the strength of the solution may be varied from three to six grains or more of cotton to the ounce, according to the kind of coating required. For lantern slides the smaller quantity is preferable, but for negatives the stronger film would perhaps be better. The varnish is poured on to the glass in the ordinary way, and left to dry spontaneously in a vertical position, or dried by heat, as may be the more convenient.

Under ordinary circumstances I have not been able to discover any ill effect arising from the presence of the camphor in the film. I have applied great heat without producing any effect whatever, beyond causing a smell of camphor; but it may be worth trying whether, when enclosed between two glasses, as in a lantern slide, a high temperature may not cause a gradual deposition of camphor on the covering glass, and consequent loss of transparency.

W. B. Bolton.

LANTERN MEMS.

The obnoxious railway rates are to be amended, and lanternists will be pleased to learn that already the larger companies whose lines run to the north and west have reverted to the old scale of charges for gas cylinders sent by goods train.

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By general consent, it seems to be admitted that the lantern trade has been suffering this season, either from the general depression, or over-production, and the increased number of dealers in apparatus. When every store, many of the large drapers, some of the athletic outfitters, map-sellers, toy-dealers, and others of outside businesses, take to buying commercial lanterns, English or foreign, as the case may be and offering them for sale, it stands to reason that the legitimate traders—*i.e.*, opticians and photographic apparatus-sellers—must be affected.

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Of course, in these days of free trade, it must not, I suppose, be hinted that business should be in any way controlled, but most people will agree with me that it is not reasonable to expect a hosier or toy-dealer to understand sufficiently the technicalities of the optical lantern and all accessories to be in a position to personally satisfy himself and customers that what he is selling is really a scientific instrument.

* * * * *

In pre-photographic days the magic lantern could hardly be called a scientific instrument, except in special instances; but now, with lantern sections to photographic societies in such numbers, and lantern societies as centres for criticism and demonstration, anything that does not approach perfection is discounted, if not tabooed.

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One naturally, with all the varied designs of lanterns as catalogued and advertised, asks the question, Is there a fashion in the optical lantern? If so, has the fashion changed during the last year or two? and, if so, in what direction is the change?

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No doubt, with technical education so much to the front, and the optical lantern popular as a means of demonstration, the inquiry for either scientific or practical slides has increased, and also some modifications in design of apparatus become necessary, so that physical and other experiments can be readily made. The change has been somewhat gradual, but, nevertheless, is decided.

* * * * *

Recently a splendidly made jet gave a little trouble by not producing as much light as formerly, and on examination it was found that the mixing chamber had become fused, and the discs and gauze alternately placed had become clogged. It had been used with a great pressure, and the orifice in nipple was the maximum size it was thought could be worked.

* * * * *

In the result it was found that, notwithstanding the mixing box was already large, it was not large enough for the orifice used, and a better light was obtained by a smaller aperture; for as the pressure increases the opportunity for mixing rapidly must also be available, otherwise the gases blow right through the nipple orifice in somewhat separate streams and do not give the best light, in fact approach nearer the principle of the blow-through jets.

* * * * *

In the old days of gas-bags the pressure was nothing like it is now from the gas-cylinder and regulators, and so the conditions of mixing in the chamber were different. I remember the late Mr. Viles designing a very free way mixing chamber and nozzle for use with bags, and with excellent results; but the same form when used now with pressures representing twenty-four inches of water pressure (and in one case I know of forty inches) it would not be at all the best kind.

* * * * *

The end of the month will bring the end of the lantern season within measurable distance, hence it will be wise to give a thought to the condition of the apparatus before it is put by for the summer. All lime-dust must be removed from inside the body of lantern and finger-marks carefully wiped off the brasswork.

* * * * *

Should it not be possible to keep the whole of the apparatus where the temperature will be equable, and above 50° Fahr., the indiarubber tubing should be disconnected, and put away separately, so that it does not get hard and perish. A little furniture polish (or sweet oil and vinegar mixed) should be rubbed on the woodwork with a soft rag, and all steel parts of jet, &c., wiped over with an oily rag, and afterwards by a clean rag.

* * * * *

For class demonstration, however, the lantern can be employed right up to midsummer, if the limelight is used, and the windows of room reasonably screened by blinds, and providing, of course, that photographs and diagrams, &c., or objects not requiring the maximum of light (such as the microscope), are exhibited.

G. R. Baker.

SKIES IN LANTERN SLIDES.

TIME was, when it was not an unusual occurrence to project upon the screen at a lantern show, a transparency in which the sky was represented by the blank sheet. "We have changed all that," as our *pyrogallic* neighbours say in a well-known proverb. Now, perhaps, there is a tendency to introduce skies too strong in character; but, as this article is to deal with the technical rather than the art side of lantern slides, I must let that pass.

There are three methods of introducing clouds, from a separate negative, into a lantern slide, viz.—

1. By printing them upon the cover glass either by contact or in the camera.

2. By combination printing in the camera upon the *same glass as the rest of the picture*.

3. By combination printing upon the *same* glass by contact.

It is my intention only to describe the first method and the last in this article. The first method because it presents the fewest difficulties in practice, the last because I have a little hobby of my own to ride, and because I think I have found a useful and convenient method.

The first way consists in printing what I may describe as the foreground of the picture upon one lantern plate, and the sky portion of the picture upon a separate lantern plate, which latter is made to serve the purpose of a cover glass. This appears at the first blush to be an extravagant way of setting to work, but it will not be found so in practice. It will be apparent that there is a greater risk of failure when two negatives are to be combined into one picture than when all the image is to be secured by one exposure only. By making a separate exposure of each part, the risk of spoiling an already good foreground by adding to it an imperfect sky is avoided. More than this, for, supposing, by way of example, that this misfortune has already happened, it is easily remedied by clearing off the faulty sky image with a strong reducer, and then adding another and a better sky upon a separate plate. So that, in this manner, if the first way be not relied upon as a *method in itself*, it is, at all events, a sort of *pis aller*—a way out of the difficulty in default of some other procedure which has failed. As I am only suggesting methods of working, and not dealing with the routine of slide-making, no instructions for exposure or development need be given, but the following points are of importance, and should be carefully attended to.

First, as to the lighting of the sky negative—I mean the direction from which the sun's light falls upon the clouds at the time of photographing. Be careful to select a negative in which the clouds are lighted from the same direction as is the foreground. A sunset sky, a magnificent effect of its kind, looks ridiculous when there are cast shadows in the foreground indicating that the sun was upon the left-hand side of the camera at the time of making the negative. It may be suggesting too much in these days of the ready-made, that every one should make his own cloud negatives, but it is a most interesting and fascinating study—that of cloud formations—and a pursuit which may often be followed when landscape is out of the question. A naturally lit sky negative secured, a reversed transparency must be made of it if the cover glass system be followed. The two films—that on the foreground portion and the sky on the cover glass—being brought together film to film for mutual protection, it is clear that the latter (the sky) will be looked at from the reverse side to that of the other, or foreground part of the picture.

Being thus viewed from opposite sides, viz., one from the glass side and the other from the film side, one of them, preferably the sky, should be reversed, so that, by being placed film inwards, its appearance when viewed *that way* is correct. This involves the making of the sky transparency by copying in the camera, and not by contact. If the sky negative be reversed in position in the copying camera, i.e., placed film side *away from the lens*, the resulting transparency will be reversed as far as right and left are concerned, and that is just what is required. Sky transparencies for the method by contact, then, are impossible, unless a sky negative be available which happens to be lighted in the opposite quarter to that obtaining in the foreground, in which case it may be used, and being reversed in the transparency, will be suitable for our present purpose. Generally speaking, I much prefer transparencies made in the camera. There is an indescribable quality about them when shown in the lantern, which is, nevertheless, an obvious one. It consists, I think, in the crispness due to the rays of light proceeding from the lens in the copying camera with little, if any, diffusion, whilst in transparency or contact work the light strikes the negative in all directions and produces a mild form of halation or blurring in the resulting transparency, evidenced in the lantern as a lack of crispness, which does not, however, amount to "unsharpness."

Unless the horizon line be very intricate it will be found most convenient to neglect the sky portion of the foreground and the foreground portion of the sky when making the transparencies. After being fixed, washed, and *dried*, those portions which ought to be clear glass may be made so by a strong reducing bath, such as Farmer's ferricyanide of potassium and hypo. I am inclined, however, to prefer for this purpose a cyanide bath containing tincture of iodine, as it leaves the gelatine film a better colour, and acts more energetically. The following works well for this purpose:—

Cyanide of potassium	100 grains.
Tincture iodide of potassium	20 or 30 minims.
Water	1 ounce.

The solution should be applied to the film, *when it is dry*, with a well-shaped sable brush. If found to act too strongly, the proportion of water may be increased. It must be used upon the *dry* gelatine film, for, if it be applied to the film when wet, the solution will be found to run out of control.

I will now pass on to the third method, viz., printing both sky and foreground upon one plate, and by contact. Let me frankly say at once that much more skill is required to work successfully upon the once sensitive plate; and that, whether it be by contact or in the camera, and whether the two exposures be made by careful registration and developed at one time, or whether the way I prefer—viz., of exposing and developing the foreground, and then adding the sky exposure—be adopted, still the technical difficulties remain. I advocate, therefore, the method which I have already described, because it is the easiest, and there is no advantage in choosing the more difficult way; and it is the cheapest, and this is a happy coincidence. If this be not enough, I am also inclined to find it the most perfect from a technical point of view, because the two portions, or rather the sky, can be pared and reduced down to an indistinguishable joint. Yet, with all these advantages, I shall be inconsistent enough to praise the last, or third, method, if for no other reason than its presumed novelty.

But to proceed. In this method the chief factors are the careful and, I ought to add, judicious shielding of the sky portion from the action of light during the exposure of the picture proper, and also of the picture portion—but this is not so important—during the imprinting of the sky. For this purpose a mask must be prepared, and I recommend that a print be made from the picture negative, and that, after mounting it upon a piece of thin card (it need not be toned or fixed), the line of demarcation between sky and picture be carefully cut with scissors or knife. Armed with the carefully cut mask, an exposure by contact of the picture may be made, the sky being judiciously shielded from light.

Development is proceeded with in the usual manner, and the plate carefully washed. Now place upon it a sheet of clear, transparent celluloid, such as is used for cut films, or a piece of Eastman's rolled film. Rub it down into contact, and be careful to remove air bells. Dry the surface of the superposed celluloid, now ready to be placed, with its attached plate, in contact with the sky negative. The function of the celluloid film is simply to prevent the wet gelatine film being brought into contact with the sky negative, which would quickly spell ruin to it. A proper exposure can now be given to the sky, the foreground being shielded or not, according as it is intended to allow the developer to flow over the whole or only the sky portion of the transparency. My usual practice is not to shield it, but to develop the sky with a large camel's-hair brush, tilting the plate and the containing developing dish at a convenient angle to prevent the developing solution covering the picture portion of the slide. This simple expedient of an intervening waterproof film enables skies to be put in by the double development process, which hitherto have involved the necessity of working by the camera method. As it is quite easy in practice, and involves no further cost for apparatus, it is, at any rate, worth a trial, which will, I trust, be as satisfactory to my readers as it has been in my own hands. If the Editor thinks there is any general interest left in it, I may describe the second method "in the camera" in another article. S. HERBERT FRY.

LANTERN MATTERS AT THE CAPE.

WE are enthusiastic here on lantern-slide making. A goodly number of the members of the Cape Town Photographic Club boast an oil lantern, and at every meeting of the Club an exhibition of lantern slides is given. I say at every meeting, but I should say at at least ten out of the twelve ordinary meetings during the year, and we generally have one or two limelight nights, when the public are invited. It is always dark before nine o'clock here, even in mid summer, and before half past nine the discussion has been disposed of, and the slides appear on the screen. A selection of slides will be shown publicly next week in Cape Town, and will then be shipped fo England to go the rounds of the various societies and clubs. I dare say you will find them a very mixed lot, but then we can say much

about the same thing with reference to the sets that came from England to go the rounds here. I have not seen them yet, and have perhaps no right to express even the very natural opinion just given. Good, bad, or indifferent, a little outspoken criticism by the English photographic journals will do us no harm.

Limelight.

We are still in the dark ages here. The old gas bags, and, alas! that it should be so, retrogression to the blow-through jet. Careless manipulation and too many cooks led to a disaster in Cape Town with the mixed jet. The old story—hydrogen in the oxygen bag. Now the proprietors of halls will not let the mixed jet be used. Up country, where coal gas is unprocurable, and it takes a day's work to make eight feet of hydrogen, the ethoxo light has grown into favour. The Cape Observatory, however, is now to the fore. Here we have an electric light installation, and the Philosophical Society recently purchased a Serrin lamp. At a recent meeting, when Dr. Gill exhibited some astronomical photographs, it was somewhat roughly rigged up, and the current from a storage battery of thirty-two cells turned on. With the dynamo, the arc light in the lantern is an exasperating failure; but, with a steady current, the light is fairly free from jumps and of great brilliancy. Altogether, it was a success, and when the lamp is properly fitted to the lantern, with suitable adjustments for centering, we hope to do better things with it. A gentleman here who has his own installation is getting a lantern wtih electric lamp fittings from England. The arc light is to be used, but I was asked by his electrical engineer what incandescent lamps it would be advisable to try with it also. As I hope to be present at the trial, I trust to be able to give you particulars later on. There is this much to be said, that electric lighting is making greater strides out here than in England proportionately to the importance of the two places, and referring also to its general use, and not to discoveries and inventions, for which, of course, we look to you. There are fewer vested interests in the shape of gas companies, &c., in the way. Some small suburbs of Cape Town are already lit by electricity, and Cape Town follows soon, the dynamos to be worked by water power, and electricity supplied to shops and private houses. I venture to think, therefore, that in its adaptation to the lantern we may get ahead of you, and any notes on the subject may be of service.

Harking back to the arc light in the lantern, I have one serious objection to make against it. The heat is great, and add to that changing of slides, and incessant looking to the centreing, the work is warm. Add further, as I experienced recently, the working of thirty or so moving comic and chromotropes in a darkened room, some twenty feet square, on a Saturday afternoon, the thermometer standing at 86° in the shade, and seventy children and adults present, and you will agree with me that Sheol would have been a relief to it. The forty minutes it lasted took more out of me than a walk up Table Mountain. Happily I had anticipated it, and put on *not* my best clothes—they wanted wringing out after the performance.

The Lanternoscope.

This is a handy little instrument, but I fancy that one of our club members, Mr. Gracie, has introduced a very obvious but great improvement. Instead of a little lens, he has introduced a large one, as in the graphoscope, so that two eyes may be used. Of course, the instrument is a little more bulky, but not remarkably so.

Cutting Lantern Masks.

Will this item be new? I have used the method some years, but it is so obvious, that I am afraid it will be new only to the few. I have always cut my own masks, "to make the punishment fit the crime," and made my own templates, but the difficulty arose in getting the opposite curves symmetrical. The template I use is only half a template, and it is graduated (see sketch) for various widths. The paper is folded, and, when cut, the opposing curves correctly balance one another.

C. Ray Woods, *Photographic Assistant at the Cape Observatory.*

FLEXIBLE METALLIC TUBING FOR THE LANTERN.

The United Flexible Metallic Tubing Company, of 96, High Holborn, is the company from whom the flexible metallic tubing recently referred to by Mr. Haes as suitable for use with the lantern may be obtained. It consists of long strips of metal, shaped to the required section by mechanical means and coiled in a spiral form round a core to form the tube. The operations are performed in a single machine, which produces the complete tubing from the plain strip. It may be had of various internal diameters, in steel or bronze, from five-sixteenths to one and a quarter inches, at sixpence per foot upwards. The tubing is gas-tight, does not kink or smell, and is so far flexible as to coil in a circle of eight inches.

A NEW FOLDING LEVER KEY.

Brin's Oxygen Company are just introducing a New Hinged Lever Key, which combines the good qualities of the ordinary "piano," or Tee

Handle Key and the long Lever Key, without possessing their disadvantages. The Company has hitherto discouraged the use of lever keys, because even in the hands of experienced workers such power can inadvertently be exerted in closing a valve, so that the spindle is liable to injure the valve seating.

The new key will render the opening of valves easier, and at the same time permit of finer and steadier adjustment than is obtainable with the ordinary "piano" key. The above sketch explains itself. The *full leverage*, as illustrated at B and C, is obtainable, if desired, for opening

the valve; but, *as the hinge acts in only one direction*, the key, when used for closing the valve, is converted into the ordinary "piano" form, as illustrated at A. The Company recommend the key to be used for medical purposes, or where oxygen is employed direct from the cylinders.

LANTERN SLIDES ON GELATINE PLATES.

[Leytonstone Camera Club.]

Our subject this evening is "Lantern Slides, and how to make them." This is a very wide title, considering the number of processes there are by which they can be made; but I only intend to treat of one of them this evening, and that is the ordinary gelatine plate of commerce, leaving the others, such as the wet-collodion, collodio-bromide, albumen, &c., to abler hands than mine.

Lantern Slides versus View Albums.

It has always been a matter of surprise to me how few photographers, either amateur or professional, go in for lantern-slide work. Personally, I consider it the most fascinating branch of photography, especially for the amateur who may only go in for a quarter-plate camera, as then it is simplicity itself; for the man who works a larger size it certainly is a little more difficult, but not a great deal. But, whether he use a large or small camera, the pleasure is just the same, as he can occupy his winter evenings, first in making them, and then by showing them in his lantern (or some one else's) to his friends, for it is a fact that you can get people to sit a whole evening and look at photographs on the screen when they will get satiated after half an hour with an album of prints. Another thing, he may have a dozen albums of views, but no one will trouble to come and borrow them to look at (except perhaps on a few occasions, for a *conversazione*, when ten to one they will come back dirty and finger-marked, and practically half spoilt), and there they lie from one year's end to another, a perfect waste of money and power. But let him make a lantern slide from each of them, or, say, only the best, and he will soon

find that his pictures, which as prints in an album no one took much notice of, are now in great demand. A friend from round the corner will send a polite note requesting the favour of the loan of a few slides, as he is going to have some friends. Then the schoolmaster hears of it, and borrows them to show the school children; and then the rector of the parish has a turn, and so on. Thus your picture, which only gave pleasure to a few before, now does so to hundreds, and perhaps thousands.

The Slide and its Uses.

What is a lantern slide? It is simply a print upon glass instead of paper, to be viewed by projection from an optical lantern upon a screen of more or less large dimensions, as by this means it is greatly enlarged. A *sine-quâ-non* of a good slide is that it shall be perfectly sharp, in fact, as sharp as needles; no fuzziness, rough paper, or diffusion of focus is allowed here. A judge who would award a prize to a print from a diffused focus negative would be "down on it like a cart of bricks" if you sent in a slide from the same negative. Another condition of a good slide is that it shall have perfect gradation, from the very highest light (which only should be clear glass, and not much of that) to the deepest shadow, so as to produce that softness of effect which, in my humble opinion, is so desirable in a good slide. I think that the days of the hard black-and-white slide, of diamond mounted brilliance, are fast being numbered.

This brings us to the uses of a lantern slide. We have already spoken of the pleasure side of the question, but that is not their only use. It is as helps to instruction that they are already, and will in time become more so, of the greatest use to man. In hospitals, colleges, schools, &c., they are used to illustrate lectures in a maner that was impossible in the old days with diagrams drawn by hand. I believe a good many hospitals and colleges now have a dark room and apparatus attached for the purpose of making slides of objects and diagrams to be used in the class-room. To the lecturer in astronomy, botany, geology, &c., they are simply invaluable.

Contact and Reduction Methods.

There are two methods of making lantern slides, first by contact, and, secondly, by reduction in the camera; the first is the most simple, and very fine results are obtained by it; but it is only applicable to small negatives or small portions of large ones. For the whole of a quarter-plate, or anything over, we must have recourse to our second method by reduction, and it is to this that I shall chiefly refer this evening; but I will give a short description of the method by contact first. In printing by contact, it is as well to have a special printing frame, such as the one I have here (Adams'). By means of this I can print from any portion of a negative, from whole-plate downwards, and, once having selected the portion required, there is no need to readjust the frame, supposing that you want more than one slide from the same negative. There is also no chance of the plate slipping and thus getting scratched, which is very likely to happen with the ordinary frame, it also prevents any light getting in at the side of the slide. A lantern plate is taken and placed in contact with the negative and exposed to the light of a lamp or gas flame for so many seconds, more or less, according to the density of the negative, near to the light if it is a hard one, and some distance off if it is a thin one. There is one good thing about this method, and that is, that you can be pretty sure of getting a good slide at the second shot if you don't manage it at the first, as, the light being nearly a constant factor, it is only necessary to give the next plate a few seconds more or less, according to circumstances.

But to come to our second method, by reduction in the camera. By reduction I mean, to reduce the whole of, say, a 10×8 negative on to the standard $3\frac{1}{4}$ inch lantern plate. Obviously this cannot be done by contact, so we must use the camera. The 10×8 or any other sized negative is placed in such a position that it is evenly illuminated, and then simply photographed on to the lantern plate. The great drawback to this is, that it is almost imperative that it be done by daylight, as the great difficulty with artificial light is to get an even illumination over the whole of the negative, unless you use a condenser, which is an exceedingly expensive item, as one large enough to cover a half-plate would have to be about eight inches in diameter, and would cost about 5*l.*, and one twelve inches in diameter would cost about 11*l.*, and that would only cover a whole-plate, so that for most amateurs is out of the question. But, by using daylight, it is a very inexpensive matter, providing you have the time and the daylight; but that is the rub; most of us have not much time when daylight is available; but for those that have, here is what is required, and those that have not got it should make it by getting up a couple of hours earlier in the morning (I know one man that makes the majority of his slides by this means), it will do them a lot of good in more ways than one. Take a board about three feet long, such as the one in front of me, and attach a frame to one end of it to hold the negative, and a small sliding platform to hold the camera. This is then to be rested on the frame of a window having a clear view of the sky. This length of board is quite long enough to reduce even from 12×10, if a four-inch lens is used. Two pieces of grooved wood cross the frame to support the negative, and these pieces can be adjusted at any angle, so as to be able to correct any lines that are not quite plumb, the swing-back of the camera being also brought into play for the same purpose. This board can also be used for artificial light without a condenser, if magnesium ribbon is used, and we will try a few exposures this evening. A piece of ribbon is burnt behind the negative, and is passed rapidly to and fro, only pausing for a moment where any part more dense than the rest requires more light, or strands of the ribbon can be stretched across a frame behind the negative, having a double thickness opposite the part that requires it; but this does not seem to give such an even illumination as the previous method.

The Plate and its Development.

There is a choice of several varieties of plates to use, and I think they are all as good as one another; but it is better to stick to one make of plate, as then you can get a set of slides all about the same colour and tone. I am speaking now of black tones, but for reds, warm brown, or purple, it is as well, perhaps, to use a chloride plate such as the Alpha or Cowan's. Some of these colours can be obtained on the ordinary plate by toning with uranium for brown sepia or reds, and by developing with pyro and carbonate of ammonia for purple; for good blacks nothing seems to beat hydroquinone, although very good shades of black can be obtained with ferrous oxalate, eikonogen, rodinal or amidol. The formula that I use is the Ilford Universal, as follows:—

No. 1.

Quinol	100 grains.
Potassium bromide	30 ,,
Soda sulphite	2 ounces.
Water to	20 ,,

No. 2.

Soda caustic	100 grains.
Water	20 ounces.

One part each No. 1, 2, and water, and for chloride plates, two parts quinol, one part soda, and four parts water. With quinol there is no necessity to use a clearing bath, as this developer does not stain the plate like ferrous oxalate. The fixing bath, four ounces hypo to a pint of water, is quite strong enough, and a fresh clean solution should always be used. After the slide is fixed it should be well washed in running water for one or one and a half hours, then dried in a place free from falling dust, when it is ready for mounting. When the slide is taken from the tank after washing it is well to give it a final rinse under the tap and gently pass the finger over the surface of the film. This will remove any particle of dust that may have become attached to it.

Exposure.

The matter of exposure is an awkward one to deal with, no two negatives require the same, a very dense one on a dull day in winter at 11 o'clock may require anything from two minutes to twenty on an Ilford Special, Fry or Paget Rapid, but a negative of good quality and proper density, say at this time of the year at 11 o'clock, with a bright clear sky about forty seconds or thereabouts, but it is mostly a case of trial and error, if thirty seconds has been found too little, the next one, at forty-five seconds, will perhaps be right. This may seem somewhat wasteful and extravagant, but it is not necessarily so, you *may* use four plates before you get a right exposure in the first negative that you start with; but this experience will serve you well in the following ones, and you may go on, and, with one or two exceptions, make a good slide at each exposure afterwards. The great difficulty is, that the light is not a constant one, especially when the sun is obscured by clouds, so that, when returning from the dark room, you may not notice that the light is not so good in consequence of a darker cloud than usual having crossed the sky; this means that the next plate will be more or less under-exposed; it is these little things that throw you out and account for the pile of wastes that come in so handy for cover glasses. While we are on the subject of exposure it is necessary to point out that there are very few negatives but what are all the better for a little judicious shading of some part or another—for instance, covering the landscape, while the clouds in the sky print through, that is supposing that the clouds are there to print; if not, it is better to sun the sky down, by moving a piece of card up and down in front of the negative, giving more exposure to the upper part of the sky than the horizon. Again, in the case of an interior view, the window will be much more dense than the remainder; this should be printed by cutting a hole in a piece of cardboard, and holding it so that the light

coming through the hole only on to the window will enable it to print through; then, when it comes to developing, these under-exposed parts may be brought up, by the use of a stronger solution applied by means of a brush, or, better still, by the finger tip, as the heat from the finger helps the action of the chemicals in the developer; this brings us to another point in the matter of under-exposed (or apparently so) plates.

Toning, Reducing, &c.

At this time of the year, if the solutions are kept in a cold room, the chemicals that compose them will refuse to act to their full power unless they are raised to the normal temperature of 60° or a little over; the careful use of a jug of warm water at this time of year will make a great difference in the number of thrown-outs; but all these under and over-exposed and under and over-developed plates need not be all wasted; take the under-done ones first, they can be intensified by bleaching with mercury, followed by a twenty grains solution of potassium sulphide, which will give them a somewhat brown tone; and apparently they are permanent, as I can detect no change in the slide that I will hand round, although I made it some two or three years ago. But the most satisfactory way of improving a plate that has been only a little under-exposed or developed is to tone it with uranium; as this also slightly intensifies it at the same time, very good browns, reds, and sepia can be obtained with it, a solution of half grain each of uranium nitrate and potassium ferricyanide and fifteen minims acetic acid to the ounce will work well. Place the slide in this and watch it, till it has gone some distance beyond the shade of brown that you require and then wash it in water until all the yellowness has disappeared from the white and it has come down to the desired tone; it must not be washed too long or it will all disappear, as the salt that is formed is ferrocyanide of uranium, which is soluble in water. If you want a chalk red or Bartolozzi tone, continue the toning a little farther and then apply a reducer, such as Howard Farmer's, of potassium ferridcyanide and hypo; or, better still, Haddon's, viz., potassium ferridcyanide five grains and sulphocyanide of ammonium ten grains to the ounce of water, this will dissolve out all the silver and leave only the red uranium image.

To come to over-exposed and developed plates, these may be reduced by the last-named reducer, being very careful to watch it well, as it is very rapid in its action. The plate must then be quickly and well washed, and carefully dried, or otherwise the tears left on the plate will go on reducing till it leaves a clean spot where it rested. Chloride plates, over-toned with gold, can be improved by these means, by dissolving away a portion of the silver and leaving the gold behind untouched.

Chloride Plates.

You will notice that I have treated only of the ordinary bromide plate; the chloride wants a different treatment entirely. Very beautiful tones can be got both by simple development and also by toning with gold, but the great drawback to the use of these plates for reduction in the camera is their slowness. Life seems almost too short when you have to use up the whole of one day in summer to obtain a half-dozen slides; but by contact it is another matter, an exposure of two or three minutes to a good paraffin lamp, with a very weak quinol developer will give you all shades of brown or red, according to the length of exposure and development; the longer the exposure, the warmer the tones. These can afterwards be toned in the combined toning and fixing bath to very rich brown, purple, or deep blue.

You will see by all this that there is a little more difficulty, perhaps, in making a slide than there is in making a print in albumen or gelatino-chloride paper, but I think that the results certainly warrant the extra trouble. I don't think that there is any process in photography that will show the amount of detail that there is in a negative better than a lantern slide, or any other sized transparency. There is one great advantage in making a lantern slide of all your good negatives, and that is, that if at any time you break the original negative it is possible to make another by enlarging from the lantern slide, which will be little, if any, worse than the original.

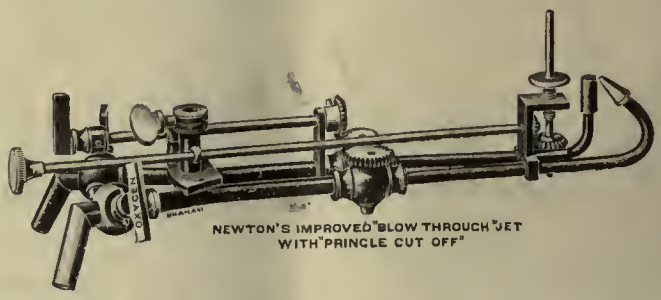
A Question.

This brings me to the end of my paper, and I have only one more thing to say, and that is to ask a question. Why is it, in all photographic competitions, the conditions in the lantern-slide classes imposes that six lantern slides shall be sent in? It seems to me distinctly unfair that one medal to six slides should disqualify prints from the whole of those negatives from being shown in competition where previously medalled pictures are barred. It is infinitely more trouble to make a good lantern slide than it is to make a print by any method that I know of. If six prints are sent in, and six lantern slides from the same negatives, if one of the prints secure an award, it only disqualifies one of the slides; but, if the slides secure the medal, it disqualifies the whole of the prints. This should not be so. Of course one can quite understand the secretaries of exhibitions wish to get as good a show of slides as they can, especially in numbers, which they might not be able to do if they offered a medal for single slides. I think that this is a very good subject for discussion by the forthcoming meeting of Exhibition Judges if it (the meeting) ever comes off.

H. E. Farmer.

AN IMPROVED BLOW-THROUGH JET.

Messrs. Newton & Co., of Fleet-street, have introduced an improved blow-through jet with the Pringle "cut off." The principles and action



of the jet can be readily understood by the lanternist from the above excellent cut.

RECENT LANTERN PATENTS.

PATENT COMPLETED.

A New Magic-lantern Slide.

No. 4668. William Havelock Mason, 8, Harold-terrace, Hermitage-road, Green Lanes.—*January* 14, 1893.

The invention has for its object the production of a new magic-lantern slide, whereby a drawing, writing, or other delineation is made, more or less gradually, to appear upon a screen as though it were being drawn thereon.

In carrying my invention into effect, I take a saturated solution of saltpetre, slightly thickened with gum arabic dissolved in water, or a solution or preparation of other suitable inflammable chemical substance or substances, and with it I write, draw, or print any design, writing, or delineation upon an unglazed paper, or other suitable substance, which is capable of burning away readily at the parts where the solution is applied, but which will remain intact at the other parts thereof.

I mount this prepared paper, or other suitable substance, as a magic-lantern slide, a suitable form consisting of a cardboard "mount," having a square, or other suitably shaped aperture therein, and of somewhat similar character to mounts used for drawings, pictures, &c., on one side of which "mount" I cement the prepared paper or other substance used.

Slides thus constructed are placed in a carrier in a magic lantern, fire is applied to one or more points of the design, and it is then focussed.

The said paper or other substance produces on the screen either darkness or a coloured disc, according to the thickness, texture, and colour of the said paper or other substance. Fire having been applied as aforesaid, the paper or other substance prepared as before described burns away at the parts drawn, written, or printed upon with the solution referred to, but remains intact at the other parts thereof. The result is that the design so written, drawn, or printed as aforesaid is more or less gradually reproduced on the screen in white upon a black or coloured ground, according to the nature of the paper or other substance used.

I would here remark that the lines of the writing, drawing, or other delineation are preferably made as continuous as possible, in order to avoid the necessity for applying fire thereto at any inconveniently large number of places; but, in order that the ground may be retained flat when the inflammable composition forming the design has been consumed, I make a suitable number of spaces in the design so as to leave at intervals unconsumed cross pieces, which connect the various parts of the ground securely together, and thereby prevent any part thereof from falling out of focus. I would also remark that other suitable solutions or preparations of inflammable material may be employed in lieu of the preparation of saltpetre herein referred to.

The claims are:—1. A magic-lantern slide consisting of a sheet of unglazed paper or other suitable material, on which any desired design or matter is written, drawn, or printed by means of a solution or preparation of saltpetre or other readily inflammable material, substantially as herein described and for the purpose stated. 2. A magic-lantern slide in which a design or other matter is drawn, written, or printed on a suitable ground with a solution or preparation which is readily inflammable, substantially as herein described and for the purpose stated.

Before the Bristol and West of England Photographic Association, on February 24, Mr. E. Brightman in the chair, Mr. Gwyer showed a new oil lantern he is patenting, which gave very nearly three times the light of a good oil lantern matched against it. This result is obtained by a new system of concentrating three wicks, using common paraffin, and an ingenious shafting for draught. The lantern worked without any smell.

"Lantern Queries" are unavoidably held over.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*April 7, 1893*

THE LANTERN RECORD.

CONTENTS.

LANTERN NOTES AND NEWS.

Mr. Walter Tyler, of Waterloo-road, has kindly promised to give, early in the ensuing season, a Lantern Entertainment, in aid of the funds of the Photographers' Benevolent Association.

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On the occasion of the Leicester Society's Exhibition a fortnight ago, Mr. H. Pickering, the Hon. Secretary, was agreeably surprised at the receipt of a testimonial from his fellow-members in recognition of his services to the Society. It took the form of a handsome lantern by Messrs. Archer & Sons, of Liverpool. By the way, Mr. W. J. Archer informs us that he, too, is "off to Chicago." "Are you going to Chicago?" is a question as frequently asked just now in the photographic world as Messrs. Pears' "Good morning! have you used Pears' soap?" is in the newspaper advertisements.

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We learn that nearly 2000 lantern slides were examined and tested recently by Messrs. F. C. Beach, William H. Rau, and Dr. G. Hunter Bartlett, the Committee of the American Lantern Slide Exchange. Over eight hours were spent in the work. Fifty per cent. of the total were sorted out as passable. Many of the others were marked with a letter showing the reason for rejection, and returned to the clubs from which they came. The slides have been arranged in nine sets, and there is also a set of English slides. The slides are already going the rounds of clubs in the Exchange. The defects in most of the slides rejected were from under-exposure and too short development.

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This is a lantern story—and a true one. At a popular place of entertainment, not a hundred miles from Sydenham, an elderly gentleman of respectable appearance one day presented himself for admission, when, to his surprise, the money-taker turned to an adjacent officer in blue, and said, with a laugh, "I say, Bill, look here; we know this man, don't we?" "Know him," replied Policeman X, grinning; "rather. Why, he's quite a notorious character!" "What do you mean?" demanded the visitor, in mingled astonishment and annoyance. "Oh, you'll do," said the money-taker; "but we've seen you too often for *that* sort of thing, you know." "I should think so," chimed in the policeman; "why, we've had our eyes on you every night for the last fortnight." The elderly visitor looked amazed. "I've never been in the place in my life before," he gasped, and then the policeman and the money-taker burst into loud laughter, to the utter discomfiture of the other. When they had had their laugh out, they explained that they had seen the elderly gentleman in uniform on a big white sheet—and then a light dawned upon him. It seems that, like Mr. Bumble, he was a "public character," and that he had been (in his picturesque official panoply) photographed, "lantern-slided," and projected on the screen at the nightly Lantern Entertainment. And so all ended happily.

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On Tuesday evening, March 28, the Photographic Society of Great Britain indulged in the mild frivolity of a Lantern Evening—just like the smallest and humblest of its adopted children. But it was quite an accident. Mr. Fred Hollyer was prevented by illness from giving his promised demonstration of *Platinotype*, and so at the last moment the bill had to be filled by a scratch collection of slides. And very good slides they were too, chiefly of Yorkshire scenery, and contributed by the Leeds Photographic Society. The chilling solemnity of the Parent Society's meetings might, in the winter months, be very well relaxed in the interests of the younger members by an occasional Lantern Night.

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Writing of the keeping properties of oxygen in cylinders, Mr. C. T. Milligan, in the *Exhibitor* (Philadelphia) says: "Our plant of tanks is in constant use, and consequently has not given us much opportunity to test this subject thoroughly, because new gas is pumped into them perhaps once every week; but we remember that, some years back, a gas tank turned up that had been out of our possession for at least two years. It had been sent away with oxygen in it, and had been stored away out of sight, we cannot tell exactly how long; but we remember when the valve was opened, it was evident, from what was blown out of the valve, that some insects had made their nests inside." Insect cultivation in oxygen sounds a bit out of the common. We always thought, and it certainly is taught, that life could not be sustained in an atmosphere of oxygen.

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Mr. Milligan has been, he says, experimenting in the direction of doing away with regulators, and, after studying out the subject for some time, tried the experiment of connecting the gas tanks having great pressure, with the lanterns direct. He found there was no difficulty whatever attending the trial, and that, with a single lantern, he could just as readily connect with a cylinder having eighteen hundred pounds pressure as one having twenty or thirty pounds pressure. There is no more skill required in operating one than the other, and no more danger in using one pressure than in using the other. The regulating of the supply of gases is done at the gas tanks the same as it is done with the lower-pressure tanks. The next experiment was with a pair of lanterns and with a dissolver. He took a pair of tanks, each having eighteen hundred pounds pressure, with no regulator, used his ordinary high-pressure dissolver that is attached to the lantern, connected the dissolver with the tanks by ordinary rubber tubing, and was enabled to get perfect dissolving. He found, he states, that it was better dissolving than with the lower pressure, and this result merely corroborated the theory on the subject which led to these experiments.

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The results of the foregoing experiments justify Mr. Milligan, he says, in condemning all regulators. He thus meets possible objections to this condemnation: "We imagine that the first answer to our condemnation will be that the regulators make a uniform supply of gas all through the exhibition. Our answer to this is, that the very

fact that the tanks being smaller, and the quantity of gas used at any one time being the same with either form of tank, that the smaller the tank the more uniform the flow will be during an exhibition. Therefore, from a small tank we expect a uniform flow. This is true when the pressure is high. The higher the pressure the more uniform the supply. We advise that regulators be thrown aside."

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From a letter published in the Journal this week it will be observed that the Plymouth Convention slides have been lost in the course of their wanderings among the various photographic societies desirous of seeing on the screen, pictures of the places to be visited next July. We hope the missing set will be recovered.

CUTTING LANTERN MASKS.

The size and shape of the mask employed is often a matter of far greater importance than the producers of lantern slides appear to think, as in very many instances an otherwise good picture is spoilt by having too much foreground or sky included, owing to the regular size of mask not suiting the particular subject. Besides this, when working from such sizes of negatives as, say, 8×5, it becomes abso lutely necessary, if the ordinary masks are used, to waste nearly half the subject, with the result, very often, that the composition is altogether ruined.

The manufacturers of lantern requisites have not yet come to fully recognise the difficulties arising from the difference in shape of the lantern plate and most of those in general use for landscape purposes; but, even if they did their utmost in the direction of supplying masks in variety, it would be impossible to meet the requirements of every individual picture or to provide for every contingency that may arise. Many amateur slide-makers are fully awake to the desirability of suiting the shape of the picture to the subject, and cut their own masks, but by far the greater majority are content to rely solely upon whatever may be put into their hands by the manufacturers.

The trouble attending the production of one's own masks is not great if the matter be taken systematically, and the result is then quite equal, with a little care, to the commercial article; but to have to turn to without proper appliances to cut half a dozen masks of different shapes and dimensions is neither an easy nor a satisfactory job. I have seen a whole evening spent in the task of cutting the masks for and mounting three or four slides which would not lend themselves to the ordinary shapes, when the same amount of time and labour devoted to the means for cutting the masks would have rendered the operator practically independent for all time.

For general purposes, especially where only one size of negative is made, three or four standard sizes will generally suffice. For instance suppose the negative be $7\frac{1}{2} \times 5$—a rather awkward size for lantern purposes—three or four fixed openings in addition to the square, measuring two and seven-eighths or two and three-quarter inches, as may be preferred, in the longest side and narrowing by eighths, will cover almost every pictorial requirement; and it will only be very extraordinary subjects, such in fact as will scarcely be worth making into lantern slides, that will necessitate any further departure from the square.

In the last number of the *Record*, Mr. C. Ray Woods described his method of cutting odd-shaped masks by means of a half template graduated for different sizes, and this plan answers admirably where a great variety is required; but, if we decide to adhere to a few fixed shapes, it is, I think, an easier plan to have a set of complete templates cut in zinc. Any zinc worker will cut them accurately from a paper pattern for a few pence a piece, or it will not greatly overtax the skill of a moderately "handy" amateur to do them himself. If he be a fret-sawer the job will be a comparatively easy one, the opening being cut nearly to the previously marked outline with the saw, and carefully finished off with a fine file.

If a fret saw or "piercing saw" be not available, the procedure is rather different. Suppose it is an ordinary "cushion"-shaped aperture we wish to make, the first step is to draw an outline of the dimensions required, but with rectangular instead of round corners, then, taking a common carpenter's three-eighth centre bit, accurately mark the four points at which it has to be worked to clear out the corners, and bore the four holes, which is easily done in the soft zinc. Next lay the zinc on a surface of hard wood or iron, and, with a mallet and carpenter's chisel, cut through from corner to corner of the rectangle between the holes, dividing the metal into four triangular pieces. Finally, with a strong-bladed knife or the corner of a chisel, score partly through the straight lines of the outline, joining the four circles on both sides of the metal until it is thin enough to break off on gently bending to and fro, and finish off with a fine, flat file or a piece of emery cloth wrapped round a flat piece of wood. A dome-shaped template is rather more difficult to cut without the saw, but it may be chipped roughly to shape with the chisel, and finished off with a half-round file, the finish being given with emery cloth.

Such a template will last for a very long time, and, if used with one of the "American" print-trimmers, will cut a mask in every way as perfect as those purchased. The trimmer, however, must be one of the real American make, not the cheap imitations now on sale with revolving cutter the size of a sixpenny piece, and requiring almost a circus ring in which to revolve. The cutter of the real "Robinson" trimmer, too, is pivoted in the same manner as a glazier's diamond, which greatly facilitates its going round corners or curves; in fact, with one of these, a circle, oval, or cushion-shaped mask can be cut in a single stroke without stoppage, which is not the case with the fixed cutter.

Some few years back there was described in the *Scientific American*, I think, a method of making a die or cutter for stamping out masks in a single operation. This, though extremely useful where large numbers of one size are required, is rather too elaborate for the purpose of only occasional use. However, it may be useful to some who probably have not seen it described. A block of hard wood is first carefully worked to the exact size and shape of the opening required. A piece of old clock-spring is then obtained, punched with holes at regular intervals, and, while hot, bent round the wood block, made to fit accurately, and fixed in position by means of screws. The ends of the spring are made to meet as accurately as possible, and the edge sharpened, when a really efficient cutter for light work is produced. I made one at the time the description appeared, and was astonished at its efficiency.

This, however, is of no use except for the one size, but corner cutters or curves n be made on the same principle. A better plan, however, for cushion masks is to substitute a hollow punch such as those used for cutting gun-wads, only smaller, and proceed in precisely the same manner as described for cutting the template. Still simpler, let an opening of the size desired be cut in a sheet of stout cardboard, but with rectangular corners. On a block of hard wood or other suitable surface lay half a dozen or a dozen sheets of the paper from which the masks are to be made, and over these the cardboard shape or guide. Get an assistant to hold this firmly, while with the hollow punch just mentioned placed in each corner of the guide in succession four circles are cut out, forming the corners of the cushion. Then, either using the cardboard still as a guide, or preferably treating each mask separately, with a sharp penknife and straight edge complete the outline by joining the circles, and a series of masks will be obtained that will be difficult to beat if proper care be taken.

This plan is, of course, available for any shape or size, and if the cardboard rectangle be only truly cut it is impossible to get the cushion corners out of square or to introduce any irregularity, and the circles then form an accurate guide for the subsequent application of the straight edge.

The methods I have given are more difficult to describe than in actual use, and, if the subject seems trivial to some of the readers of the *Record*, I dare say there are others who have experienced the difficulty of cutting odd-shaped masks.

W. B. Bolton.

LANTERN MEMS.

There was much to interest photographers at the meeting of the Royal Meteorological Society, on March 15, when Professor Shelford Bidwell, F.R.S., gave a lecture on "Some Meteorological

Problems," and illustrated the same by experiments. As the optical lantern assisted in the demonstrations, some description of the part it played may be a fit subject for the LANTERN RECORD.

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As many of the experiments were shown in a fairly lighted room, and the projection of the photographs was quite clear to a large and representative audience, it may be said, with reason, that the optical lantern, as far as lectures and class-room work is concerned, is quite as useful in summer as in winter. In this instance the lantern was not only used for ordinary projection, but for illuminating chemical and other apparatus, and making visible the results of the experiments.

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AFTER showing electrification produced by evaporation and by friction of dust, many photographs of lightning flashes were exhibited as well as photographs of electric sparks, and by means of suitable connexions and apparatus the projection of a Leyden discharge was performed, and its resemblance to lightning made manifest. The phosphorescence of the air was clearly shown by means of an electrically connected board, covered with Balmain's luminous paint, and also by the revolution of a vacuum tube.

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SOME idea was given of the duration of a lightning flash by means or a rotating colour disc. This was of the usual "Newton disc" order, with successive sections of seven colours, and was made to revolve at a rapid rate, so that only a grey colour was seen on the disc. When the electric spark illuminated this disc the coloured sections were distinctly seen, and it was stated as a result that the duration of the flash must be less than 1·10,000th part of a second for this to be seen.

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THE value of photographs of lightning flashes was clearly shown, and many optical effects illustrated by the different pictures, the so-called ribbon lightning being clearly traced to a movement of the camera, and certain dark streaks in the sky of zigzag or branchlike pattern were due to complementary impressions on the plate following a comparatively long exposure when photographing the lightning flash. In some such way as we get a complement by looking at a bright window, and then closing our eyes and looking away we see dark for the light of the glass windows and light for the dark sashes.

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MANY other effects, such as the flicker of lightning, the efficiency and non-efficiency of lightning conductors under certain atmospheric conditions, the production of two forms of lightning discharge on Professor Lodge's plan were illustrated by the convenient electrical apparatus, in the capable hands of the lecturer and his assistant, while the optical lantern was again requisitioned in illustrating why thunder clouds are dark and large raindrops fall during a thunder shower.

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THE first was shown to be due to the electrification of vapour, for, by means of a spirit lamp and vessel of water, with a bent tube (twice bent at right angles), a jet of steam was projected on the screen, and, at first, looked quite clear, in fact, only just showing by the flicker or waving of the air; but, directly it was electrified by means of a rod charged from the Leyden jar, it assumed a blackness on the screen that was very decided, and each successive contact or withdrawal of the rod produced alternate clear or opaque projections.

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THE electrification of water showed that while a jet of water, after rising, fell, as one naturally sees it in a fountain, with a certain amount of spray, when it was electrified the drops coalesced and came down remarkably solid. The projection of this spray was managed by shadow on the screen, the rays from the lantern illuminating that part of the fountain which had been arranged on a table in front of the lantern.

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AFTER demonstrating that dust in the air was essential for the condensation of water vapour, and that the colour of the sky was due to refracted rays and not direct rays of light, a pretty and fitting conclusion was made to the lecture by the performance of Captain Abney's experiment illustrating the formation of sunset colours.

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FOR those who have not seen this interesting effect I may mention how it is performed. An opaque screen is placed in front of the condenser with a small aperture in it that can be focussed on the screen to resemble the sun. A trough is placed on the stage of lantern having some hyposulphite of soda; on this is poured dilute hydrochloric acid, and, as the solution is stirred, the disc on the screen changes colour from bright yellow to orange, and, finally, to red.

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A FEW words respecting the lanterns used. They were quite simple, without any pretensions to appearance, but had arrangements whereby the front could be withdrawn from the stage for the insertion of tubes, troughs, or apparatus. If one had been disposed to criticise, one would have said they were too simple for ordinary projections where the apparatus is placed between the audience and the screen, for until something was improvised to stop it the light streamed out at the back of the lantern into the eyes of a number of gentlemen in that part of the lecture-hall.

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THIS shows the value of having a curtain at the back of the lantern, for one can never tell in a hall or room what will be the most convenient place to fix up the apparatus. And again, viewed simply as an optical lantern for projection of photographs, the nearness to the screen and the considerable tilt or angle of the front prevented square pictures being rectangular when projected on the screen. They were considerably broader at the top than bottom. With so much of interest and so many experiments brilliantly performed, one hesitates to say one word that may be considered disparaging, and my only idea in mentioning it is, that if a lantern cannot be elevated so that the beam from it is nearly at right angles to the screen, then a greater distance must be arranged for placing the lantern, that is, to project ordinary photographs, if one desires to get the best results all round.

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THIS lecture of Professor Shelford Bidwell's was so full of interest that I would advise all who possibly can to get a copy when it is published, as I hope it will be, in the *Journal of the Royal Meteorological Society*; and should it be possible to arrange a repeat, say at the Society of Arts, a great treat will be in store for the members and friends.

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THE field open for the Optical Lantern is a large one, and almost all the sciences can by its aid be taught, and demonstrations made to large or small audiences of so much practical value that would not have been possible before photography was simplified and the introduction of compressed oxygen and hydrogen had made the limelight the simple, clean, and of course powerful light it is, so convenient to hand. Medical and surgical subjects, chemistry, electricity, astronomy, geology, botany, optics, and physics generally can be shown, or phenomena and laws demonstrated, by photographs or actual experiments, and it is only for exact requirements to be known for apparatus to be forthcoming to aid to this end. G. R. BAKER.

THE GENESIS OF THE REGULATOR.

As no one seems to answer a recent correspondent's question *re* the first compressed gas regulators, possibly the following notes on the subject may be of interest.

The first regulator that came under my notice was in 1882–3; it was introduced by Messrs. Pexton & Ash. The construction of this was the ordinary Bourdon gauge tube, the movement caused by the deflection or straightening with the pressure submitted was taken advantage of, and, by attaching to the free end a lever connected to a screw valve, the condensed gas was to be controlled; but, forty years back, both French and German patents were taken out for a reducing valve for condensed gases, such as carbolic, but evidently did not answer, as they were never worked. I think I am right in saying

that the first effectual automatic regulator was produced by Oakley & Beard in 1884, but owing to its bulk never met with much favour. This was followed by Clarkson's bellows-regulator, worked much upon the same principle, having a lever instead of the central differential screw spindle, possibly the outcome of Mr. Hepworth's miniature gas bag and pressure board connected with the lever-key of cylinder direct. I also heard of Mr. Mellor having a gas-regulator which he worked by a column of water about twenty inches, but have never ascertained the exact working.

The next regulator was Beard's (small size) of present-day pattern. This was at once seen to meet every requirement, being extremely portable and the working parts being protected. In manufacturing these instruments it was soon seen that a moving valve upon its seat could not long be kept sound, and hence the life of a regulator which depended upon the soundness of its valve was very short. With the lazy levers in conjunction with the two eccentrics any amount of leverage upon the valve could be obtained, and absence of friction upon the valve seat greatly prolonged the life of the regulator. It was evident that a direct-acting valve (that is, a valve which has only vertical movement) is the best kind for automatic regulating valves for high pressures, or, where lower or very accurate and even pressure is required, the pressure could be stopped down, as it were, from one regulator to another (see patent specification). After the introduction of this form others quickly came into the market, all more or less following upon the same lines.

The first to follow was Messrs. Clarkson & Spurges duplex regulator, an analysis of which soon reveals the bisection of the eccentric arrangement, viz., only one eccentric with a compound lever attached to the bellows, in the high-pressure chamber; this is again stepped down by a secondary valve which is attached direct to bellows-cover.

During this time Henry Brier, of the Scotch and Irish Oxygen Company, was working at this metallic bellows-regulator, and, I should think, might have been on the market long before had it not been for the difficulty of manufacturing the bellows. The principle of the regulating mechanism is the straightening of a bent rod, the valve being pressed against its seat by the end of a broken arm, as it were, the shoulder being the fulcrum, and the elbow, connected with a rod from the movable bellows-cover, the hand pressing the valve — a very ingenious arrangement, and it will be seen, as the straighter the arm gets, the more power is exerted upon the valve, without increasing, to any very great extent, the pressure in the bellows.

Suiter's valve was next put upon the market. No multiplying leverage was employed, the spring of the metal diaphragm acting as the movement for the controlling valve, the valve being attached to the diaphragm direct, exactly similar to the well-known Bickerdike diaphragm regulator for house gas, the diaphragm being metal in place of leather. Since, an improvement upon this has been introduced, and a lever employed; the valve in this shuts upon the gas.

By the above it will be seen that all the valves now in use are vertical-acting, only being pressed upon their seats by the various mechanism employed by the gas-inflating bellows or diaphragms.

I may, in conclusion, remark that the life of a regulator is dependent upon the property the valve has of remaining gas-tight.

R. R. Beard.

HOW TO COLOUR LANTERN SLIDES.

[Scientific American.]

Nothing is more interesting and satisfactory to the amateur photographer than to place upon the screen, by means of a good lantern, the results of the summer's work; and, while it may be questioned whether anything can be more desirable for projection than a really first-class, well-toned lantern slide, yet experience proves that the majority of people who enjoy an evening with the lantern are pleased when a well-colonred slide is shown.

A suitable subject, carefully printed and artistically coloured, when reflected from the screen, strongly resembles a huge water-colour picture, the great difference between such a picture and a water colour being a superabundance of detail, which is inherent in photographic pictures and which is not desirable in a water colour. A photograph can be made which will answer admirably for colouring which would not be satisfactory as an uncoloured picture. Such pictures are taken through a large diaphragm or with full opening. The foreground is made sharp, while the middle distance and distance are softened down by being a little out of focus; however, it is not advisable to try to make negatives expressly for coloured pictures.

The print for colouring should be moderately light and without great contrasts. Inky shadows are to be avoided, and it is well to vignette off the distance to give atmosphere. The sky should be transparent, unless cloud effects are to be shown. While specks and pinholes are very damaging to an otherwise fine lantern slide, they entirely spoil a picture, for colouring. In a picture well broken up, as in a wooda scene, where little sky appears and when there is no placid water, these small defects do little harm; but, in a sky or in a clear lake or pond, they can never be concealed or removed so as to be unnoticed, so that the first requisite for a good coloured lantern slide is a good print of the proper intensity, and with transparent lights. The second requisite is a knowledge of colours and colouring, and the third and last thing needed is an assortment of colours and brushes.

With regard to the slide itself, it might be mentioned in passing that anything which tends to harden the film in developing, fixing, or after-treatment, interferes with the free working of the colours. For instance, alum in the fixing bath, intensifying and reducing solutions all tend to harden the film, and prevent the free absorption of colour.

The first operation in lantern-slide colouring is to soak the plate in cold water until the film will absorb no more; then, while it is still wet, go over the entire surface of the film with a thin wash of warm colour, which may be either yellow or pink, depending upon the subject. This kills the chalky whiteness of the high lights, and gives the entire picture a warm and desirable tone, even though the wash is not sufficiently strong to be detected when the picture is thrown upon the screen.

The colours used for this purpose are transparent aniline colours, prepared for colouring photographs. They are labelled brown, blue, violet, flesh, orange, green, and so on. The ordinary aniline dyes may be used instead of the prepared colours, as they are practically the same. The manipulation of the colours is the same as in water-colour painting. The film is kept wet continually, from the beginning to the end of the operation, but, after the broad washes of the first warm tint and the final sky colour, the water lying on the surface of the film is allowed to dry off leaving the film still swelled and wet, but without the surface water.

The prepared colours can rarely be applied to the slide without being reduced with water. Sometimes the best effects are produced by mixing different colours before applying them, while in other cases the effects are secured by separate washes of different colours, superposed. Each wash of colour sinks into the film, and is not removed by a subsequent wash.

Although an easel, or support something like a retouching frame, may be useful, the writer prefers to hold the slide in the hand, as shown in the engraving. The wet plate is held in a slightly inclined position in front of a lamp provided with a plain opal or ground-glass shade. The write, prefers artificial light for colouring, as the pictures are to be shown generally by artificial light, which is yellow. If the pictures are designed for projection by sunlight, it is undoubtedly better to colour them in daylight.

The first wash is preferably put on while the slide is held in an inverted position, and while it is still flowing the blue is added for the sky —at first very light, near the horizon, increasing in intensity toward the top of the slide. After this wash is set, and superfluous water has evaporated, the water accumulating along the lower edge of the plate is removed with the fingers, and the slide is turned right side up, when the extreme distance, whether it be mountain or foliage, is covered with a light wash of blue, and this wash is brought well down toward the foreground. If the blue appears cold, it can be toned down by a very light wash of yellow or red. Trees in the middle distance can now be gone over with a light wash of orange, or orange with a little of the flesh colour or pink added. When near the foreground, a very light wash of green is applied to the foliage, but the raw green of the colour set cannot be used for this; it must be modified by the addition of orange or of brown. If, when applied, the green appears too cold, it may be toned down by a light wash of brown, of orange, or flesh colour. It is desirable to produce variety in the foliage.

Rocks in the distance are washed with blue, and the colour is subsequently modified by washes of red or brown. Trunks of distant trees and some rocks may be left nearly the original colour of the photograph, but near rocks and tree trunks may be tinted with brown, blue, or warm green, and subsequently modified by washes of green, red, brown, yellow, or orange.

It is useless to trace the smaller branches of trees and shrubs, and it is rarely necessary to deal with single leaves or blossoms; when this must be done, a jeweller's eyeglass is required, and fine, small brushes are used, great care being taken to keep within the outline of the object being coloured. In all this work the artist does well to remember that the colouring is to stand the test of great magnification and strong light.

The plate is apt to dry out in some places while the colouring is going on at other places. As colouring cannot be successfully done on a dry surface, it is important to wet the surface before proceeding. This is done by applying water with a soft camel's-hair brush. After the surface water has disappeared, the colouring may proceed.

It is obviously impossible to mention every modification of colour that may be produced by mixtures and washes. This is something to be acquired by practice. The writer uses very few colours—rarely more than the following: blue, green, brown, orange, flesh, rose, and yellow. The last is a strong colour, which must be applied with caution. Green and blue are also strong colours, which can never be applied without the admixture of a warm colour, or a subsequent wash of the same. Brown, in different strengths, has a large application. It is useful in toning down bright greens, for rocks, tree trunks, earth, &c. A wash of blue over the brown produces a different but useful grey.

The principal points to be observed are: to keep the plate always wet, to use light washes, to modify colour by subsequent washes, and, in working up details, to preserve the outlines.

Should a small area be over-coloured, the colour may generally be partly removed by means of a soft brush charged with clean water, the brush being gently and repeatedly passed over the spot. The brush is frequently washed during the operation. When the broad washes show streaks, or when the entire slide is too highly coloured, or the effects are unsatisfactory, the only remedy is to place the slide in cold water, and allow it to soak, with occasional changes of water, until the colour is partly or entirely removed.

It is well enough to bear in mind that a coloured lantern slide bears all the colour that is to appear on the screen; consequently it must be more highly coloured than a transparency for direct vision. On the screen, however, a picture is better under-coloured than over-coloured. It will often be found that prints which are too light and flat for use as plain slides answer very well when coloured, and pictures which are too dark for use as plain slides may be tinted with blue, and presented as moonlight scenes.

Brushes for this work should be of the best quality, very soft and pliable; and such as are used for working up detail must have a fine point.

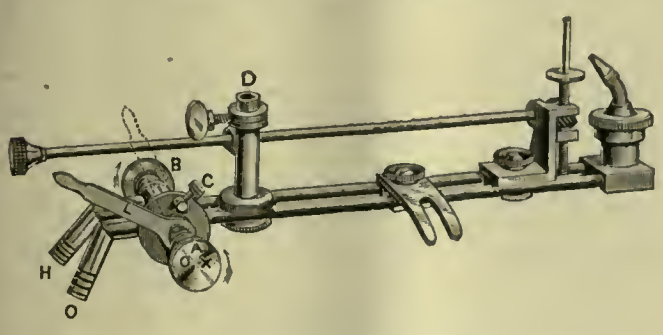
This method applies to portraits and figure pieces.

The coloured slides are generally mounted in the same manner as the plain ones. If, however, the highest perfection is sought, thin plate glass is used for the sensitive plates, and glass of the same kind is used for covers, the cover and coloured picture being cemented together with Canada balsam. Made in this way, the slides are more transparent; but, in view of the extra trouble and expense, the improvement over the uncemented slides is hardly sufficient to warrant the general application of this method.

GEO. M. HOPKINS.

BEARD'S NEW CUT-OFF JET.

MR. R. R. BEARD, of 62 Alscot Road, Bermondsey, S.E., has recently brought out a new jet. The connections for supply are as usual H and O, and the regulating screw-down valves A for oxygen and B for hydrogen. The index arrows show their method of adjusting. The lever L is



attached to the cut-off plug, and the dotted line shows the position when gases are cut off, it being stopped by coming in contact with the by pass adjusting screw C. The jet-holder D is a solid, having the pear-shaped hole for securing rigidly to the pin of ordinary lantern trays. The mixing chamber and nipple are constructed with the greatest care to obtain the best possible light combined with quietness and economy.

THE LANTERN IN JAPAN.

AMONG the pleasantest entertainments of the winter season in Yokohama are the lantern meetings of the Photographic Society of Japan, and in the past many an enjoyable evening has been spent by the members and their friends in Kiel's-buildings, while the work of the year has passed in review through the agency of the magic lantern and its attendant screen. The ubiquitous cameras of the society have penetrated almost everywhere in Japan, from the Emperor's chrysanthemum garden to Uyeno's cherry groves and Ginza's bustling thoroughfare; the daintest bits of land and seascape, charming maid and ancient temple, have been caught in their loveliest aspects by them, to be enshrined for the benefit of the stay-at-homes in collotype, platinotype, bromide, carbon tissue, or beautifully coloured positives. Perhaps the views which recently evoked most applause were the exquisite moonlight scenes which came from Mr. Kajima's collection. They were delicate pieces of art workmanship, and their rare technique was undeniable. Another set which ran them close in beauty and vividness were the yachting plates taken by a Yokohama amateur. Professor Burton exhibited several of his famous views of volcanoes, their exteriors and craters, and some snow scenes. Great hilarity was provoked by the "combinations" and "subject" pictures, many of which were running over with kindliest humour. The quaint idyll of "The Three Old Belles of Tokyo" was a delicious story without words, but it spoke ill of the morality of one that she sat with unconcealed glee with five aces in her hand at a quiet game of poker! The loss of her bedroom clock, at the pilfering hands of a gentleman of the night, was, however, a sufficient punishment for this trifling misdemeanour on the part of a dear, comfortable, old soul. Altogether, the audience were well pleased, and the society are to be congratulated on the successful result of the evening.

PHOTO-MICROGRAPHY.

[Amateur Photographic Society of Madras.]

1. THE representation of microscopic objects was one of the earliest applications of photography, and even as far back as 1802 fugitive photo-micrographic impressions on paper and leather were obtained by Sir Humphrey Davy and Wedgewood. At first great things were expected from the new power thus brought into play, but as results fell short of anticipations the process came to be looked on with a certain amount of disfavour. Now, however, that a juster appreciation of the capabilities of photography prevails, this manner of delineating microscopic objects is much used, and many beautiful photo-micrographs are existent, showing a delicacy and fulness of detail which could not have been obtained by any other process. In a short paper like the present it is only possible to deal with photo-micrography in a very sketchy way.

2. Some slight knowledge of the microscope is necessary before any attempt can be made to use the instrument in conjunction with photography, and of course before any really good work can be done a considerable amount of facility in using the instrument and in the management of light must be attained. However, as very little practice, and a not expensive outfit will enable many interesting photographs to be taken, it is hoped that beginners may not be scared by the imposing outfit recommended in the catalogues of many dealers in scientific instruments.

3. The picture of a microscopic object should show all the details with as perfect distinctness as possible, but where the object to be represented has any appreciable thickness, the whole of the details are only visible through the microscope by successively changing the focus of the instrument to suit the principal planes of the subject. A microscopic illustration is consequently a diagram showing as if they were simultaneously visible, details which can only be seen at different focal distances. These requirements impose a limit to the application of photography, for if we attempt to change the focus of the microscope during exposure a confused negative will be the only result. It is therefore obvious that the flatter an object is the more suitable is it for photographic reproduction under the microscope, and that it is hopeless to try and take in one operation a subject having much relief. The greater the magnification employed, the more limited is the depth of focus, that is, the thinner is the portion of the object clearly visible at one time. Hence, irrespective of the difficulties in the manipulation of high powers, a flat object is the easiest to photograph, where the structure can be properly shown under low magnification. Good photographs can however be obtained under very great amplification with skilled manipulation and suitable lenses, for the reason that high power subjects are very thin, and that one position of focus embraces all the planes necessary for serviceable representation. The most satisfactory field for photo-micrography lies at the extremes of amplification from, say, magnifications of 20 to 70, and from 500 to 1500 diameters. Subjects requiring objectives of a quarter to one-sixth of an

inch focus for their examination will probably be found the most difficult to photograph.

4. Although medium power objects cannot be photographed to advantage in one operation, it is, of course, possible to take a series of negatives of the most important planes and combine the results into one picture. In delicate subjects this is not very easy, but it is worth trying, especially if the operator has facility in drawing. Another method adopted with success consists in painting out on the negative the indistinct portions, and taking an under-exposed print on smooth bromide paper. This positive is used as the basis of a diagram which can be filled in by hand, and which, when worked up in Indian ink and pencil, presents the appearance of an elaborately finished drawing. A treatment of the difficulty, which has been recommended by some authorities, is to take in the first instance a photograph under a low degree of magnification, and afterwards enlarge it by any ordinary photographic copying process. This method has the advantage of shortening the time of exposure, but necessitates the focus of the original negative being extremely sharp.

5. Photography as applied to microscopy is further complicated by the differences in transparency, and the great contrasts in colour which are frequently present in the same object. In ordinary photography, the first difficulty is not met with, as objects are illuminated by reflected light and variations in opacity do not influence the quality of the negative. In the microscope, however, the majority of preparations can only be viewed by transmitted lighted, that is, light which passes through the object, so that the resulting negative is very largely affected by the colour contrasts, and the variations in transparency of the subject to be photographed. The yellow colour of many anatomical specimens so interferes with the transmission of light as to almost preclude the possibility of making a photograph. Again, the thinness with which modern sections are usually cut renders them too actinically transparent to be photographed with low powers, but, at the expense of prolonging the exposure from three to four times, this may be overcome by the interposition of a screen of yellowish-green glass. Where great differences in colour are present in the same preparation, or where non-actinic colours, such as deep brown, prevail, orthochromatic plates offer decided advantages. Many dark-coloured objects, such as insects, may be bleached by prolonged maceration in turpentine, while sections of dark woods may be treated in nitric acid.

6. The only absolutely essential apparatus required for micro-photography are a few good object-glasses, with some type of stage and illuminating arrangement, and some form of camera or its equivalent, whereby the picture formed by the objective may be received on a sensitised plate. A very large number of arrangements have been devised to meet these requirements, but it is impossible in this paper to do more than discuss them in a general manner. It will be convenient to consider photo-micrographic apparatus as divided into four classes as under:—

(*a*). The attachment of a special camera to an ordinary compound microscope.

(*b*). The combination of an ordinary camera with a compound microscope.

(*c*). The substitution of a dark room for the camera and the use either of an ordinary compound microscope or a system consisting of stage, objective, and mirror.

(*d*). A combination camera and microscope forming one piece of apparatus.

7. A very simple method of effecting the first arrangement (*a*) is by attaching a pyramidal light tight box to the microscope, the small end of the box fitting closely to the eye-piece, and the large end being adapted in the usual way to take a focussing screen and a dark slide. The focussing is effected by the adjusting screws of the microscope, which can be used either with the body horizontal or vertical.

8. The second arrangement (*b*) is still easier for all who possess an ordinary photographic camera. It merely consists in the insertion of the eyepiece end of a compound microscope placed with the body horizontal into the lens aperture of the camera. The space between the microscope and the woodwork of the front must be carefully closed to exclude light. When working with lamplight, any black cloth packed well into the space will answer all purposes. The eyepiece of the microscope may or may not be removed; it is simpler not to do so, as its presence permits of a short camera being used, and the focussing screws of the microscope remain within reach of the hand. Most of the well-known microscopists recommend the removal of the eyepiece, as its use involves a loss of light, but in this case some mechanical arrangements must be devised to actuate the focussing screws which will not be in reach. Dr. Woodward, in place of the eyepiece, employs a special combination, which he calls an achromatic concave. Dr. R. Neuhauss has found that the ordinary eyepiece can be used instead of a projection ocular for throwing the picture on the focussing screen. The lenses of the eyepiece are separated a little distance and an additional diaphragm is fitted on. The arrangement is simple, a paper case or tube, 2½ cm. long, is fitted on to the brass tube, the internal diaphragm remains in its original position, while the new one is fitted over the eyepiece by means of a short movable tube. The nearer the objects to be photographed are to the focussing screen, the further must the lenses of the eyepiece be removed from one another.

9. The third arrangement (*c*) may be exemplified by the plan adopted by Mr. Wenham, who dispenses with a camera and uses instead a dark room. This room he closes with a shutter having a circular aperture three inches in diameter; upon the outside of the aperture is placed a reflector of same type, which can be actuated from inside the room. The microscope body is arranged horizontally on a table or bench, so that its axis, if prolonged, would pass through the centre of the hole in the shutter. The object to be photographed is suitably placed on the stage of the microscope and near to the inside of the aperture, the light around the stage being cut off by a black cloth. A vertical stand, grooved to carry a sensitised plate or a white card, completes the arrangement. The enlarged view of the object to be photographed is first projected on to the white card and focussed, the light is then cut off and the sensitised plate is inserted in the grooves which held the card. The plate is then exposed by readmitting the light for the necessary time.

10. The fourth arrangement (*d*) need only be briefly referred to. A stage with mirror and objective is attached to the front of a special camera provided with necessary fittings for adjustment.

11. The next point to be considered is illumination. The sun, the electric, oxyhydrogen, magnesium or zircon light, and the ordinary paraffin or petroleum flame are the usual sources of illumination. Of these the majority of operators prefer sunlight, but in using it with any form of condenser care must be taken to guard against the intense heating effects of the rays, which are liable to injure the object, and even in the case of high-power objectives to uncement the lenses. In the case of subjects requiring long exposure, it will be necessary to supplement the apparatus previously enumerated by a heliostat in order that the solar beam may be reflected in a constant direction; without a heliostat rapidity of impression is absolutely necessary for the most perfect definition. Various devices have been resorted to for overcoming the heating effects of the condensed solar rays, the most common plan being to reflect the light through a cell filled with a solution of sulphate of copper, the blue colour of which filters off the heat rays while allowing the actinic components of the solar beam to pass through. Another plan is to break up the light by means of a large prism of wide dispersion and then intercept the rays of the red end of the spectrum. In this way the defects of chromatic aberration may be avoided, and a more perfect definition obtained. A very ingenious method, proposed by Mr. Reade, for using his hemispherical condenser with a solar condenser, is given *How to Work with the Microscope*, by Dr. Beale. The rays furnishing light and those giving off heat having different degrees of refrangibility, we have here the cone of light rays formed within the cone of heat rays, so that, when these rays cross the axis their respective positions are reversed. The hemispherical lens is so arranged that it is separated from the principal focus of the heat rays by its own focal length, when the principal focus for light will be found at a greater distance than that for heat; the heat rays will thus be rendered parallel, while the light rays will converge to a second focus furnishing an intense light unaccompanied by heat. The same object is effected by Dr. Woodward by placing an achromatic lens at such a distance from the achromatic condenser of the microscope that the solar rays are brought to a focus and begin again to diverge before they reach the lowest glass of the condenser. This method is so successful that enough light can be obtained to give excellent definition on a cardboard screen under a magnification of 5000 diameters.

12. When using sunlight, it will sometimes be found that diatoms and soft tissues, when illuminated with parallel rays, will produce interference lines. A ground-glass screen, preferably greased, interposed between the mirror and the condenser, will remedy this inconvenience. The electric light, by exaggerating the effects of light and shade, is well suited for delicate objects possessed of little contrast. In using this illumination the pencil of light should be first rendered parallel by means of the condenser usually supplied with electric lamps for this purpose, and then condensed, as with solar light. The electric light is said, by some authorities, to be cumbrous, unsteady, expensive, and troublesome, but these remarks would appear to be directed against the arc light, as the incandescent lamp seems free from these objections. The magnesium and oxyhydrogen lights are of special service in photographing soft tissues, and, no interference phenomena presenting, the greased glass

screen can be dispensed with. The light is concentrated on to the lower lens of the achromatic condenser, and the ammonia-sulphate cell should invariably be used. The fumes of magnesia, which give trouble by the deposits on surrounding objects, may be collected on a muslin chimney, made by covering a spiral wire column five feet long, the cloth being folded in similar fashion to the bellows of a camera. The zirconia light is produced by placing in the oxyhydrogen flame a mass, made by strongly heating, in an iron mould, a paste composed of zirconia, mixed with a solution of boracic acid. This illumination is even more brilliantly luminous than limelight. Zirconium is very resistant, and gives a regular, steady flame. It will be found, however, that petroleum light is sufficient for almost all purposes, and any good lamp may be used, but the ordinary microscopic lamp, which can be raised or lowered bodily, will be found most convenient. A very intense illumination may be obtained from paraffin oil by using it in a triple-wick lamp, with a condenser to parallelise the rays. This pencil will, of course, have to be rendered convergent before it enters the optical portion of the microscope. With all lighting, the achromatic condenser must be carefully centered, as otherwise unequal illumination will result. After centering, the condenser must be moved back until the field is uniformly lighted.

13. Certain objects, such as diatoms of close striation, require the use of very oblique light, which can be obtained in the following way, given in Davis's *Practical Microscopy*: "A parallel pencil of solar rays from the heliostat and plane mirror is intercepted by a blue cell and diaphragm, which only allows a circular pencil of half an inch diameter to pass. The light enters parallel to the optic axis of the microscope placed in the usual position for photography, but at a lateral distance to the right or left of three inches. If the light is intercepted by a large achromatic prism of a focal length of about three inches, the desired obliquity can be obtained without difficulty. The best result is obtained when the rays are concentrated to a focus upon the object, and it is indispensable that the stage of the microscope should be as thin as possible. The illumination thus obtained is in general sufficient to produce negatives by the wet process up to 2500 diameters, with three minutes' exposure."

14. The magnified image of the object to be photographed can be focussed by projecting it on to a white screen, or on to a ground or plane-glass plate, or by examining it with the ordinary microscopic eyepiece. The ground glass usually supplied with the camera is too coarse for fine focussing, and should be reground with the finest emery and water, or a focussing screen may be made by coating an ordinary glass plate with the following varnish recommended by Davis:—

Gum mastic	40	grains.
Gum sandarac	160	,,
Ether	4	ounces.
Benzol	1½	,,

This varnish is not easy to apply, as even the heat of the fingers is sufficient to make the coating immediately over them dry with a smooth instead of a matt surface.

If a piece of plate glass be used, the image is viewed by a focussing glass or eyepiece held against the plate glass, the focus of the lens corresponding exactly with the anterior surface of the plate. The simplest, and I believe the best, method of focussing is to use the ordinary low-power eyepiece inserted into a series of apertures in a thin wooden board substituted for the usual ground glass, care being taken that the diaphragm of the eyepiece is in the exact position that will be occupied by the film side of the sensitised plate.

15. In connexion with focussing it is to be noted that, objectives being over-corrected, it frequently happens with low and medium powers that the actinic and visual foci are not coincident. The result of this is that a blurred and indistinct negative may be obtained, although the image viewed by the eye when focussing showed perfect definition. This drawback can be remedied by having the objectives specially corrected for photography, or by withdrawing the object-glass after focussing a certain amount determined by experiment. The number of turns of the fine adjustment screw necessary to get the chemical focus is easily obtained by developing a negative taken at the best visual focus, and then withdrawing the objective till the image appears to the eye as indistinct as it is on the negative. I append the amount of correction required by various objectives, which have been extracted from Beale's and Davis' works.

Beck	1½ inch	Browning	4 inch
,,	⅔ inch	,,	1 inch
,,	⅒ inch	,,	½ inch
Dancer	2 inch	,,	¼ inch nil.
,,	1 inch nil	,,	⅛ inch nil.

In Beck's recent catalogues, however, it is stated that these makers' objectives can be used without alteration, the two foci being so nearly coincident, and, as far as my limited experience goes, I can substantiate the statement.

16. As in ordinary photography, many assert that the wet process gives results superior to the dry, but I much doubt this. If there is any difference it is so slight that only an advocate of the wet plate can detect it. Gelatine plates should not be over-exposed, especially in the case of delicate work, or all the finer details will be lost. No precise directions can be given as to the time of exposure necessary for the production of a good negative. The exposure is largely dependent upon the quality of illumination, but even more so upon the nature of the object. By direct sunlight, with a not too dense subject, under the strongest magnification and sufficient weakening of the light by a filter a few seconds should suffice. Opaque objects illuminated by reflected light require a much longer exposure than transparent subjects with transmitted light, and the difficulties in focussing increase rapidly with the magnifying power. As a guide to exposure I extract from Davis' *Practical Microscopy* the following table relating to Mawson & Swan's "fifteen times" plates:—

Objective.	Subject.	Exposures. With microscope lamp.	Exposures. With a triplexicon or selopticon lamp.
4 inch	Wing of blow-fly	6 seconds.	3 seconds.
2 ,,	Proboscis of do.	60 ,,	10 ,,
1 ,,	Do. do.	70 ,,	20 ,,
½ ,,	Glass crystal	60 ,,	30 ,,
¼ ,,	Section of deal	7 minutes.	2 minutes.
⅛ ,,	Podura scale	10 ,,	2½ ,,
1/15 ,,	Pleurosigma attennatum ...	15 ,,	3 ,,

In recent years instantaneous work has been taken up with a view to photograph moving organisms, and exposures from one-twentieth to one-two-hundredth of a second are reported to have been satisfactorily given with immersion lenses. Formerly infusoria, &c., were rendered stationary by killing them with an electric shock. A flashlight recommended for instantaneous work is produced by the ignition of the following mixture which gives a flash lasting from one-fiftieth to one-thirtieth of a second:—

Magnesium	30	parts (by weight)	in	powder.
Chlorate of potash	60	,,	,,	,,
Sulphide of antimony	10	,,	,,	,,

The combustion of this powder is effected in a metallic tube closed at one end and provided at the other with a glass plate and diaphragm, the aperture of which corresponds accurately with the diameter of the illuminating lens. Within the tube, and on a level with its central point, is a metal plate upon which the powder with a piece of touch paper is placed. The latter is ignited through a slit in the tube closable by a shutter. The tube is further provided with a very long chimney.

17. With long exposures it is very essential that freedom from vibration should be secured, and this is a matter of considerable difficulty. Dr. Woodward used to isolate his apparatus from the floor of the room by placing it on solid concrete pillars built up independently from the ground, but even this was not always satisfactory. However, long exposures can be made, and photographs of phosphorescent bacilli have been taken by their own emitted light with an exposure of thirty-six hours or more.

18. As regards development, the same rules as apply to ordinary photography hold with photo-micrography, but in fine work it is not advisable to push development too far lest the more delicate details should be lost. There is no object in giving recipes for developers, as it will be best to adopt the formula which the operator is in the habit of using for ordinary work. A. D. G. Shelley, Captain, R.E.

THE SIMPLICITY OF LANTERN-SLIDE MAKING.

[Anthony's Bulletin.]

Much has been written on this subject, and from the constantly increasing interest shown in their production and use it would seem as if there was plenty of ground to be covered. In all the publications connected with the photographic art that have been issued, the manipulation

of the lantern slide has been very lightly touched upon. I know a case where most elegant examples were shown, and those who enjoyed seeing them declared that the party who made them had a secret process he would not divulge, hence there was no use asking him. Not being blessed with timidity to such a degree, I questioned the gentleman, and he promptly replied, "There is no secret whatever in the manner in which I make them, as I used the —— lantern-slide plate, a ready-mixed developer I get from ———, and fix them in hypo the same as any other party. The only secret to the entire process is the use of brains." Like all other good things, to obtain the best results, care must be used and operations closely watched. The best mode for a beginner would be to take a good average negative and use no other until he is satisfied he can produce from it as good a slide as it will yield. In the trials will enter different exposures and various strengths of sundry developers. Take one of these developers as recommended by some one in whom you have confidence, and do not change until you are convinced that you have as good a slide as can be produced by the method employed.

The great stumbling-block will be the time of exposure. If over-exposed, you will find that before you secure sufficient density your skies will be greyed over or filled up. If too short a time has been given, it will develop up to a certain point, and before you have sufficient detail it will be too dense in parts and then stop, refusing to go farther, and continued forcing strains the slide. Experience as to the time for each negative (and you rarely have two just alike) can only be gained by practice. Do not attempt to rush them through too quickly, but take your time. Six or eight really handsome slides are better than so many dozen poor ones. A good rule for a transparency developer is: To your normal developer, as used for negatives, add an equal bulk of water, and to every six ounces of this solution add five drops of a saturated solution of bromide of potassium in water. In developing a negative, you make your developer give way to the negative, *i.e.*, weaken or strengthen as required during development; but in making lantern slides, if you use judgment in printing them, you can use the same developer for a large number, having six or nine in the same tray at once undergoing development. The fact that there is more latitude in the exposure of a transparency plate is of great assistance, and often prevents what would be a total loss if a quicker plate were used; but the true exposure is always the best, and, with care and judgment, there is no necessity of losing one plate out of several dozen.

Printing by contact is by far the easier method, and if the plate admits of such I would always so print them. It happens often, however, that larger negatives are to be used, and for this purpose very handy cameras are in market, called "copying, enlarging, and reducing cameras." They are, in fact, so handy for the amateur in many ways, that no well-regulated establishment is complete without one. They are so arranged that the negative is placed in one end, the lens in a centre compartment, and the holder on the rear end. By varying the distance between the negative and lens, the amount of subject shown in the large negative can be varied at will, and I have made three distinct slides from one 5 × 8 negative, by taking different parts at a time. Care must be taken that nothing will be opposite the negative that would be photographed through it. If the camera cannot be so pointed that you have a clear sky for a background, put a screen covered with smooth white tissue paper two feet distant from the negative. This will destroy all lines and shadows. Use a small diaphragm in the lens in order to secure the sharpest results, and you can judge of the time as readily as when printing by contact, only it will probably be minutes, where before it was seconds. These minutes can be employed in looking at those developing or fixing, placing another plate in your extra holder, and selecting the negative for subsequent exposure. In fact, you need never be idle. I have covers for my trays, to enable me to turn on full gaslight and work at other things during developing, fixing, &c.

Exhibiting the pictures on the wall or screen during the winter evenings is the most enjoyable part of photography, and prints on paper, even from the same negative, pale before the lantern slide. If you have not tried it, do so at once. You will never regret it, and you will find there is no mystery in the production of them, but endless enjoyment, both for yourself and friends.

H. S. Nutt.

POMPEII ON THE LANTERN SCREEN.

At the Bath Photographic Society a Lantern Evening was given on Wednesday, the 22nd ult., at the Royal Institution, when Mr. Austin J. King, president, gave an illustrated lecture entitled "Some Memoirs of a buried City" (Pompeii). The chair was occupied by Dr. G. Norman.

The Secretary announced that the lens to be used that evening for the projection of the lecturer's slides was of a new pattern, manufactured and forwarded for the occasion by Swift & Son, Opticians, London.

Mr. King dwelt not only with the existing buildings of Pompeii, of which many photographs were exhibited, but also with the numerous bronze articles of household and domestic use which have been found in the course of the excavations. With the aid of these and of plans of the Roman houses and villas he attempted to show what manner of men and women inhabited Pompeii, and how they lived their lives. The streets, the temples, the theatres, the amphitheatre, the palaces of the rich, the hovels of the poor, the baker's shop, the public bakery, the inn, the wine bar, the baths, were made to tell their story. Some pictures were from photographs by the lecturer, others from drawing of Gill's restoration, and others again were descriptive. The audience was a very appreciative one, and followed the lecturer closely through his account of what had been based upon what there still is. All agreed that not only is Pompeii just the place where good photographers would like to be sent to, but that, without the aid of photography, the great treasure of this marvellous City of the Dead would be lost to nineteen-twentieths of those who now revel in the archæological and ethnological treat which the excavations have provided.

The Chairman very cordially thanked the lecturer. Mr. King, he said, was always doing something for the Society, and this last entertainment had afforded them a better opportunity of studying the subject of the buried city than it had been his (the Chairman's) privilege to witness hitherto.

THE LANTERN IN TASMANIA.

At the last meeting of the Hobart Photographic and Art Association a very large collection of lantern slides was exhibited. Messrs. E. Ash, G. Hull, H. J. Buckland, C. Gruncell, Rev. J. T. Pierccy, Russell Young, F. J. Paterson, W. K. Morris, and N. Oldham contributed slides. The lantern was managed by Messrs. W. K. Morris and N. Oldham. A collection of coloured slides by Miss Hope and Miss Minnie Smith were also exhibited, and proved that these ladies will soon be able to produce coloured slides of an excellent quality. A large quantity of members' work was placed upon the table, including crayon drawings by Miss Hope, photographs by Messrs. Clayton and Hull, oil painting by Miss Minnie Smith, and a new lantern slide making camera by Mr. H. Downing. At the conclusion of the meeting Mr. Russell Young offered a prize for the best painted lantern slide, open to any Association member.

Lantern Queries.

F. R.—The slide sent is far too dense for projection. Try again, and do not force development so much.

L. Morris.—The optics of the lantern are fully dealt with in the editorial article in the Almanac for 1888.

Wm. Strange.—From a circular just received from Messrs. Wilkinson & Co., of Holmeside, Sunderland, we observe that they make a speciality of lantern-slide painting. Put yourself in communication with them.

Lanterno.—Yes, the "Lantern Record" will appear during the summer.

Barium.—The barium is heated to about 1300° Fahr.

C. (Balham).—Thanks. We have read the article in the *Daily Telegraph* on "Magic Lanterns and their Users." It is evidently written by a non-technical journalist, although the information it conveys is, in the main, correct.

Simplex.—The crystallisation on the slide is probably due to imperfect fixation. We have met with such cases as you cite on several occasions.

J.—The heliochromoscope, so far as we are aware, is not yet obtainable commercially in this country. Mr. Ives is, however, we learn, making arrangements to that end.

RECENT LANTERN PATENTS.

PATENT COMPLETED.

Improvement in Limelight Jets.

No. 5541. David William Noakes, 23, Nelson-street, Greenwich, Kent.—*February* 18, 1893.

When the lime jet is used as a radiant, either singly or in conjunction with optical instruments, it is desirable to obtain the utmost intensity of light. Hitherto limelight jets have been constructed with one mixing chamber only, into which hydrogen and oxygen, or oxygenated ether and oxygen, or other suitable gases, are introduced by means of separate conduits. After coming together and mixing as far as possible in this single chamber, they issue from the outlet, and being lit impinge upon a piece of lime, heating it to incandescence. The more intimately the gases can be mixed, the greater the state of incandescence that can be produced. In my invention the gases are more intimately mixed by using two chambers in lieu of one, which to suit existing apparatus are preferably constructed one within the other and conical in section, although for some requirements it might be necessary to separate the chambers or alter their sectional shapes.

MONTHLY SUPPLEMENT

TO THE "BRITISH JOURNAL OF PHOTOGRAPHY."] [*May* 5, 1893

THE LANTERN RECORD.

CONTENTS.

LANTERN NOTES AND NEWS.

"AT the recent Exhibition of the Manchester Amateur Photographic Society," says the Society's organ, the *Photographic Record*, "among the many interesting slides was one—taken as a snap-shot—of a group of four editors of the photographic journals engaged in friendly chat with each other, and evidently quite innocent of the fact that they were being made into 'copy.' They had been attending the Photographic Convention at Edinburgh." That slide should be preserved as a witness of the amicable relations that subsist between photographic pressmen, of which testimony is not altogether unneeded.

* * * * *

BEFORE the Society of Architects, on April 20, Mr. William Allport, F.S.I., read a paper on the *Use of Photography in its Relation to Architecture*, in the course of which he touched upon the uses of lantern slides for projections of architectural subjects:—"As to the use of photography in connexion with lantern slides for demonstrations of architectural subjects, the illustrations we have seen this evening fully show what a powerful agent and adjunct it has proved to be in connexion with photography in the development of architectural art, and in the illustration of such papers as are given from time to time by this Society. It is even adopted by an eminent bishop as the most efficient means of making an impression on his flock. His practice is to prepare clear, terse, short sermons in simple language; photographs of these are then taken, and put on to lantern slides and exhibited through the medium of the lantern to his audience; and he states that he finds this manner of discoursing to be far more telling, impressive, and attractive than when it had been vocally delivered; that the same practical effect equally applies, if not more so, to lectures on architecture, must be admitted by all, especially as when on the same slide examples can be shown side by side, specimens of good and bad design or construction, thereby impressing upon the minds of the students facts and matters of importance in a manner that no other process, with the like facility, can give with accuracy."

* * * * *

SINGLE limes for the lantern, each packed in hermetically sealed tubes, can now be obtained from our local dealers, says the *Photographic Gazette*. This innovation has been introduced at the suggestion of the Committee of the West Surrey Society, and will be best appreciated by those who have experienced the trouble and loss entailed in keeping the larger quantities usually put up by dealers. We concur in the last remark, and regard the hint as one which might with advantage be taken by dealers at large.

* * * * *

THE optical lantern of the Society of Arts was put to considerable use during the Camera Club Conference on April 12 and 13, no fewer than five of the papers being illustrated with slides, some of which being only of diagrammatic interest were shown with as much success in the afternoon as others were in the evening.

* * * * *

IN no class of photograph does the blurring or halation of the image stand out with such disagreeable prominence as in a lantern slide projected on to the screen. During the past winter we saw many otherwise good slides marred by this defect, which may be so easily avoided by backing the negative plate, that we should have thought few photographers taking pictures with a view to making lantern slides from them would neglect it. Now that the subject of halation and its remedies—including the use of multiple-coated films, such as the Sandell plate—is a topic of much discussion, and seems likely to remain so, it is to be hoped that lantern slides showing halation will be subjected to more criticism and objection than has been the case hitherto, and that an improvement in this respect will result.

* * * * *

THE safe packing of a large number of lantern slides for constant circulation among, say, the various photographic societies, is a subject of no little importance, and one that demands more care and consideration than may at first sight seem necessary. The number of negatives in twos and threes which are constantly reaching this office in a pulverulent condition, through bad packing, makes one tremble at the thought of what would happen to a collection of 100 or 150 lantern slides if packed according to the same free-and-easy system, which so many adopt. Mr. R. Child Bayley, of the Photographic Society of Great Britain, who has charge of several ever-circulator sets of slides, contributed by affiliated societies, and who feels the need of a safe system of packing, informs us that he proposes adopting the following method:—The slides are first packed closely together in a strong box lined with strips of rubber, the box having a shut-over lid, the bottom of which is lined with rubber, which, when the box is closed, comes in contact with the tops of the slides. The latter are thus securely held in a casing of rubber. This box is then placed in an outer box, strongly iron-bound, and having a sliding lid secured or opened by means of a single screw. The opinion of those having experience of the transmission of large numbers of lantern slides, on this or any other plan that may have been found satisfactory, would no doubt interest many.

* * * * *

LOOKING in at the lantern-slide entertainment in connexion with the Crystal Palace Exhibition on Saturday evening last, we found a large audience evidently enjoying a miscellaneous collection of slides that was being shown, several slides from frenagraphs (we believe that is the correct term for negatives taken in Messrs. Beck's ingenious Frena camera) securing much applause. By the way, in our notice of the Exhibition on April 14, we omitted mention of the fact that the series of enlargements from frenagraphs which Messrs. Beck had at their stand were made by Mr. F. A. Bridge.

* * * * *

THE lantern in use at the Crystal Palace was a biunial by Messrs. W. Watson & Sons, and at the time of our visit it was working smoothly and evenly in the hands of Mr. Wollaston. It was fitted with a pair of Mr. R. R. Beard's new cut-off jets (which we described at page 53 of the "Lantern Record" for April 7), and the same gentleman's safety dissolver, suggested by Mr. W. Brooks some time

ago, and identical in pattern with that which had been in use with lanterns previously used. Mr. Beard had also provided extra large limes for the jets.

* * * * *

For the information of those of our readers who have never attended a Lantern Exhibition at the Crystal Palace, it should be mentioned that the distance from the lantern to the screen is 110 feet, and that the available size of the screen is about thirty feet square—that is, the dimensions of the proscenium. This large screen was one of the Mason & Payne kind.

* * * * *

The plant for supplying the gases for use in the optical lantern in the theatre at the Crystal Palace was laid down at the time of the first photographic Exhibition, and being, we were informed, such as is commonly adopted at most theatres, and at the same time specially designed for use in lantern shows, it looks as if the Company contemplated making this class of entertainment a permanent feature of the Palace. Mains are laid on to the stage for limelight purposes, as well as up to the lantern gallery, both being available at any moment. The gasholders or tanks are situated in the basement, and are of a capacity of 100 feet each. The hydrogen is drawn from the main; the oxygen-holder is filled from high-pressure cylinders.

* * * * *

Although the apparatus section of the Exhibition was, as we said at the first onset, very small, we were pleased to learn that several of those who did exhibit were rewarded for their enterprise. Mr. J. D. England (who showed negatives on celluloid, lantern transparencies, &c.), the Cresco-fylma Company (whose elegant and simple process of enlarging negatives and transparencies was in course of constant demonstration and attracted much attention), and other exhibitors, assured us they were pleased with the result of the three weeks exhibit. Great interest also seemed to be excited by Messrs. Beck's, Messrs. Theobald's, Messrs. Noakes', Messrs. Platte & Witte's and other exhibits, all of which were connected with the optical lantern, more or less. Indeed, but for the lantern exhibits and cognates, and the lantern-slide entertainments, which always tickle the public taste, it is appalling to think what would have been the fate of the Exhibition as a whole. So, Crystal Palace Exhibition of 1893, *au revoir* or farewell—which?

IRON CARBONYL IN COMPRESSED GAS.

So many readers of the Journal possess a competent knowledge of chemistry that I am not without hope we may obtain from one or other of them assistance in the matter described above. This I have no hesitation in saying is now found the principal practical nuisance and drawback in the use of cylinders for the mixed jet, whilst I am not satisfied that it is altogether free from danger. It is in that hope I wish to direct more special attention to it.

Users of oxygen alone are never confronted with this difficulty; but those who use compressed house gas, as the use of this in cylinders has also extended, have been finding, again and again, that the gas as it issued from the jet was often "impure." In many cases, before the oxygen is turned on, the small flame of gas will smoke greatly, and after a little time the lime or other incandescent body appears where played upon of a deep red colour, so deep sometimes as to be nearly black. The colour in itself does not seem to matter much, and, according to the usual laws of radiation, a *black* line, if one could be made, should give more light than the white; but in a pronounced case of this impurity the light does suffer most woefully. The Editor will personally remember that on a recent occasion, when verbally discussing this matter, another operator told us how, on more than one occasion he had been utterly baffled by the impossibility of "getting a light." I have never found it so bad as this, but serious loss of light has been experienced frequently. In fact, but few readers who use the mixed jet from cylinders will not be able to bear out from experience all the above.

Till lately, so much was all that was known; but in 1891 Mond and Quincke followed up the discovery of nickel carbonyl by that of iron carbonyl, similarly formed by the action of carbonic oxide upon iron. Roscoe and Scudder found that "water gas" compressed in steel cylinders formed the same compound. Finally, Mond and Langer obtained *two* different iron carbonyls in a state of purity, having the formulæ of $Fe(CO)_5$ and $Fe(CO)_7$. They were able in one day to prepare about one grain of viscous liquid carbonyl from 100 grains of finely divided iron. It differs from nickel carbonyl in being much less volatile, distilling at about 102° C. The consequence of this is that in some cylinders not only is the gas "impure," but liquid carbonyl itself is deposited in the shape of an oil, which will run out of the valve if the cylinder is inverted when empty. Instances of this have been observed.

Besides the loss of light caused in this way, I have hinted that the formation of carbonyl *may* not be free from danger. For it is clear that the metal is acted upon and disintegrated; and the question is, to what extent? Unless confined to an infinitesimal degree—which I am by no means sure of—the metal may be in time so thinned or become so spongy as not to be safe under the pressure. This side of the question especially needs careful investigation. But the mere loss of light is bad enough, and the practical question is, Can anything be done to either prevent, or, at least, greatly diminish the evil? Here I hope for help from some who have more chemical knowledge than I can pretend to; still, I add what suggestions occur or have been suggested to myself.

1. A chemical friend, alluding to the recently discovered but now well-known fact, that *perfect dryness* prevented chemical action in gases, suggested that, if a hydrogen cylinder were dried out by heat before pumping, and the gas dried by passage over calcium chloride, in the ordinary laboratory manner, whilst passing to the cylinder, the evil would probably be diminished. It is possible, but I have doubts whether it would be practicable. Only practical pumpers could decide that question.

2. Gas is commonly called carburetted hydrogen. It does not, however, appear that the carbon thus combined with the hydrogen does the mischief. Rather it seems the portion of carbon monoxide present in the gas which is responsible. This looks to me more hopeful, and I do not think it should be impossible so far to *purify* the gas before compression as to separate the carbonic oxides from the truly inflammable gases. If the gas can be *thoroughly* purified from both carbonic monoxide and dioxide, I believe the evil will cease, and it is not even certain that dioxide causes any.

3. If this is not feasible, the question will occur whether some hard *varnish* cannot be found which will resist the gas under pressure, and chemically protect the steel of the cylinder from contact or chemical action. Surely this should be practicable; and, if so, such a varnish or coating could be readily melted over the inside by heat before the valve was screwed in.

4. High temperature greatly facilitates the action; therefore, keeping the cylinder cold under pumping should be carefully attended to.

The above, I am sorry to say, exhaust my stock of suggestions. It has appeared to me that this formation of carbonyl has increased since the improved steel cylinders came in; and it may possibly be that steel (iron already *combined with carbon* in another way) may be more readily acted upon; but there is no doubt that iron itself is attacked. There is also no doubt at all that a given cylinder goes on getting *worse than at first*, and that some are worse than others. It is also, I have reason to believe, fairly certain that *stale* gas pumped (as from a store gasometer some time filled) is worse than fresh. I think the first fact is explained probably by a film of grease, or some other protective varnish, accidentally protecting some cylinders more than others (again pointing to a varnish); and the second fact by the gradual formation in stored gas (of which there is some evidence) of more free carbonic oxide.

Be all this as it may, the only practical palliative I know at present is to use gas (if one have influence or power to get it) fresh pumped to use it new, or fresh, and not keep any; and to use a "necky" cylinder. To keep the gas in cylinder seems to make the latter get worse and worse; better let it go. This objection to "keeping" gas is one of the greatest nuisances of the situation. Altogether, no more pressing problem demands solution at the hands of the compressed gas industry.

Lewis Wright.

DOUBLE PRINTING FOR TRANSPARENCIES OR ENLARGEMENTS.

The simple operations of printing in a sky to a transparency or enlargement, of taking out one portrait from a group, or even of successfully vignetting a single figure, although perfectly easy in theory, are sometimes very troublesome, if not really difficult, in practice, owing to the want of a little system. The following plan, which I have used for some years, while thoroughly efficient for the purpose, entails very little initial trouble and a minimum of skill in its working.

It is simply an elaboration of the rough-and-ready method of vignetting by holding a card with an aperture in it between the lens and enlargement during exposure, the screen in this case being held in a frame provided for the purpose. Even in simple vignetting much of the effect depends upon the proper centering of the picture and the vignetting screen; but when, as in the case of double printing, an irregular outline has to be rather closely followed, the importance of this point is vastly increased, and it is just the difficulty of accurately masking the various parts of the picture by hand work that constitutes the trouble. When, however, a properly centered frame is provided in which to fix the screen, the latter may be placed in any desired position along the axis of the lens, and any degree of sharpness or the reverse of the outline secured without losing centrality.

The precise mechanical details of the screen are unimportant, and will depend in some measure upon existing arrangements. When the enlargement is made upon an easel running on a tramway, the vignetting screen, as I may call it, may consist of an additional framework running upon the same lines, or, if preferred, the arrangement may take the form of an attachment to the enlarging lens itself. Such a one, which answered my purpose very well some few years back, consisted of the discarded mount of an old whole-plate portrait lens, which was attached to the front of the enlarging camera behind the lens, or between the lens and the enlargement. In place of the cap a series of wooden frames was made to fit on to carry masks of different sizes, and the rack and pinion served to give the necessary motion for securing accuracy of adjustment and softness of outline.

The capability of thus altering the position of the screen smoothly and easily, and preferably by mechanical means without losing centrality, is one of the most important features in the arrangement, as it not only greatly helps in the adjustment of the screen as already mentioned, but is absolutely necessary in preparing an accurately outlined screen, upon which, of course, depends the success of the operation. In simple vignetting this is, of course, of comparatively little moment, as all that is necessary is an aperture of oval or irregular shape placed sufficiently out of focus to give a softened edge to the printing. In blocking out a sky, or a figure, or other object, however, the case is different, as the exact outline must be closely followed in cutting the mask, which must be so placed that it just cuts off the requisite portions of the picture without showing too abrupt an edge on one side or too much diffusion on the other. To make such a mask may at first sight appear extremely difficult, but it is really the simplest matter in the world if properly taken in hand.

In some respects the simplest plan of all is that adopted in blocking out the background of a negative for direct printing, namely to cut out the outline for a silver print as carefully as possible with a sharp penknife. If such a screen or mask be placed exactly the same distance from the lens as the latter is from the negative, and accurately centered, it should be in the proper position, and only requires a slight motion to and fro during exposure to give the desired softness of edge. But with this arrangement there still remains the difficulty of getting the mask properly centered, whereas, by following the plan I have to describe, the task is performed automatically.

In making the mask I use the travelling framework itself as the easel on which to make a tracing of the outline. Although not absolutely necessary, it is convenient to adhere to some definite proportion in the relative dimensions of the negative and the mask, if only that it obviates the necessity for any wide range of motion of the screen. The mask may be the same size as the original, it may be smaller, or it may be larger, as may be preferred. I use myself a fixed proportion of two to one, the mask being twice the dimensions of the negative. A piece of thin paper is attached to the travelling frame in such a manner that it can be taken off if desired and restored to exactly its original position; then, regardless entirely of the dimensions of any subsequent enlargement, the temporary easel is placed in position, and accurately focussed for an enlargement to two diameters, and the required outline is then carefully traced with a pencil upon the paper, and cut out with a sharp penknife.

It is obvious, that if the travelling vignetting frame is accurately centered and moves truly in the axis of the lens, the mask so produced will also be correctly centered, and only requires adjusting to the right position between the lens and enlargement to secure the necessary softening of the edge. The exact position should be, with the dimensions in question, just twice the distance from lens to mask as between lens and negative, this rule holding good whatever may be the dimension to which the negative is enlarged. Observe that it is not a fixed position, but will vary with each degree of enlargement, although the dimensions of the mask remain the same; thus, in using a six-inch focus lens, and making an enlargement up to four diameters, the correct position of the screen would be fifteen inches from the lens, while, if the enlargement were to, say, nine diameters, the distance would be only thirteen and one-third inches. However, it is not necessary to resort to such calculation in practice, since the eye will be the best guide, provided the mask has been correctly made.

For some purposes I have used in the travelling framework zinc plates with central apertures to which to attach the cut-out paper mask. A mere bordering of zinc resembling a *passe-partout*, to which the paper may be gummed, is all that is needful, and this should be so arranged that it can be replaced in the wooden frame in exactly the same position. This is easily effected by drilling three holes in the zinc to correspond with a similar number of pins in the frame.

There are, however, cases in which the zinc plate is useless, as for instance, when a central figure or object has to be masked while a background or landscape is being printed on to the margin of the picture. Here there is nothing for it but to stick the figure mask on to the centre of a sheet of glass, which should, of course, be as free from faults as possible, since the image has to pass through it. In preparing such a mask in all probability both portions will be wanted, that is to say, both the figure cut out and the surroundings from which it is cut; or in the case of a landscape, probably both the landscape and sky portions will be required for separate use.

In such instances I proceed as follows in the preparation of the double masks, which require to register not only with the negative, but with one another. For this purpose the wooden framework should be provided with a sunk rebate, accurately cut and finished, into which specially cut squares of glass fit neatly. The glasses should be preferably ground at the edges so as to fall readily into exactly the same position in the rebate. One of the glasses being placed in position, a piece of paper of exactly the same size is laid on it and the outline traced. After cutting the mask, the two portions are laid upon the glass in the rebate in proper position, and the marginal or landscape portion having been gummed is made to adhere. Then the other portion, the figure or sky as the case may be, while still in position is touched with gum on its upper surface and another piece of glass laid carefully down upon it and pressed into contact. If this is properly done, the result will be a fair accurately registering mask, by means of which either portion of the negative may be covered at will.

It is beyond the intention of this article, even if space permitted, to go deeply into the details of the application of this contrivance, but many suggestions will present themselves in connexion with vignetting, double printing, and even with combination printing, from a number of negatives. I have dealt more especially with the application to enlarging, but with a little variation the plan is equally applicable to the production of lantern slides by reduction in the camera, in which case the masks may be applied either inside or out of the instrument. It is, however, scarcely necessary to enter into details here.

W. B. Bolton.

Mr. Alfred H. Saunders, of Mount Pleasant, Brierley Hill, has sent us his price-list of lantern-slide making and colouring. For the former Mr. Saunders employs the wet-plate process. The prices appear to be moderate.

LANTERN MEMS.

Ether and other saturators have for some years past been matters of interest to lanternists, and considerable ingenuity has been displayed in the design of new forms, or development of old ones. Among names associated with work in connexion with the same, one remembers those of Broughton, Hardwich, Ives, and the late Albert Scott.

* * * * *

The latest form of saturator is that combined with a jet—the invention of Mr. Lawson, and members of the Lantern Society had at the last meeting an opportunity of seeing it worked practically by Mr. Hay Taylor with every appearance of success, the light, as most lanternists are aware, when oxygen gas is passed through ether or benzoline, being brilliant, quiet, and steady.

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From the remarks made after, it would appear that saturators generally have to live down a questionable reputation, and, on the principle of "Give a dog a bad name," nothing but practical proof over an extended period will cause lanternists and the public to have thorough confidence in the oxy-ether light.

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Personally I have always thought the light a useful one, and, under certain conditions, almost indispensable, while in my own hands, and those of my friends it has been quite successful. It has, unhappily, come under notice on more than one occasion that others have not been so successful, as testified by destroyed apparatus, &c.

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That it is a light that can be indiscriminately used with some of the forms of saturators on the market will not be admitted by many; but, surrounded with safeguards, it no doubt can not only privately but in public (especially for single lantern) be employed with success. I have used the Broughton-Hardwich ether saturator and compressed oxygen in the field for special purposes of limelight work, and moved the apparatus about during operation, but a similar apparatus in the hands of those for whom it was purchased quite failed.

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Then, again, I had occasion to adapt a similar oxy-ether light, with saturator, to a triple lantern for use in South America, and it not only answered perfectly here, but on last hearing from the owner continued to do so; hence the conclusion is that, the more the difficulties are made known and overcome by apparatus being perfected, the more certain *will* the satisfactory working of the light become.

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For dissolving with the regular forms of gas dissolvers, such as those known as "universal," the "Star," &c., certain modifications have to be made, so that the light does not pop out; and, as the action of dissolving causes an accumulation of pressure on the supply side, and an exhaust to a certain extent on the other, pumice chambers immediately under the nozzle of the jet are, in my opinion, absolutely necessary.

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Although in the case referred to ordinary dissolvers were employed, I should strongly advise that double plug dissolvers be used as a general rule for the oxy-ether light, so as to keep the saturated *gas* quite distinct from the pure oxygen. With old patterns revived and new ones introduced there will be no difficulty in selecting one suitable for the purpose.

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Photographers know well the nature of sulphuric ether, but for all that it is not always kept under control, and whether in its stoppered bottle or in the saturator too much care cannot be exercised to ensure that none escapes. As to the quality, there must be no question about that, it must be the best, *and best only*, somewhere about ·770 specific gravity (·750 or ·760 will answer), the filling to take place in the open air, or in an outhouse away from any light or fire. All washers to be periodically tested or changed so as to ensure perfectly tight joints, and each indiarubber tube kept to its own gas (oxygen or saturated).

For England, and wherever both hydrogen and oxygen gases can be obtained compressed, I should always prefer to use the *two* gases; and, as house gas is so much easier for the companies to get and compress in lieu of pure hydrogen, there is no reason why that should not be continued to be used, providing (and this is where the *if* comes in) they have it purified before compressing.

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The price charged for compressed house gas should be ample to supply a practically pure gas, and it is not enough for the oxygen compressors to shield themselves behind the excuse that the compressed house gas is only supplied to oblige the customers who use their oxygen (as I once heard stated), for without hydrogen for limelight work (as at present mostly employed) oxygen would be little or no use. Probably, by some arrangement with the large gas companies, a specially *good* quality of gas could be supplied for compression.

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A new use has been found for the old lantern favourite of childhood's days—the "chromatrope"—which has been introduced in the now popular serpentine dance. With a dark cloth background the dancers in their ample skirts gyrate in the rays of the limelight, constantly changing in colour with all the prismatic hues and its effectiveness, and then when a number of jets below the stage are sending up clouds of steam to surround the dancers and create a weird effect, the chromatropes from the lantern in the front of the stage, and hidden from sight, are projected on the dancers and revolved.

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Patterns for the chromatropes have been selected that lend themselves to effective contrast, among them being a pattern that produces a serpentine twisting of the design, while others are of the stereotyped patterns. In all, I believe, five lanterns are employed at the Canterbury Theatre of Varieties, where this innovation occurs in *Satan Junior*, by Charles Lauri, the clever pantomimist of Drury-lane renown.

G. R. Baker.

THE DISSOLVER.

I.

Strictly speaking, the lantern season was over, for April had come, when the Society's biunial and gas bottles were usually consigned to inactivity until the shortening days of the autumn should release them from their imprisonment in the big cupboard of the old-fashioned room which the Society rented at "The Flat Iron and Sugar Tongs." This year, however, an extra lantern night, to take place in the middle of April, was decided upon. Mr. Samuel Skinner had proposed it, Mr. William Poddleton had seconded it, and the proposition was carried unanimously. So said that unimpeachable witness, the minute book.

But there were several circumstances connected with this extra lantern night which the minute book did not record. For instance, had the worthy Honorary Secretary instead of making the contents of the sacred volume a bald, exact, and colourless *résumé* of the Society's proceedings, imported a thread of explanatory and vivifying narrative into it, it is quite certain that he would have mentioned the interesting fact that this was the first time that Mr. William Poddleton had seconded anything that Mr. Samuel Skinner had proposed at the Society's meetings.

Yes, Skinner and Poddleton had agreed at last! Wonderful! and not merely agreed—but over a lantern matter! That was the astonishing part of it. The Society, so to speak, would have rubbed its eyes with amazement at beholding Skinner and Poddleton in accord over anything, but that they should be of one mind as regards something directly or indirectly associated with the optical lantern was a phenomenon of such an extraordinary nature that the Society gasped and wondered what would happen next. Momentarily recovering their surprise, however, members held up their hands in favour of Skinner and Poddleton's proposition; and, when the Chairman declared it carried, and the members looked curiously at Skinner and Poddleton, who sat glaring at each other with hatred gleaming in their eyes and illuminating their faces, they instantly took in the position of affairs, and chuckled with the enjoyment of anticipation. For lively times were in store at the extra lantern night, as Skinner and Poddleton were, of course, going to have a heated and bitter wrangle over the merits of their respective slides. There was always a great deal of fun to be extracted from the photographic quarrels of Skinner and Poddleton, and, doubtless, there would be no exception to

the rule on the extra lantern night. Nay, since Skinner and Poddleton were the instigators of the extra lantern night, might it not be assumed and hoped that some special attraction in the shape of a row of hitherto unapproached piquancy would be forthcoming? Assuredly. So the Society smacked its lips at the delightful prospect before it.

II.

Mr. Skinner and Mr. Poddleton were not exactly, in their two selves, the Great Mugglesby Amateur Photographic Society, inasmuch as the Society had a total membership of thirty-six, but it is quite fair to say that of that number thirty-four counted for so little by themselves, they would have been incapable of sustaining the existence of the Society, which, but for Skinner and Poddleton, must inevitably have died of inanition. The happy pair bore the same relationship to the Society, as a whole, that oxygen does to nitrogen in atmospheric air—they were simply diluted by the other thirty-four, whereas the thirty-four, without the other two, would have been in just about the same position as nitrogen would be for breathing purposes without oxygen.

Still, the other thirty-four members of the Great Mugglesby Society were not, as you might have imagined from what I have just said, all padding, in a photographic sense. Oh, dear no! there were some really good photographers among them, with a great deal of sound technical, and artistic knowledge, which is more easily conveyed in words than works, although not, perhaps, with so much conviction. They talked and read papers at the meetings, showed results, asked questions, spoilt as many plates and made as many lantern slides as, perhaps, any other four-and-thirty amateur photographers chosen at random; but, after all said and done, they were but a mere pack of minnows round those dominant Tritons, Skinner and Poddleton.

For Skinner and Poddleton were *the* authorities of the Society, and, like most authorities, they did not leave those about them in ignorance of the fact. Skinner was one of the last to be converted from collodion to gelatine; Poddleton was one of the first to adopt the newest dry-plate process. Skinner swore by pyro; Poddleton tried every new developer as it came out, and instantly became its oracle for the benefit of the Society at large. Skinner cherished a deeply rooted sentimental loyalty for albumen paper; Poddleton went into ecstasies over platinotype. Skinner declined to consider the feasibility of any process coming up to collodio-bromide for lantern-slide work; Poddleton averred that *he* could not tell the difference between *good* gelatine slides and those on collodion.

What Skinner recommended Poddleton denounced, and what Poddleton suggested Skinner tried to improve on. They were both endowed with the unfortunate defect of loquacity, so that now and again there were some warm discussions between them. Singular to say, when either of them absented himself from a meeting, flatness and inertness characterised it, and once, when both were away, it really seemed as if the members were incapable of sustaining a discussion, and, although neither Skinner nor Poddleton was liked, it ultimately came to be recognised that, without them, the Society would be shorn of its chief sources of vitality. And, as Skinner and Poddleton knew this just as well as the other members, it raised their self-conceit and mutual dislikes to a glorious extent.

III.

It was not, perhaps, an ill-natured feud; for, as Great Mugglesby is a large town, and as Skinner lived at one end of it and Poddleton at the other, they seldom, if ever, met in private life, and, in point of fact, had nothing whatever in common outside photography; but, photographically speaking, they regarded each other as arrant quacks and asses, a state of feeling possibly largely born of jealousy, and, no doubt, liberally nourished by resentment. It began at the very first meeting of the Society. Skinner showed a negative with transparent spots upon it, for the purpose of eliciting the cause of them. Poddleton incidentally observed that the subject—a rustic scene—was not sharply focussed. Skinner, who had a leaning towards diffusion of focus, retorted that he was not a map-maker. Poddleton opined that it would be to the advantage of photography if "map-making" were a little more prevalent than it was. Skinner said it was a matter of taste. Poddleton said it was very bad taste. Skinner said Poddleton didn't know what he was talking about. Poddleton said, "Sir, to you!" And thus the seed of strife was sown, and the Great Mugglesby Society was assured a career of liveliness which was a capital preventive of somnolence, although, perhaps, no great help to photographic science.

So matters ran on during the three years' existence of the Society, the acute stage of the great Skinner and Poddleton controversy being, of course, reached in the winter months, when the lantern nights were on. They were both great on slides, and were indeed clever workers, but so prejudiced one against the other that, no matter how excellent the one's slides were, the other with insurmountable obstinacy refused to be persuaded of the fact, and continued to find faults where none in reality existed.

"These," the assistant lanternist would say, as he came to them, "are Mr. Poddleton's slides." Then the semicircle of members seated in front of the screen would nudge each other and "ahem!" and Skinner would fold his arms and fix his gaze on the sheet with a remorseful smile and compressed lips.

When the applause on the first slide had subsided—for Poddleton was really a good worker—Mr. Skinner would ask, in a tone of assumed amiability, whether Poddleton had his camera quite straight when he was taking the negative? Now, if there was one thing more than another upon which Poddleton prided himself it was taking his pictures "plumb," all his cameras being most profusely studded with spirit levels, so that he was absolutely independent of that fallacious instrument, the eye.

Mr. Poddleton's retort, which was always allowed a free field by the other members, who never interfered between Skinner and Poddleton except to keep the apple of discord plainly apparent to both of them, would be not altogether untinged by personality.

"Was Mr. Skinner sure he could see straight?"

"Mr. Skinner would confess himself unable to do so after looking at Mr. Poddleton's distorted photographs. Had not Mr. Poddleton rather over-developed the next slide?"

"Mr. Skinner liked a full range of gradation; some people had an inexplicable love of want of contrast."

"The next slide had a bluish tone in the shadows, and a distinct red colouration in the half-tones. How did Mr. Poddleton account for that?"

"Mr. Poddleton would not attempt to account for anything of the existence of which he was unaware. Some people could not distinguish between monochromatic and polychromatic effects. Colour blindness was a deplorable disease in both positive and negative form." And so on.

Mr. Skinner's slides would come on in due course, and then it would be Poddleton's turn.

"Mr. Poddleton would like to know if the clouds in the first slide were in the negative?"

"They were," from Skinner.

"Then perhaps Mr. Skinner would be good enough to explain, for the benefit of the members at large, what peculiar phenomenon in nature was responsible for the clouds being lighted from one side of the picture and the landscape from the other?"

"Mr. Skinner was not responsible for the freaks of nature."

"The next slide was *rather* dense; would Mr. Skinner like a little more gas?"

"Mr. Skinner would like a little *less* gas from Mr. Poddleton."

"What developer did Mr. Skinner use that he should have got that disagreeable brownish-reddish tone?"

"Pyro and carbonate of ammonia."

"Did not Mr. Skinner think he could have got a better result with a mixture of eikonogen, hydroquinone, amidol, metol, and glycin, well restrained, and containing an alkaline carbonate and hydrate?"

"Mr. Skinner had more respect for his collodio-bromide emulsion than to subject it to the noxious influence of such a fearful and wonderful hotch-potch."

From these sparsely culled amenities of the lantern meeting the reader can easily see what a capital fund of amusement the general body of members derived from the rivalry of Skinner and Poddleton. Sometimes they took sides; not, it must be confessed, from any conviction that in so doing they were obeying the dictates of a reasoning instinct, but simply to keep the game alive between the disputants; for, although Skinner and Poddleton were good enough photographers, and had a useful historical and practical knowledge of ancient and modern processes, the other members were in most respects their equals in skill, so that the authority they enjoyed was more fictitious than real. In secret, therefore, as the reader will have guessed, Skinner and Poddleton were laughed at by their fellow-members, notwithstanding the fact that those two gentlemen were the chief instruments in holding the Society together.

IV.

So far, however, the breach between the two opponents had never widened to anything like an extent which would not admit of being bridged over; but, in the nature of things, such a crisis was bound to arise. It arose, and in this way.

There was to be a lantern-slide competition for a challenge cup among

the photographic societies of the county of which Great Mugglesby is the chief town, and naturally the Great Mugglesby Society were among the competitors. It was arranged that the slides to represent the Society should be chosen by the vote of the members upon those shown at a lantern evening to be devoted mainly to the purpose of selecting a representative set. Most of the members sent in collections, and among them were, of course, sets from Mr. Samuel Skinner and Mr. William Poddleton.

The method chosen for ascertaining the opinion of the meeting on the individual slide was the highly simple one of counting audible votes for or against. Thus, when a slide was on, there would be a mingled chorus of "Noes" and "Yeses" from the members, just as they might consider the slide good enough or not to represent the Society. Then the Chairman, if the preponderance of opinion was not sufficiently marked one way or the other, would count the votes and declare the result accordingly.

Mr. Skinner's slides were so good that they were instantly greeted with applauding "Yeses." Poddleton was silent throughout the passage of his rival's slides across the screen; but when the last of them had been shown his voice was heard, in a distant corner of the room, saying, "Mr. Chairman!" A hush fell upon the members, who turned with smiling faces to where Mr. Poddleton was sitting. The fun was about to commence!

"I should like to ask if it is not understood," said Mr. Poddleton, sweetly, "that slides entered for this competition should be from the slidemaker's own negatives."

"Of course," said the Chairman.

"Decidedly," said several members.

"It states so in the rules of the competition," added the Honorary Secretary. The Honorary Secretary was always strong on the rules.

"Then I take it, sir," continued Mr. Poddleton, in honeyed accents, "that Mr. Skinner's slides are ineligible, as they are not made from his own negatives. Mr. Skinner said in this room, only a month ago, that he had no experience of photographing in Norway; so how did he manage to take these pictures there? Has he been there during March, and obtained summer effects?"

"I—I—beg pardon," stammered poor Skinner; "the negatives were lent me by a friend. I forgot to mention it, and—I—didn't know—I—I—I—didn't remember the rule the Chairman refers to. Of course—oh, of course—the slides are ineligible. So, take 'em out, by all means."

So the slides were taken out, much to Mr. Poddleton's delight and the chagrin of Mr. Skinner, who enjoyed nothing so much as favourable comments upon his lantern-slide work. The sharp-eared Poddleton had clearly scored a very good point against his rival, although the feeling of the members was one of regret that he had announced his discovery as to the authenticity of Skinner's negatives in so public a manner. It was evident that there was something more than mere superficial rivalry between the two men that urged Poddleton to take such an extreme course against Skinner, and whatever doubts on the subject may have existed in members' minds were removed later in the evening when Mr. Poddleton's slides were put on; for whether it was resentment or mortification alone, or a combination of both, the members could not tell, but Mr. Skinner, for the first time in the history of the Club, was quite silent while the Poddleton slides were passing through the lantern—yes, quite silent. He looked at them as critically as anybody, but said never a word. Everybody expected an angry outburst of cantankerous criticism upon Mr. Poddleton's slides, or, at least, a fusillade of "Noes" as they were shown, and nobody more so than Mr. Poddleton himself.

When all the slides had been shown, and the meeting was concluding, a further surprise was sprung on the members. Mr. Skinner rose, unnaturally self-possessed and cool.

"The lantern meetings throughout the winter have been so very successful, Mr. Chairman," he remarked, quietly, "that I'm sure we are sorry they are over. As it is possible that members generally may like to have one more lantern night in the semi-winter month of April, I beg to propose that an extra lantern night be held this day month."

"I second that," said Mr. Poddleton.

The surprise of the members at this unexpected partnership of the two old foes was not so acute that it prevented them from acquiescing in the suggestion, and so it was carried. But after the meeting, and for days following, the temporary coalition of Skinner and Poddleton was the theme of speculation and discussion.

V.

Mr. Skinner was a flourishing dentist and a bachelor; Mr. Poddleton was a partner in an extensive grocery business, and also unmarried. As I have said, outside the Society's meetings and outings there was no bond of intimacy between them, and, except on these occasions, they seldom met. During the last few weeks, however, they had stumbled across each other several times, the frequency and circumstances of their meetings arguing that they had both suddenly contracted an absorbing fondness for the drama, for it was at the Great Mugglesby Theatre Royal that these meetings took place.

The Great Mugglesby Theatre was run on the same system as most country playhouses, that is to say, a different entertainment was given every week, provided by travelling companies. For the last few weeks, however, the theatre had been occupied by a company organized by the manager himself, and it was during this "stock season" that Mr. Skinner and Mr. Poddleton, who had hitherto only visited the theatre at distant intervals, began so generously to patronise the local temple of the drama.

Melodrama of the conventional or Adelphi type was the bill of fare, varied in style, although not in nature, from week to week at the Great Mugglesby Theatre, and it was "interpreted by the most powerful company ever got together in the provinces, including the celebrated London actress, Miss Melpomene de Vere." Gifted and beautiful as Miss De Vere possibly was, nobody in London had ever seen or heard of her. There is nothing to be surprised at in this; parallel cases by the hundred abound.

Miss De Vere's histrionic powers do not concern us, although Skinner and Poddleton thought her a great actress; but they, poor fellows, were blinded by her beauty, and, therefore, became quite incompetent to criticise her. She was, undoubtedly, a good-looking and charming young person, and better men than Skinner and Poddleton might have been excused for losing their hearts and heads over her. But this is not a love story, so let me skim through the sentiment quickly. Skinner and Poddleton soon learned, as gallants will, that they were rivals for the favours of the one divinity, and therefore they would have assassinated each other, had they dared.

The extra lantern night arrived in due course. The Society had several visitors, and the room at the "Flat Iron and Sugar-tongs" was well filled. A numerous collection of slides was shown, and altogether the affair—at any rate, in its earlier stages—passed off very well.

Mr. Skinner's slides were much admired, and it seemed that, as if in atonement for his error of judgment in having shown slides from another man's negatives at the last meeting without acknowledging that the originals were not his own, and also, probably, to convince his fellow-members that his own powers of negative-making were not in any way inferior to his friend's, he had, during the past month, made an earnest effort to utilise his undoubted cleverness in photography to its best advantage. The slides he showed were voted perfect in technique and pictorial quality. They were from a series of negatives of the scenery round about Great Mugglesby, which, although the trees were as yet nearly bare of leaves, afforded many opportunities for the production of pretty views, in which lake, river, wood, meadow, and hill could be included with the happiest artistic effects.

As Mr. Skinner's slides were being shown, it dawned upon the members that he had recently taken a new departure in landscape photography—that is, for the first time he had introduced figures in landscape. To be more correct, only one figure appeared throughout his series of slides; it was the person of a delightfully dressed lady, and it is due to Mr. Skinner's artistic instincts to say that she was so placed in each of his views as to fit well into the picture, and assist the composition. In one she was standing by a rustic stile, looking out upon the landscape; in another, walking under a row of trees; in another, looking up at a bird; and so on.

The last of Mr. Skinner's slides was a portrait of the lady herself. It was greeted with great applause, as much for the beauty of the original as for the delicacy of the picture. Then members nudged and whispered each other, and wondered what Mr. Skinner had to do with Miss Melpomene de Vere that he should have had so many opportunities of including her in his pictures. Some admired his boldness in showing them; others condemned it; but all were surprised and jealous at his success.

Mr. Skinner looked across in the semi-darkness to Mr. Poddleton with an expression of countenance that betokened a feeling of triumph; but, if he could have seen the latter gentleman's face, he might have been surprised to find how unmoved and reposeful it was, under what Mr. Skinner evidently looked upon as conclusive proof that *he* (Skinner) was the swain upon whom the fair De Vere had deigned to bestow her choicest smiles. And Mr. Skinner would have seen something more if the gas had been turned up; he would have seen that among those who examined his pictures one gentleman, a visitor, who had been introduced by a friend, a member, did so with rapt interest; and he might have noticed that when the portrait appeared he turned to his friend and asked him who had taken the photographs, and that, on being informed, he asked where Mr. Skinner

lived, and was also told. To say that the real state of the case had dawned on the members at large would, perhaps, be alleging too much; but undoubtedly an inkling of it was abroad, so that, bearing in mind the significant fact that Poddleton had seconded Skinner's suggestion for the extra lantern night, the former's slides were anticipated with much eagerness and curiosity. When they at length appeared, members were not disappointed.

Melpomene de Vere pervaded Poddleton's slides as she pervaded Skinner's, but to a greater degree. Of Skinner's pictures she was but a part, of Poddleton's she was the whole. Poddleton, in fact, had photographed the De Vere at his own private studio in all her characters, and in a variety of attitudes and poses; and amidst all the applause that greeted the pictures it was somehow felt that Poddleton, having been admitted to the privilege of photographing the leading lady of the Great Mugglesby Theatre in character, had beaten the rival for whom she had merely consented to pose in his landscapes. Unable any longer to restrain themselves, members laughingly cheered Poddleton, cheered his slides, and cheered Miss Melpomene de Vere. Some of them asked Poddleton "when it would be," others requested to be favoured with a piece of cake, some inquired when he was going on the boards, and indulged in other pleasantries of a like character, which he took in the best possible part. In the midst of all this hubbub, Skinner contrived to escape from the room. As he left the hotel he encountered the visitor who had been so anxious to know who had taken the landscape photographs in which Miss Melpomene de Vere figured, and who, besides, when Mr. Poddleton's studies of the lady in character appeared, exhibited a similar degree of curiosity as to who *he* (Poddleton) was and where he lived.

The dejected Skinner went home to concoct schemes for outwitting his rival before it was too late; the stranger betook himself to the Great Mugglesby Theatre, and was just in time to witness the last act of the play in which Miss De Vere was appearing.

VI.

Elated with having publicly shown his rival that he had made further progress in the good graces of Melpomene de Vere than Mr. Samuel Skinner, whose outdoor photographs with the lady in them antedated Mr. Poddleton's studies of her in character by some three weeks, and, therefore, were held by Mr. Poddleton and the members of the Society as adducing conclusive proof that Mr. Skinner had lost ground in the contest, Mr. Poddleton, when the lantern meeting was over, hurried off to the Great Mugglesby Theatre, burning to tell the fair De Vere what admiration of her his slides had evoked, and calculating thereby to advance yet another step towards the goal he had in sight, which was the conversion of the lady's name into Poddleton.

When he reached the theatre the performance had concluded. He sent in his card to Miss De Vere, hoping to catch her before she went home. The messenger returned, to say that the lady could not see Mr. Poddleton that evening, and that gentleman had perforce to depart, with the intention, however, of repeating his visit on the following day, which he begged the messenger to intimate to the lady.

Interesting and exciting as the play was in which Miss De Vere had that evening sustained a deeply emotional part, and which bathed the handkerchiefs of the female section of the audience with lachrymatory moisture, it was dwarfed in human interest by the short, but stirring, drama of real life in which she suddenly found herself engaged shortly after the fall of the curtain that same evening; for, when the play was over, the stranger who had been present at the Mugglesby Society's lantern entertainment quickly made his way round to the lady's dressing-room, and demanded and gained admission by the inalienable right of his relationship towards Miss De Vere.

Her sternly sorrowful husband stood before her. The tears that rushed to her eyes were real ones, and her kneeling, supplicating attitude sprang from true, and not simulated, repentance. Six months before, the young couple had quarrelled over a mere trifle, and the man, as men sometimes do, had spoken words of blighting harshness, that had stung the girl into leaving his house and seeking a living by the aid of her undoubted talents on the provincial stage. To do her justice, her triflings with the amatory Skinner and Poddleton had nothing more serious at bottom than the harmless vanity of her sex and profession.

In a quarter of an hour the marital quarrel was at an end, and an hour later husband and wife were comfortably seated in the midnight mail for London, and "Miss Melpomene de Vere" had said "Good bye" to Great Mugglesby, to the footlights, and to the *rôle* of model for amateur photographers for ever.

Mr. Vincent Crummles, the ingenuous theatrical manager of the pages of *Nicholas Nickleby*, wondered, on a memorable occasion, when he saw mention of himself and his doings in a country paper, "Who put such things in print?" and, in a like degree, the same feeling of wonderment survives in many breasts to this day, and remains as a tribute to the energy and smartness of your modern journalist. Two days later the *Great Mugglesby Free Press* came out with a sensationally worked-up article, which Mugglesbyites in general, and the members of the town's Photographic Society in particular, read with feelings of peculiar interest.

"A Magic Lantern Romance" was the heading of the article, and its sub-titles were: "The Runaway Actress and the Amateur Photographers!" "Two Photographic Romeos and one Juliet;" "Mr. Samuel Skinner and Mr. William Poddleton idealise the Goddess of the Theatre Royal in their Photographs;" "The Photographs are shown on the Screen;" "The Lady's Husband is accidentally present, and discovers the Whereabouts of his Long-lost Wife;" "Husband and Wife Meet;" "A Reconciliation;" "The Boards will know the Lady no more;" "Mr. Skinner and Mr. Poddleton have taken a Holiday for the Benefit of their Health."

The article contained a highly embellished account of the events which have been detailed in the foregoing narrative, with several reportorial reflections on the ways and wiles of amateur photographers, and the important part played by the camera in modern *affaires-de-cœur*. Needless to say, it created a great sensation, and drew down upon the Society, and upon its members, no end of banter, which survived for more than the traditional nine days. How the affair got into print remains a mystery to this day, but a clue to it may be found in the circumstance that the treasurer of the theatre was very friendly with one of the staff of the *Free Press*, who had a friend who was a brother of a member of the Society; and that, in all probability, the article was the result of a conference between the three of them.

* * * * *

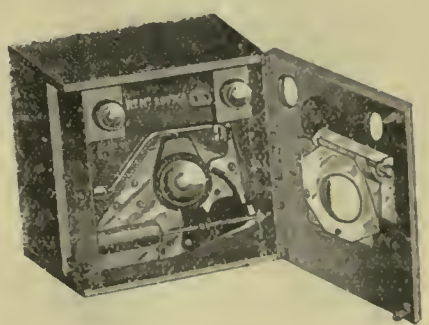
Mr. Skinner decided to look after a branch of his business in a neighbouring town until the affair blew over, and Mr. Poddleton took a spring holiday with the same object. On the next meeting night of the Great Mugglesby Photographic Society nobody turned up, and it was decided, in consequence of these events, to suspend its meetings until the following winter; but, when the winter came, only a handful of members were found to have preserved their allegiance to the Society, and, as Skinner and Poddleton had forsaken it, it was finally dissolved. It will be a long time before anybody starts a new photographic society at Great Mugglesby.

FERRERS OXLEY.

THE "N. & G." HAND CAMERAS.

MESSRS. NEWMAN & GUARDIA, of 71, Farringdon-road, informed us, on a recent visit to their establishment, that the fine weather we have been having lately has made them extremely busy with the hand cameras they have recently introduced. Powerful as the weather is in influencing business, we should be inclined to attribute not a little of the success which the "N. & G." specialities are meeting with to the excellence of the material and workmanship employed, of which we were able to judge from an inspection of all the innumerable parts and cameras in various stages of construction that were shown us the other day.

The No. 1 Standard pattern "N. & G." Hand Camera embodies many of the ingenious ideas of the firm, to which we referred in the course of a



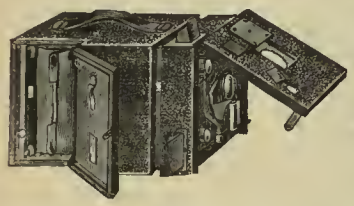
former article. It is fitted with a Wray rapid rectilinear lens and iris diaphragm, and an automatic self-cap in front of the lens. The shutter, which works between the lenses, has an hermetically closed regulating cylinder, effectually preventing all possible entrance of dust, and a pneumatic regulation, giving automatic exposures varying from $\frac{1}{2}$ to $\frac{1}{150}$ of a second.

Both pneumatic and hand releases are provided, and the shutter is noiseless in action. The setting knob is arranged at the top of the camera, and it always indicates the position of the shutter. All the parts are of metal, and the whole working mechanism is fitted on a single plate.

The camera has the well-known detachable changing box for plates or films, two view finders, a central rack and focussing scale from two yards to infinity, celluloid focussing screen and rising front, and is so constructed that every part can be got at for cleaning, the shutter set and released, and all adjustments made from the outside without opening the camera. The camera can be focussed and used on the stand in the ordinary way, and is covered with black morocco. The N. & G. Standard pattern is undoubtedly the perfection of what a working hand camera should be, and from the point of view of the photographer anxious to have an efficient instrument is a veritable luxury. Its movements and minutiæ appeal to one as very elegant.

There are in all six "N. & G." patterns, the one described being No. 1. "Standard" pattern. No. 2 has the addition of a cross front and double extension; No. 3, the addition of a swing back; No. 4 folds and collapses to half the usual length; No. 5 is a stereoscopic camera, and has a rising front, double extension, special shutter, special changing box, level, and can be used either for stereoscopicor single quarter-plate pictures.

No. 6 is a twin-lens camera, and is practically a "Standard," with a smaller camera on the top showing the identical image taken. This has the "N. & G." folding device for accurate focussing, which consists of a cone attachment over the focussing screen, upon which the full-size image is projected, fine focussing being obtained by means of an eyepiece fitted to the cone.



The stereoscopic camera is a particularly handsome instrument, and the twin-lens perhaps the most effective pattern of its class.

Among Messrs. Newman & Guardia's other novelties are the "Eiffel" stand, a very light, slender, but rigid stand for hand cameras, and an adaptation of the familiar changing back for taking twenty-four films in sheaths. This changing back works very smoothly and easily. The Nydia Pocket Camera will shortly be on the market. This is a folding camera, having all necessary movements, which with a dark slide packs up to a thickness of about one and a half inches, and, from the model we saw, is likely to be extremely popular. We were also informed that facilities will be given for adapting the N. & G. "Celeritas" shutter, which Mr. Medland, Captain Hayes, and other well-known workers employ for their photographs of animals in motion, to the Standard hand cameras as required. This shutter works between the lenses at $\frac{1}{100}$ of a second on an inch aperture, an aluminium plate $\frac{1}{250}$ of an inch thick being driven by a very strong spring, the impact on the release being so great that great care and strength of construction are necessary in order to prevent the shutter from smashing itself up.

Messrs. Newman & Guardia's specialities are of a high order of merit, and evince not only much ingenuity in their inception, with every regard to the requirements of the photographer, but that which appeals to all lovers of good apparatus—excellence and finish of construction.

THE "ARCHER" COMBINED HAND OR STAND CAMERA.

Messrs. Archer & Sons, of Lord-street, Liverpool, are placing on the market a "combined" hand or stand camera, which has a double extension to a maximum of twelve inches, leather bellows with side rack and pinion, rising front, and double swing, together with a reversing back and

a double swing back working from the centre. Double dark slides are used. The camera is fitted with a revolving head in the baseboard for tripod, as well as finder and focussing index. A celluloid focussing screen is also fitted to the camera; the lens, shutter, and stand being at the choice of the purchaser. The workmanship throughout is of the highest class.

It will thus be seen that the "Archer" hand or stand camera has all the movements which are demanded in the latest forms of hand camera, which it may be desired on occasion to employ on a stand.

RECENT LANTERN PATENTS.

PATENTS COMPLETED.

Improvements in Apparatus for Printing and Mounting Lantern Slides and Transparencies.

No. 5977. James Robson Rendell, Whinside, Whalley-road, Accrington.—*March* 25, 1893.

The first part of my invention is a frame for printing lantern slides and transparencies. I make two frames of wood or other material. In one of these, which I call the bottom frame, there is an opening, square or otherwise, in the case of lantern slides, three inches square. In the other or top frame an opening is made a little larger than the opening in the bottom frame; in the case of lantern slides three and a quarter inches square. Through this hole a sensitive plate can pass.

These boards or frames are held in contact by springs, in such position that the openings are exactly opposite each other, so that when a negative is placed between the two boards it is kept firmly in position.

At one end of the top board a lever is fixed, by means of which the top board may be raised so as to insert a negative between the two boards in any position that may be required.

On the top side of the top board, a wood or metal back is attached by a special form of hinge. This back fits exactly into the opening of the top board. This back is kept in position by a spring, as usually used in printing frames. These boards are covered with cloth, or other suitable soft material, on all parts which come into contact with the glass plates.

To cut round masks to be used in the printing frame, or for mounting lantern slides or transparencies, I make a pad of wood or metal, flat on the under surface. This pad has a round hole running through its axis at right angles to the under surface. In this hole a rod of circular section, and fitting the hole, is placed. It projects from the pad on the upper surface. A radial arm is attached to this rod by a hinge or a spring. On the radial arm slides another piece of metal, carrying a circular cutter of steel, the plane of the cutters being at right angles to the direction of the radial arm. A scale is engraved on the radial arm, so that the cutter can be placed at any required distance from the centre.

An Improvement in the Production of Names, Titles, and other Inscriptions on Photographic Prints, Transparencies, and Lantern Slides.

No. 20,156. Adam Gray, 142, Mercers'-road, Tufnell Park, London.—*March* 25, 1893.

Heretofore the production of names, titles, numbers, or other inscriptions upon photographic prints has been effected by writing, painting, or printing in reversed characters on the photographic negative itself, which is a difficult operation, requiring special skill, and is frequently unsatisfactory.

The object of my invention is to enable such names or other inscriptions to be produced from ordinary type, so that in printing from the negative the name or other matter in question will appear in clear, sharp, white characters upon the photographic print as a ground without necessitating any retouching of the negative, or of the photographic print, transparency, or lantern slide.

The invention consists in printing from metal or rubber type and with a fatty or transfer ink, such as is used in lithography, the name, title, or other matter upon a gummed or otherwise prepared transfer paper, and in transferring the impression to the photographic negative in the following manner:—

The part of the negative which is to receive the transferred impression must be prepared by rubbing the unvarnished or varnished surface of the film with powdered resin in the same way as for retouching, so as to give the surface a "tooth," to enable it to retain the ink and present a sharp and well-covered impression.

The transfer impression, of which the ink is still moist, is then to be laid face downwards on the prepared surface of the negative, and pressed into close contact therewith by rubbing the back of the transfer paper with a scraper or other instrument by which a uniform rubbing pressure can be applied, so as to cause the impression to be transferred to the negative.

The transfer paper being then stripped off, charcoal, bronze, or other powder is then to be applied to the transferred impression, in order to render the characters opaque, after which the negative should be varnished, whether previously varnished or not.

The operation is the same for lantern slides as for negatives, except that, whereas for ordinary photographic negatives the type used in printing the transfers would be similar to ordinary type, so that, when the impression is transferred to the negative, the letters will be reversed, whilst for lantern slides the type would be reversed as regards direction, so that, when transferred to the lantern slide, they will be presented the right way for reading.

Lantern Query.

Micro.—You seem to have complied with all the necessary conditions required in photo-micrography, and we can only conjecture that the want of sharpness is due to vibration of the floor of the room in which you used the apparatus. It should be employed in a room entirely free from tremor—say, a stone-lined apartment in the basement.

We understand that lantern slides are to be made from the pictures shown at the recent "Sandell" Exhibition, and that Mr. Sandell will be willing to loan the slides to photographic societies.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [June 2, 1893

THE LANTERN RECORD.

CONTENTS.

LANTERN NOTES AND NEWS.

A flashing light for marine purposes, the device of Professor Schevin, has, it is stated, been adopted by the German Admiralty The light is produced by running finely powdered magnesium through a benzoletted air flame. The flashes are said to be visible even by day, and at over six miles' distance. The light is equal to 400,000 candles, and will be specially useful in foggy weather.

* * * * *

We read that "the Parisian Photographers' Benevolent Association is making arrangements to open a kind of photographic theatre. The idea is to photograph the actors at intervals during a performance, and, afterwards, while the photographs are projected on the screen, a reader behind reproduces the dialogue. With good photographs and a clever reader, there is no reason why such an entertainment should not be a success"—or a failure, which?

* * * * *

On September 4, Mr. F. W. Edwards lectures before the South London Photographic Society on *Reminiscences of a few Eminent Men*, with lantern illustrations. A lantern lecture on the fathers of photography, and those who have materially contributed to its technical advancement by their experimental work, should be of great interest to young photographers. There should not be any insuperable difficulties in the way of securing a set of portrait transparencies to illustrate the lecture, which might be made the vehicle of a deal of useful technical and practical knowledge.

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As evidence of the useful work which the affiliation Committee of the Photographic Society of Great Britain is doing, it may be mentioned that the sets of slides which the committee places at the disposal of affiliated Societies, have sometimes during the past winter been in request as many as four or five times a week.

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The last Lantern Night of the season of the London and Provincial Photographic Association was held on Thursday, May 18, when, in addition to some admirable slides by Mr. C. H. Cooke, a collection by Mr. T. E. Freshwater from negatives taken at the Tower of London was shown. These were of very great interest, many of the principal features of the grim old fortress being represented, such as the Regalia, the Armoury, historical sets of armour, the "Little Ease," and spots associated with Raleigh, Queen Elizabeth, and other celebrated personages. Mr. Freshwater tells us that it is exceedingly difficult to get permission to photograph at the Tower.

* * * * *

It is not easy to tell with certainty in the dark room which is the coated side of most sensitive surfaces, and especially is this the case with lantern plates; with glass plates, celluloid films, and bromide papers the difficulty is only one degree less. To simplify the matter. Mr. W. I. Chadwick has suggested to us that if at the top right-hand corner of the plate, film, or paper a portion of the support was cut away so as to be readily detected by the finger in travelling round the edges, no mistake could be made, as it would then be known that the coated surface was towards one.

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The chemical composition of the mantle in the new Auer incandescent lights has lately been discussed. The substance deposited on the cotton web consists of the oxides of metals of the cerium and zirconium groups, which exist in various minerals, for the most part in combination with silicic acid. The oxides are extracted from the minerals, and dissolved in nitric acid. This solution forms the bath in which the cotton web is dipped, and impregnates the latter so thoroughly that, on drying and burning, a finely meshed mantle of the oxides remains.

ORTHOCHROMATISM APPLIED TO PHOTO-MICROGRAPHY.

Before the Société Française de Photographie, on May 5, M. Monpillard read a paper on this subject, in the course of which he said that the design of photo-micrography is, given an object invisible to the naked eye, to obain an enlarged image of it, scrupulously accurate both in form and detail. Nothing is more easy in the case of colourless objects, such as diatoms, sections of bones, &c., the great perfection of modern objectives permitting of the obtainment of great sharpness and detail of image. It is not equally so when the objects are coloured, either naturally or artificially, and it may be said—for experience has proved it to be so—that all colouration degrades the perfection of the photographic image obtained with ordinary gelatine plates, so that, if the object be of a blue or violet colour (the most actinic colours), it stands out badly from the ground, and has its details poorly rendered. On the other hand, if it is yellow, orange, or red, the object is vigorously rendered on the ground, but the details bathed, as it were, in a light that is powerless to affect the sensitive salt, will, if the object be green, be very small, and less so with yellow and red.

In all cases, the employment of orthochromatic plates requires also the use of coloured screens.

Orthochromatic Sensitiveness.

Though commercial orthochromatic plates are sensitive for the green and red, and generally give satisfaction, M. Monpillard says that, for scientific purposes, he prefers ready-orthochromatised plates, which, when used shortly after preparation, have a maximum of sensitiveness to the luminous radiations. The operation of orthochromatisation demands only elementary care. The dark-room lamp should have two thicknesses of deep ruby glass, the flame being reduced to as small a degree as convenient during the bathing of the plates. After the plates are bathed they are passed through three dishes of distilled water, and are finally dried in a drying cupboard containing a vessel in which calcium chloride is placed.

For photo-micrographic purposes, the following colours give the best results:—

1. Erythrosine (for green-yellow; yellow and yellow-orange).
2. Cyanine (for red-orange and red).

M. Monpillard says the following formulæ have given him satisfaction:—

Erythrosine.

(Stock Solution.)

Erythrosine	1 part.
Distilled water	1000 parts.

Sensitising Bath.

Stock solution of erythrosine	4 c.c.
Water	100 „
Ammonia	0·5 „

Cyanine.

(Stock Solution.)

Cyanine	0·2 part.
Alcohol (at 95°)	100 parts.

Only a small quantity of the solution should be prepared, and it should be kept in the dark.

Sensitising Bath.

Stock solution of cyanine	4 c.c.
Water	100 „
Alcohol (at 95°)	5 „
Ammonia	1·5 „

The plates are immersed in either of the foregoing baths for two minutes, and are then washed and dried as directed.

ERYTHROSINE AND CYANINE.

Plates bathed in both erythrosine and cyanine are rendered sensitive to both yellow and red. The first bath consists of

Stock solution of erythrosine	20 c.c.
Distilled water	80 „

After two minutes' immersion the plates are washed in two waters, and are then bathed in the cyanine solution given, washed, and dried.

Plates so treated are, it is pointed out, very much slower, but this is no disadvantage in photo-micrography, and, on the other hand, they do not fog in development, which frequently happens when, to raise their general sensitiveness, the orthochromatising bath is preceded by an alkaline bath.

COLOURED SCREENS.

Coloured screens may be used either in the form of stained collodion, or, preferably, a small glass trough with parallel faces may be filled with either of the following solutions:—

(1) *For Light Yellow Screen.*

Neutral chromate of potash	1 gramme.
Water	100 parts.

(2) *For Deep Yellow Screen.*

Neutral chromate of potash	5 grammes.
Water	100 parts.

(3) *For Orange Screen.*

Bichromate of potash	8 grammes.
Water	100 parts.

(4) *For Red Screen.*

Erythrosine	0·2 gramme.
Water	100 parts.

No. 1 weakens the blues and yellows; No. 2 extinguishes them No. 3 cuts off the blue; No. 4 accentuates the action of the red.

With these coloured screens, and having sensitised the plates for given colours it will be easy to obtain in their true values reproductions of objects coloured or uncoloured. It is necessary, however, that the focus and the exposure should be made in the same monochromatic light, corresponding to a determined spectrum colour; this method of working assures the perfect sharpness of the image, inasmuch as the chemical focus is corrected. For this reason it is desirable to avoid, in exposing on one object, the use of screens of two different colours, except in the case where, on account of the presence of a deep red, it would be useful to prolong the exposure.

The plates, after treatment with erythrosine and cyanine, being sensitive to the red and blue, it is indispensable, to give the image its maximum of effect, to illuminate the object with a yellow or orange light, arresting or moderating the action of the actinic rays, and leaving free to pass the radiations corresponding to the colour of the object, if that is green, yellow, orange, or red. The following table will give an idea of the employment of coloured screens with plates sensitised with cyanine and erythrosine.

OBJECTS IN MONOCHROME.

	Colour.	Sensitiser.	Screen.
Actinic rays.	Blues or violets deep	Erythrosine	Pale Yellow
	Blues or violets pale	Erythrosine	Deep yellow or orange
Chemical rays	Greens, Yellows, Yellow-orange, Orange-red, Red	Erythrosine	Deep yellow or orange
	Greens, Yellows, Yellow-orange, Orange-red, Red, Deep red	Cyanine	Deep yellow or orange
	Deep red	Cyanine	Orange, red

COLOURED OBJECTS.

	Colour.	Sensitiser.	Screen.
Non-actinic colours.	Green and yellow	Erythrosine	Deep yellow
	Green and red, Yellow and red	Erythrosine	Deep yellow or orange, then red
	Green and red, Yellow and red	Erythrosine and cyanine	Deep yellow or orange
Actinic colours in the presence of non-actinic colours.	Blue or violet, with yellow	Erythrosine	Light or deep yellow, or orange, according to the intensity of the blue or the violet
	Blue or violet, with red	Cyanine	Same screens; in case the red is very deep, continue the exposure with a red screen

At first sight it might seem abnormal to attempt to photograph an object of a blue or violet colour with an emulsion sensitised for yellow, but M. Monpillard says nothing is more rational. It will suffice to obtain an image showing vigorously, with the shadows and half-tones well rendered. Now, with an emulsion which is particularly sensitive to the blue and violet, the object in question will appear so luminous that the ground will be slightly lost, and the half tones will not come up well. The interposition of a yellow or orange screen will retard the luminous impression by neutralising the rays emanating from the blue or violet parts of the object; but, the emulsion not being sensitive to the yellow, a general cutting off will result both for the ground as well as for the object, and the image will not have gained. Retaining the same screen and substituting for the ordinary plate a plate sensitised for the yellow, the ground will be forcibly rendered, while the blues and the violets, partly reduced by the coloured screen, will act with less rapidity, and will be rendered on the plate in their proper value. In a word, the plate sensitised for the yellow will reproduce the object as if it were gray and black on a white ground.

Where an object combines both red and yellow colours, it would be possible, at a push, to obtain a true rendering with a plate sensitised for yellow by commencing the exposure with a yellow screen, and continuing for the red with a screen equally red; although, for the reasons already given, the substitution of one screen for the other would endanger the sharpness of the image. It would be better to sensitise for red and yellow, and according to the intensity of the former expose with a deep yellow or orange screen. If blues and violets are found in the presence of yellows, oranges, or reds, it would suffice to use a plate sensitised for the least actinic colour (yellow or red), and, as the plate is, of course, sensitive to the blues and violets, a yellow screen, pale or deep, could be used according as the more actinic parts of the object are more or less coloured.

For development the author recommends hydroquinone with an alkaline carbonate and bromide, and the use of a feeble light in the dark room.

LANTERN MEMS.

The employment of triple lanterns for optical projections will receive a further impetus if Professor Ives' anticipations are realised, and he is able in the course of a year to publish details and instructions for producing his "Chromograms," as he stated he hoped to do when giving his lecture before the Society of Arts in May.

* * * * *

That Professor Ives has not been idle during the past twelve months, and since he first was able to project photographs in natural colours before a London audience, the illustrations the other evening amply showed, and it would be difficult to realise anything more natural, and at the same time beautiful, than the representation of fruit he was able to project on the screen, the colour of the grapes, pears, &c., being perfect.

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That the result was not due to the aid of the artist with brush and colours was readily shown, by placing an object in the rays coming from the lantern (between it and the screen), when the shadow of the object on the screen had each of its three images a separate colour corresponding to the colour screen on each of the three lantern fronts. The colours—red, green, and blue violet—when combined very nearly approached to perfect white light.

* * * * *

No doubt details of the optical arrangement will be published in due course, and then one can better judge how far existing apparatus can be used for it; but, as perfect registration formed a special feature of the apparatus, there should be no difficulty in arranging the better class of triple lanterns for this purpose, especially as there are three distinct photographic pictures to produce the one chromo projection on the screen.

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These pictures, or rather photographs, Professor Ives calls chromograms, and are taken in a camera having three lenses of the same focus so as to be identical for size, and in each one the light has to pass through a colour screen before forming an image on the sensitive plate. Although to outward appearance an ordinary photograph certain colour rays having been stopped back by the colour screen and others allowed to pass, each photograph is differently effected, and when suitably aided by other colour screens at the time of projection the original colours of the object photographed appears, and that with great brilliancy.

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In the demonstrations referred to the Society of Arts electric light lantern was used, and the one-arc light made to illuminate all three pictures. This and the method of registering the three photographs so that they superimposed on the screen seemed most ingenious, it being understood that refraction and reflection from plates of glass both helped to this end. Perhaps an illustration of the arrangement will be published, when the plan will be understood.

* * * * *

With electricity being daily extended as far as area of distribution goes, no doubt in a few years ten persons will have command of current where one has now, and for small projection the incandescent 100 candle power lamps will supersede oil lamps in the optical lantern, while for special work of scientific demonstration the arc electric lamp will replace the limelight; not, however, for ordinary views and photographic projection so much as for the lantern microscope, polariscope, spectrum analyses, and colour experiments.

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Now is the time for the invention and introduction of a simple automatic "focus" keeping arc lamp that can be sold at a moderate price—say 5*l.* or thereabouts—and that will give a naked light of 500 to 1000 candle power. It should be fairly portable, and have its adjustment for centering, &c., self-contained, so as to obviate the necessity of an expensive centering table. Several have been invented during the past twenty years, but none of them seem to have stood the test of trial for lanternists' use excepting the Siemens and the Brokie lamps, and these are both somewhat too expensive for general adoption.

The lantern, as a means for advertisement, seems still to find favour, for, while the miniature lanterns can be seen at work daily at some of the underground railway stations and in other "dark places," those overhead in the Strand and Oxford-street attract small knots of people when slides of average interest are being shown, while crowds congregate when something funny is on that appeals directly to the mirthful proclivities of the juveniles. I noticed in the papers, in one instance, neighbours that had been unneighbourly on account of the crowds shook hands in the Law Court, and were friends once more, it being understood that the advertisement of the one was not to be to the detriment of the business of the other.

* * * * *

Limelights have been in general use this Whitsuntide by signallers of the volunteers, who have formed a chain of stations, and have kept up communication, by means of messages flashed by the Moorse code, from the South Coast over the Sussex Downs to Caterham, and thence on one side to Aldershot, and the other to Chatham, showing that, in the case of an invasion and the telegraph being cut, communication could be kept up with our great military centres by night, while in the daytime flags and the heliograph enable messages to be sent as often as desired.

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A good joke occurred at the preliminary practice when making oxygen gas to use from bags, as is still done by those who use the same outfit as the Government adopt. The retort, purifier, gas bag, &c., were all ready, and the fire was about to be lit to make the gas when the officer in charge of the signallers was approached by a weather-beaten soldier attached to the headquarters, who, after saluting, said, "Beg pardon, sir, I have had the stretcher put handy." There was an ambulance attached to the corps, and as there had been some considerable fun about the blowing up of the place and the danger of making oxygen gas, and whether the safety valve of the oxygen retort was all right, he had taken it seriously, and thought there must be more danger than facing the enemy in battle. However, all went well, and the gas was made safely, and the old soldier had nothing worse to do than (as he said) "I suppose I can put the stretcher away now, sir?"

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In my "Lantern Mems." of last month I put ·770 as the specific gravity of the best sulphuric ether, by a clerical error, instead of ·717. The heavier kind, such as ·750, is very strong-smelling, and ·720 is the densest that can be used for oxy-ether limelight with satisfactory results.

G. R. Baker.

TRANSLUCENCY OF IMAGE IN LANTERN SLIDES.

After the usual technical points on the character of a lantern slide, such as correctness of gradation and clearness of lights, tone, or colour, is considered the one which adds most to the perception of the whole. But colour alone is of no value unless the deposit forming the image is of such a character that its colour is transmitted to the screen, in other words, the deposit must be to a certain extent transparent, or at least translucent. The silver forming the image in fact has to play the same part in a photograph that the pigments do in a painted slide, and no one, I imagine, would be foolish enough to employ opaque colours in painting a picture to be viewed by transmitted light.

It often occurs that a slide, or series of slides, that to the eye appear in every way satisfactory, cause nothing but disappointment when thrown on the screen, the cause being very likely set down as too weak a light, or perhaps to the slides being too dense. In a certain sense the latter may be true, though not altogether so, for if the image be formed of a purely divided and semi-translucent deposit and be in correct gradation, there is scarcely any limit to the general density that is allowable. But when the material forming the picture is coarse and opaque a comparatively thin layer of it suffices to stop the transmission of light, and although to the eye there may be a certain amount of gradation apparent, in the lantern the half tones and high lights are practically equal.

The same remarks apply not only to lantern slides, but quite as forcibly to negatives that are intended for enlargement. For this purpose, as is well known, the best kind of negative is a moderately

thin one rich in detail; but if that detail be composed of an opaque material that stops the light too powerfully, the negative is of no value for enlarging, though it may print well in the printing frame and in strong light. On the other hand, provided the image is translucent, a negative of considerable density—that is, a slow printer—will enlarge well if only a sufficient exposure be given.

The causes of want of translucency are various, and may be due to or found in the plate or film itself, or may arise from the method of development. In the old wet-collodion days the film, although distinctly granular under the microscope, was not sufficiently so to show any structure when enlarged only to the dimensions necessary in lantern practice; besides, the material constituting the sensitive film did not go to form the developed image—the latter being entirely deposited by the developer—although, if of an abnormally coarse nature, the silver in the film might to an extent govern that deposited in development. According to the developer employed, and, almost as a necessary consequence, to the exposure, so would the deposit be dense and opaque, or fine and translucent; in fact, in using the wet collodion process, the translucency or otherwise of the image depends almost wholly upon the exposure and development. If a full exposure be given, and pyro or well-restrained iron development be adopted, there will not be much wrong with the result; but, in case of under-exposure and forced development, the silver will be piled on in too coarse a form, with the consequence that the image is opaque and hard.

With the advent of collodion emulsion, or, indeed, of dry plates with alkaline development, the circumstances were altered, for now the image was formed out of the material contained in the film, that is to say, the silver forming the sensitive surface was itself reduced to form the image instead of merely forming the nucleus upon which metal was deposited from outside sources. Then the film itself began to play an important part in the question of translucency, and from the fact that the particles of silver, in collodion emulsion films especially, attain an extremely fine state of division, these have long enjoyed a high reputation for lantern-slide work.

But, although in such films we start with a finely divided and translucent basis to work upon, it by no means follows that it is impossible to produce opacity of image. On the contrary, nothing is easier, for the slightest under-exposure, giving rise to the necessity of forced development, will inevitable tend to destruction of the transparency of the image. When it is borne in mind that the leaning towards under-exposure is far greater with collodion dry plates than with gelatine, or even wet collodion, the balance of advantage possessed by the former in virtue of their finely divided films is, perhaps, not very conspicuous.

Another element that contributes, in conjunction with development, to the production of translucent (or the reverse) images on collodion films is the organic character of the pyroxyline used, or the means adopted to confer such qualities where they do not exist naturally. The more organic the sample of pyroxyline, as a rule, the greater the tendency to opacity of image, and *vice versâ;* while, of the various means adopted to make density with an "inorganic" sample of cotton, those which tend most to its disintegration or destruction—such as nitric acid and free silver in the emulsion—are the ones which tend to the same result.

But, outside of development proper, it is quite possible to greatly modify the character of the image, and to rob it of any claims to translucency it may originally possess. This is frequently done in intensifying or toning two dissimilar ends, which are frequently attained by similar means. Indeed, most of, if not the whole of, the methods of toning applicable to collodion transparencies are equally available, with little or no modification, for purposes of intensification, Perhaps I should have said that the methods of intensification are equally available for toning; but, if I did so, I should have to include toning methods which are objectionable on the very ground I am discussing their destruction of the transparency of the image. Amongst these I class most, if not all, of the methods based upon the bleaching of the image, and subsequent reduction by a second agent. Whether the bleaching agent be mercuric chloride, cupric chloride, or bromide, the final result appears to be a filling up of the pores of the film, or the interstices between the particles of silver in the original image, with fresh matter that converts transparency into comparative opacity. Bleaching with bichromate of potash and a soluble bromide or chloride is not necessarily followed by the same result, as no new matter is added to the film; the metal is simply reconverted to the haloid state, from which it is again reduced by any suitable developer.

The best and ablest intensifying process—with acid pyro and silver—is also one of the best for toning if properly conducted, but the precautions to be observed are just the same as in successful intensification, namely, to add the silver slowly and in as small quantity as possible. If the silver be added too quickly or too freely, not only will the deposition be rapid, coarse, and opaque, but the colour will also be bad, while by adopting the reverse tactics, although it takes a little longer, the results are in every way satisfactory, and I know no better colour, nor "juicier" (to use the old phrase) image than that produced on collodion by pyro and silver properly used.

Salts of uranium in conjunction with ferricyanide of potassium, have been much recommended of late years for toning bromide prints, and have also been applied in the same manner for lantern slides, both in gelatine and collodion. For the prints I find no objection when the desired tones are given, because any want of transparency of the image is of comparatively little importance; but for slides I consider the plan utterly unsuited. I have seen slides so toned that, to the eye, were as a newly baked brick; but, on the screen, black, heavy, and totally wanting in half-tone and gradation One of the best methods of toning for collodion slides, especially where a little intensification is also desirable, is that with sulphide of ammonia or of potassium—I prefer the former—as it has absolutely no tendency to lessen the transparency of the image. I hesitate rather to recommend it for gelatine owing to the immense amount of washing necessary before and after use.

With gelatine plates we have another difficulty to reckon with, and that is in the coarseness or granularity of some of the plates themselves. At the present day, however, I presume the purveyors of lantern plates take care to avoid this fault, but it is very certain that the plates of to-day are none of them so fine in "grains" as those of twelve or thirteen years ago. I have negatives of that date, that, to quote the old expression, "are more like a stain than a deposit." But with the finest plates it is very easy to spoil them in development by using too strong a developer especially of pyro. Strong pyro in conjunction with a full dose of alkali will "block up" and spoil any film whatever the exposure may be. But pyro is the one developer that gives any power in altering the colour of image; its newer rivals, admirable as they are for cleanness, give only black tones, but these prove generally acceptable, chiefly, I believe, because they are not opaque.

Of toning methods for gelatine plates I know none better than bleaching with bichromate of potash and hydrochloric acid and redevelopment *as a chloride plate.* The same range of colours can be obtained and the same fineness and transparency as with the chloride lantern plates provided the process is carried out carefully upon a good plate to start with.

If more attention were paid to the transparency of the slides shown, there would be fewer bad ones than is the case at present.

W. B. Bolton.

MENDING BROKEN SLIDES.

In a communication to the *Photo Beacon*, Mr. Charles Preston gives the following method of mending a broken slide. He says:—

"It was a picture I was anxious to possess, and could not get another copy. Examination showed that the binding strip adhered firmly to the splinters, and that when the splintered cover was carefully removed bit by bit, the matt simply consisted of four strips of paper pasted on the picture, keeping the pieces firmly in position.

"The picture was laid face up on a piece of thick plate glass, and gently warmed in the kitchen oven, after which a small pool of Canada balsam was poured on the middle, and the picture, still on the glass plate, returned to the oven till something like air bubbles began to rise. It was then removed, and a cover glass, which had been warming in the oven, was laid on the pool, and gently pressed down so as to spread the balsam completely over the picture without enclosing a single air bubble.

"A second piece of glass was then laid over the cover glass, pre-

viously covered with a piece of paper, the whole turned upside down, and the first piece of glass removed and carefully cleaned of a trace of balsam that had found its way through some of the cracks. The slide was then covered with a piece of paper to prevent adhesion, the glass replaced, and the whole set aside to harden, which was thoroughly effected in a few days, after which the superfluous balsam round the edges, and a trace from some of the cracks, was removed by a rag moisted with turpentine.

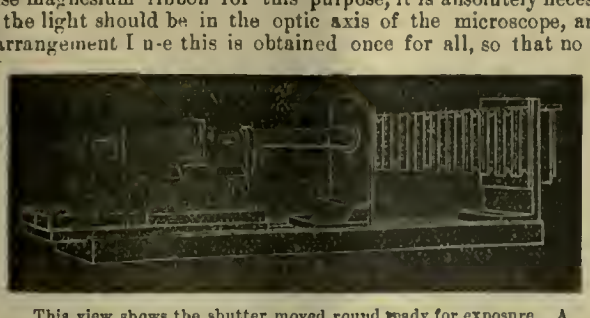
"It was considered advisable, although not absolutely necessary, to place a cover glass on the outside of the picture plate, and the whole was bound in the ordinary way.

"To say that the slide is as good as before it was broken would not be strictly true, but it has been shown among others, and so little is the damage apparent that the spectators did not notice anything peculiar about it."

PHOTOMICROGRAPHY WITH ARTIFICIAL LIGHT.

Photomicrography has been practised by me, more or less, for the last twenty years, and with varying success. My avocations do not permit of my having the advantage of using sunlight, and it is therefore necessary to use artificial light of some kind. For many years I had to be content with the light of a paraffin lamp. This light, even with the assistance of the best condensers, is not satisfactory, as, from the lengthened exposures required, the results are uncertain. With high powers, the long exposure almost renders it impossible to get good results. The light seems to become diffused over the plate, and the resulting negatives are poor and weak. In my case limelight was out of the question from the cumbrous nature of the apparatus. About five years ago I began the use of magnesium ribbon as the illuminant, and I have found it so satisfactory in every way, so simple in the use in the way I use it, and the exposures with it so rapid, that, even with high powers, what required formerly minutes with a paraffin lamp may be got in as many seconds with magnesium. As is well known, magnesium light is peculiarly rich in those rays which most affect the sensitive plate, and is, therefore, one of the best to use for that purpose. The use of magnesium has been so satisfactory to myself that I have thought it would be of use to many others were they made aware of the benefits to be derived from it, and the particular way in which I burn it made known. I find, from the *American Science Review*, that magnesium was tried by the late Colonel Dr. Woodward, but he burnt it in a special lamp. Magnesium lamps are always unsatisfactory. I have tried many of them, but always found the driving arrangement either pushed the ribbon out faster than it could be burned, or too slow, and the light went out. A Mr. Johnson described in the *Popular Science Review*, as long ago as 1864, his method of using it. It is not, however, quite the same as the method I use. I only became aware of Mr. Johnson's paper during the course of last summer.

I have, for a number of years past, made for myself and others a number of photomicrographic apparatus of various forms, but, after a lengthened experience, I have come to the conclusion that the one I am now to describe is the simplest and most satisfactory I have tried. It has no useless parts, and is so easily manipulated that any one, with a very slight experience, may acquire the skill to take very good photomicrographs in a reasonably short time by using magnesium. To use magnesium ribbon for this purpose, it is absolutely necessary that the light should be in the optic axis of the microscope, and in the arrangement I use this is obtained once for all, so that no difficulty is experienced in repeating exposures indefinitely. With this view, it is necessary that the apparatus should be described somewhat minutely to enable it to be understood. The illustrations will show very clearly, with a little explanation, the construction of the apparatus.



This view shows the shutter moved round ready for exposure. A book or any other article of proper height is placed beneath the camera bellows, to keep it straight and prevent any of the field of view being cut off.

The baseboard is 40 inches long by 7 inches broad, and is made of yellow pine 1½ inches thick. I prefer yellow pine, well seasoned, to any other wood, as it is lighter and stiffer than mahogany or any of the hard woods, and, when stained with bichromate of potash and exposed to sunlight, takes a fine dark colour. This length is, perhaps, rather shorter than I would like: four feet over all would be better, and would satisfy all requirements. The baseboard has two strips of pine, half-inch thick and seven-eighths broad, screwed to the upper surface, at the sides, as guides for the rest of the apparatus to slide to and fro within. The end of the camera which carries the dark slide is screwed down to the baseboard by long screws from beneath, thus making it as rigid as possible. I prefer this form to that in which this end of the camera is made movable, as one gets more comfortably at the screen when focussing a very important matter. The front end of the camera is made to move backwards and forwards, and on the front of it is the flange, into which the tube

Side view showing hole in board carrying exposure shutter with lamp in position for arranging object. A small box marked X is placed between the upright board and microscope to catch magnesium oxide.

screws which connects the camera with the microscope. The flange takes a portable symmetrical lens, when the camera may be used for other purposes. The bellows is thirty inches long. The sliding of the camera front, and also the block which carries the microscope, is much facilitated by gluing to each side of their under surfaces lengths of velvet ribbon, as used by Zeiss. The camera only takes quarter-plate size, and the centre of the connecting tube and dark slide are placed about six and a half inches above the surface of the board which carries the microscope.

The microscope I use is one which I made specially for this work. The body consists of a triangular bar of gun metal, eight inches long, measuring one inch on each face, and it is rigidly screwed down on the top of two A's, which again are screwed to the wooden block on which they stand by four screws from beneath, one into the broad flange of each foot. The stage is carried on a saddle, which moves backwards and forwards by a large pinion head on the left-hand side, working into a rack on the under side of the bar. The instrument has in this way great steadiness. The only drawback is that one has to turn the pinion head the wrong way to bring the stage up to the object-glass, but practice overcomes this. The cross arm, which carries the optical part, is made on the Ross model, and is firmly fixed to the triangular bar by a strong screw. The fine adjustment is a very delicate one. The lever is one of the first order. The fulcrum upon which it works is placed about a quarter of an inch from the front end, while that portion of it behind the fulcrum or pin is about one and a half inches. The screw is one of 100 threads to the inch, and in this way one whole turn of the screw is equal to the $\frac{1}{100}$ of an inch. As the button head of the screw is a large one, it is possible with the hand alone to turn it as little as the $\frac{1}{100}$ part, and so move the tube the $\frac{1}{3000}$ of an inch. For low or medium power this is much too fine, and I have another screw of half the pitch, which can be readily substituted for the finer one. The end of the lever raises or depresses the fine adjustment sliding tube by impinging on a small pin screwed into the tube through a slot in the brass of the cross arm, which pin also prevents the tube turning round. The fine adjustment tube has bearings three and a half inches apart. The tube is ground truly round, and highly polished, and after the rings in which it works are turned to size, they are tinned, which seems to make the tube slide more easily and smoothly. The microscope tube is simply pushed on the outside of the fitting on which the fine adjustment tube works, which fitting is turned to size. The microscope tube is one and a quarter inches in diameter, and it has an adapter to take Zeiss eyepieces for adjusting the object, and another one, with a diaphragm, to connect with the camera tube. This adapter has an outside ring, and, as the microscope tube is immovable, no other light-tight connexion is needed.

As the microscope is rigidly fixed to the board, and adjusted once for all to throw the image in the centre of the plate, no after adjustment for collimation is required. The stage is an old one of Andrew Ross's, which was on microscope No. 1773, and which, I understand,

was round the world with the *Challenger*. The photographs do not show a focussing rod, as I had to take it off for another apparatus I was making of the same kind. I use for it a three-sixteenth round iron rod, with a large button on the camera end. This rod turns in bearings made of the screwed ends of brass rings. A linen thread is passed round the rod several times opposite to the fine adjustment button, over which it is placed, and which has a V groove for the purpose, and a half-ounce weight hung on the end, which is more than sufficient to turn it. The upright board beyond the microscope carries the exposure shutter, and is rigidly screwed down to the board which carries the microscope. This upright board is pierced with a hole about one and a half inches in diameter opposite to the centre of the optical combination of the microscope, and it carries behind it an oval-shaped shutter, in the centre of which, at the broad end, is an inch of three-sixteenths brass tube.

The arrangement of this shutter and tube requires some attention. The ordinary microscope lamp is placed behind the upright piece beyond the microscope, and the shutter is held in position by means of a hand vice. (Zeiss) 70 mm. apochromatic object-glass is screwed into the microscope. This glass, although stated by the maker to be of 70 mm. focal length when used in the microscope above described, the tube of which is about eight inches long, requires four and a half inches from the front of the lens to the object. The small brass tube in the shutter may then be placed exactly in the centre of the optical combinations in the microscope by shifting the shutter about till this takes place, the lamplight clearly showing when the shutter and tube is in the right position. A screw nail is then placed through the small end of the shutter as a pin on which it turns, and another small one screwed into the upright on which it turns for the larger end of the shutter to rest on when exposing. One of the photographs will show the shutter turned aside, and the other the shutter in position for exposing.

When about to take a photograph, the board carrying the microscope is slid along to the end of the baseboard and the front of the camera slid back to the other end. A microscope lamp is placed behind the hole in the upright board, and a slide placed on the stage. The operator sits down on the left-hand side of the instrument and by means of the adapter eyepiece he arranges the object to his satisfaction. The connecting adapter is then placed in the tube, the front of the camera brought forward and connexion made. Both the microscope board and front of camera are firmly fixed with the pinching screws shown in the photographs, a correct focus is obtained either by the hand, or fine adjustment button, or by the focussing rod and weight. After the plate is put in the slide, the lamp is withdrawn, the shutter moved round into position ready for the exposure. Suppose we are using a Zeiss AA object-glass of 27 mm. focus, with a length from stage to screen of thirty inches, without an eyepiece, a short piece of magnesium ribbon is pushed through the tube in the shutter, and less than a quarter of an inch of the ribbon is burned after being lit with a match. This is more than enough to give a dense negative; and if a light filter is used—say, a piece of deep orange-coloured glass, to counteract the effects of an eosine-stained slide—one and a half inches of ribbon gives fine dense negatives. When using lower powers, such as three-inch and two-inch objectives (by Wray), I find that I cannot, with from thirty inches to three feet of camera, give sufficiently short exposures when no eyepiece is used. It will be noticed that I have not said anything about a condenser.

When the preparation is of such a character that the objective shows all the necessary detail, I never use a condenser, as I find that with magnesium the light is so powerful that everything one wants can be got without one. When, however, it is necessary to produce shadows on the object to allow the lens to reveal the finer detail of diatoms, a condenser is used. Even then, with a very small oblique aperture in a chromatic condenser of my own construction, I have got beautiful negatives by burning only from eight to ten inches of ribbon with objectives as high as $\frac{1}{12}$ of an inch.

Using, say, a C object-glass by Zeiss, of 50°, I get very fine negatives by burning only from two and a half to three inches of ribbon with a camera length of three feet, using, of course, no eyepiece and no condensers of any kind. The two negatives sent herewith of a section of the lung of a cow ill with the so-called corn-stalk disease and of another ill with pleuro were both done with this lens in this way.

I also send two transparencies of *Navicula spectabilis*, a diatom measuring $\frac{1}{1\frac{1}{2}\frac{1}{0}}$ of an inch in length; one taken with a Zeiss four-mm. apochromatic and projection eyepiece No. 2, and the other with a Zeiss water immersion apochromatic 2·5 mm. and same projection eyepiece. Both of these were photographed without any condenser. The magnesium was simply burned in front of the slide through the small tube. I used less than ten inches of ribbon in each case.

It is not necessary for one to multiply examples to show the immense benefit to photo-micrographers by the use of this light. The rapidity of the process, and the simplicity of the apparatus, are its best recommendations. Those interested in its practical results will see these exemplified in a paper by Professor J. M. Macfarlane, of the University of Philadelphia, formerly of Edinburgh, in the last number of the *Transactions of the Royal Society of Edinburgh*, on the hybridisation of plants. The whole of these photo-micrographs were taken by Professor Macfarlane himself by means of an apparatus I made for him, the same as that above described, and the exposures were made in the same way. Professor Macfarlane had had but a limited previous experience in photography, but with magnesium he had no difficulty in getting the results he wanted with a minimum of time and trouble. I have, perhaps, explained the detail of the apparatus more fully than desirable, but I have been induced to do so to make everything plain.

I never use any but Ilford ordinary plates, and have no difficulty in getting the results I desire with them.

It is not, of course, every one who can afford to set aside a special microscope for this work. Indeed, that is not necessary; but if the microscope is to be used for other purposes, care—the utmost care—must be taken that each time it is used for photo-micrography in the way I have described to have the small exposing tube exactly in the centre of the optic axis, otherwise failure will result.

There is another point to which allusion may be made, viz., photographing objects with polarised light. Of course, the Nicol prisms stop a very large portion of the light, but with magnesium no difficulty will be experienced, as another inch or so of ribbon is only required to give the density required.

I have been induced to publish this method of using magnesium by the fact that some of those who are recognised as good workers in this line still use oil lamps and a number of condensers to intensify the light. Reference may only be made to the report of the meeting of the Royal Microscopical Society in October last, as showing how both time and trouble may be wasted by using an inferior light. No such failure is possible with magnesium. As its manipulation is so simple in the way I have indicated, it would seem to be the light which all photo-micrographers must sooner or later resort to in the future, if the best results are desired with the least amount of trouble and also expense.

PROCELLA.

HOW I MAKE LANTERN SLIDES.

[Photographic Times.]

IN the first place I wish to define my position as it may stand related to what I have to say on the subject of this paper. I wish it understood that I am simply relating *my* methods, making no claim of superiority over others. I am familiar with the *fact* that a given formula for almost any photographic work will not produce uniform results in the hands of different operators. The question *why* is an interesting one, but cannot be discussed at this time, as it would furnish material alone for a lengthy article; it therefore must suffice to simply note the fact as a reason why it is not expected that every one who attempts to try my way will succeed in obtaining the same results. In the *Photographic Times* of December 23, 1892, was published a paper which I read before the Photographic Section of the American Institute, which I illustrated with seventy slides, made in the way I am about to describe, and the unanimous verdict of those who heard the paper and saw the illustrations was, that my position was correct, and the illustrations were superior to the generally accepted slide, inasmuch as they gave artistic effects. I refer to this as presenting sufficient evidence that I work my way successfully, whatever may be the result in the hands of others.

The first thing to be observed in the production of a lantern slide is cleanliness. So many otherwise good slides are ruined by appearing on the screen as if a pepper-box had been partially emptied over either the negative or slide when wet, so the first thing to do is to see that the negative from which a slide is to be made is perfectly clean; if the negative is not clean, and cannot be made so, do not use it. Use only clean negatives. The next most important element in this class of work, as well as in all photographic manipulation requiring development, is the *developer*. For several years I have been using caustic alkalies in most of my experiments. After introducing to the photographic fraternity the carbonates of soda and potash as a substitute for ammonia, I turned my attention to experimenting with caustic alkalies, and published some results in the *International Annual*, for the year 1888. In that article I gave an account of some experiments obtained with lime water. About two years after this publication, my attention was called to the saccherate of lime by Mr. Easterbrook, I think it was, who had a formula for its use printed on a card, one of which he gave me, but which I lost before I had

tried it. I mention this because, if the formula which I have worked out is, in the main, like the one he gave me, he will be entitled to the credit, if any is due. Suffice it to say, that I have used the saccharate of lime mainly for the last two years, both for negatives and positives.

My way of preparing it is to put into one gallon of water one pound of granulated sugar; when this is dissolved, it is used to slack a quantity of quick-lime.

Two or three pounds will be more than will be dissolved. When the water has become saturated, you will have about five pints of the solution, which should show about sixty-two grains to the ounce by the hydrometer.

Allowing eight grains for the sugar, you have remaining fifty-four grains of lime to the ounce, which is about four times the quantity in ordinary lime water; this, however, reduced to less than fifteen grains to the ounce, is much more energetic than plain lime water. This solution is slightly coloured by the heat evolved in its production on the sugar, and should be about the colour of pale sherry.

How to use this solution to prepare a developer will depend upon what effect you wish to produce, whether it be a negative or a positive, or whether the plate to be used is very sensitive or the opposite, and whether the exposure will be instantaneous or time.

For the development of a lantern slide on a very sensitive plate, I use one ounce of the lime solution, and three ounces of water, dissolve in this twenty grains to the ounce of glucose, or, in other words grape sugar, the most convenient form in which it can be found is in any candy shop by the name of rock candy. Maple sugar will answer, or twenty minims of honey, whether natural or artificial. The addition of grape sugar renders the use of a bromide unnecessary, and assists in producing intensity, which is more difficult on a very sensitive plate than on a slow and specially prepared plate. The next thing to add is sulphite of soda-fifteen grains to the ounce. This will cause a little reaction by converting some of the lime into an insoluble sulphite, which will give the solution a milky appearance; it will soon settle, however, and leave the solution clear. You need not wait for this, however, as it exerts no injurious effect on the plate. When the sulphite is dissolved, add four grains of hydroquinone. When this is dissolved, the developer is ready for use.

It can be used repeatedly until all used up. If any is left over, do not return to the bottle containing that which has not been used, but put it into a bottle especially for old developer. By constant use it becomes charged with the bromide released by the decomposition of bromide of silver in the sensitive film, and becomes slower in its action, but will develop just the same if about double the time of exposure is given. A little fresh developer added restores its activity. I have made beautiful negatives with the old after standing all winter in the cellar of my country home.

For landscape, and general out-of-door work, two grains of hydroquinone is all that is necessary, and for a specially prepared plate for lantern slides, one or one and a half grains will be found sufficient.

My comparative experiments with amido are incomplete; the most serious charge I have against amido, as compared with hydroquinone in the form in which I use it, is that it lacks the keeping qualities of the latter. The best results of my experiments, as far as keeping qualities are concerned, are as follows:—

Water	1 ounce.
Rock candy	20 grains.
Sulphite of soda	20 ,,

I would say here that I use the granulated sulphite, and my samples are quite alkaline. To neutralise the alkaline property in twenty grains I use five minims of formic acid, then add two grains of amidol, and it is ready for use, and is a powerful developer. This is the only form of amidol that I have tried where a bromide was not necessary. As soon as the weather will permit I shall give it the final comparative test by instantaneous exposure. This developer will produce beautiful lantern slides. I apprehend, however, if a trial should be made the next day with the developer which had been used the day before, that the hydroquinone would prove victorious. In developing a lantern slide on a very sensitive plate the developer should be constituted so as to produce the necessary density in the least possible time.

In slacking quick-lime the product is, in fact, calcium hydrate. I have tried various quantities of sugar in given quantities of water, and have evaporated these solutions to dryness, forming salts which, being dissolved in water, formed, when treated as above described, the same developer and as effective. In this form it becomes a commercial article, and I am informed that this salt is for sale by a wholesale druggist on Third avenue. In one experiment, in making saccherate of lime, I used rock candy, one pound to one gallon of water, and from the comparative tests so far made, am inclined to give it the preference over cane sugar. It frequently happens that a slide, or a negative when completed, is not as intense as might be desired.

With me it is the exception that I do not strengthen a negative or positive, and may sometimes reduce them; my method of intensifying I published many years since, but on account of the prejudice against the use of mercury, and a misapprehension of the chemical nature of the iodide of mercury, some chemists discouraged its use. It is prepared by dissolving in 10 ounces of water 60 grains of mercury bichloride; in another 10 ounces of water dissolve 180 grains of iodide of potash, or 175 grains of iodide of ammonia, whichever may be most convenient.

When dissolved, pour the iodide solution into the mercury solution. The iodide of mercury will immediately be precipitated in the form of a red powder. This is iodide of mercury, and is soluble in hyposulphite of soda, and by some has been recommended in such solution, but if used in this form will in time destroy the negative treated with it. The iodide of mercury is also soluble in a solution of either the iodide of ammonia or potash, and the formula which I have given contains sufficient iodide to dissolve all of the iodide of mercury formed, and leave a small amount of iodide in excess.

In this form it is ready for use, and will keep indefinitely, and, as only the mercury is taken up in the process of strengthening, the proper equilibrium can be restored at any time by keeping a saturated solution of the mercury salt always on hand. When the mercury becomes depleted, which will be indicated by its working slow and weak, add a small quantity of the solution of mercurial chloride, and the red iodide formed will soon be dissolved by the excess of iodide. If by putting in too much of the mercury more of the iodide of mercury is formed than can be dissolved, add crystals of some iodide sufficient to make the solution clear. A plate should not be put into the solution while any of the iodide of mercury remains undissolved, as it would fill it with pinholes.

The negative to be strengthened should be thoroughly fixed and dried. The action is quite rapid, and care must be taken not to get too much intensity; if, however, you should, the ordinary reducing agents will act as on ordinary negatives. In the process of strengthening a gelatine plate in this solution some iodide of mercury combines with the gelatine and cannot be washed out. You can determine this by washing a plate after strengthening and letting it lay for half an hour in a dish of clean water; in this time the plate will have turned to an orange colour by reflected light. By this it becomes apparent that this must be fixed out; but *this* iodide of mercury is not soluble in an iodide solution of ammonia or potash, but is instantly dissolved in a solution of hypo, and therefore should always be fixed in hypo for at least thirty seconds. As the plate has been dried and is hard, the hypo does not penetrate the film, and can be washed off in a few minutes under the tap. A plate so strengthened is, in my opinion, absolutely permanent. I can show many plates as old as the gelatine process, and some from which several hundred prints have been made, without any signs of change or deterioration. Some of the leading professional photographers of this town, to whom I have given it, have used it for years, and would not be without it. To produce a superlative negative or positive, the force of the developer used must correspond *exactly* to the needs of the exposed plate. My method of making a negative from a time exposure is to expose the plate double the time necessary for a new developer, and commence with my old developer. I have another graduate glass with old developer, containing a small quantity of new developer. What I mean by new is that which has not been used, and another glass containing new developer; thus equipped, I feel my way until I determine just the requirements of the exposure. In this way I am always sure, with a good plate, to secure a negative as near perfect as possible under the circumstances. HENRY J. NEWTON.

COLOURED LANTERN SLIDES.

THE beauty of a coloured lantern slide is, of course, in direct proportion to the care, precision, and taste shown in applying the colour. I have felt so disturbed by the crude, raw, and fantastic work which is exhibited upon screens, says Mr. L. C. Laudy, in the *Photographic Times*, and am so confident that work of a superior quality could be produced by many who are possessed of correct judgment and some natural facility in the use of a brush, that I beg to say a few words in relation to this interesting subject. The slide-makers and lecturers are in need of good colourists, those, too, who can combine the knowledge of technique with the discernments requisite for producing truthful and artistic results. As also I have frequently received letters in reference to this subject, I believe that some simple directions would be very generally useful, and might lead some thoughtful person into the cultivation of this beautiful art, which, to-day, is perhaps less occupied than any other field of employment.

At the outset, have the transparency or slide which you propose to colour of very good quality, as good, in fact, as it can be made, sharp, not too dense, and with perfectly clear high lights. In the second place, procure the proper colours, and insist, in getting them, to receive only such as are warranted and made for this purpose. The artist can employ water or oil colours, but the former are more generally used in this country, and perhaps can usually be more readily obtained. The article needed is the Tube Transparent Water Colours, put up by G. Rowney & Co., of London, and which have printed on their label "For Glass Painting." This direction is very essential, as other moist water colours prepared by this firm are not transparent, and would be utterly worthless in work of this character. Almost any dealer in art material will order them, and will also furnish a list of the colours needed. I have had my attention called to the unpleasant experience of some colourists in not receiving what they order, and meeting with a very objectionable inclination on the part of dealers to supply some substitute. In all such cases insist upon the genuine material, as the results the artist aims to secure cannot be reached without the very best colours and the most flawless slides.

The slide or transparency having passed inspection, and the proper colours having been obtained, flow the plate with any good negative or positive spirit varnish, and then prepare the colours. The colours should be pressed from the tube in small quantities upon a clear glass; the best way, perhaps, is to take out the ground glass from a retouching frame and substitute a clear plate glass, upon the upper part of which, in one or two rows, squeeze out a very small quantity of the colours to be used. In this way waste is avoided. Then place the slide to be coloured, after having it varnished and well dried, on the plain glass, resting upon a strip of wood, in the same position as that assumed by a negative when it is retouched.

Procure good sable-hair brushes provided with fine tapering points, and also one or two flat ones, about one-quarter of an inch broad. Let them be of the best quality. The colourist provides himself with a cup of clear water in which he moistens his brush, and then, dipping it in the moist colour, and avoiding filling his sable with too much pigment, begins the application of the tint. Begin with the sky in a landscape, as the effectiveness of a landscape picture depends greatly upon the perfection, softness, and graded colour of the sky. The treatment of the sky can be varied according to the effects desired, and the artist may be led into the most successful imitations of nature. For ordinary broad daylight effects commence with blue at the top and wipe a line of colour clear across the upper part of the slide and bring it down near the horizon, when a little yellow is brushed across the slide down to the land line. The mingling of the edges of these two coloured zones must be nicely done, and for this purpose stipple the outline of the two sections with the second or third finger of the right hand. This blending along the line of contact can be very successfully accomplished after a little practice. Should the colours seem a little too dry for manipulation, breathe on the slide a few times, and the operator will be surprised to see how attractively he will be able to stipple or blend the two colours together, and let him continue the breathing as often as necessary, as these colours, ground in honey and glycerine, soften naturally to this treatment. He can thus secure a clear and soft sky. For sunset effects use below the yellow a thin streak of red and stipple as before until it is pleasantly blended with the overlying yellow. If, in the application of these sky colours, steeples, towers, mountain summits, houses, or trees have been covered with colour, they can be readily cleared with a clean brush and a little water. After these cleared parts are dry, proceed to the body of the slide and colour the foliage, ground, rocks, and building, as near to nature as possible, avoiding too deep greens, as this colour shows intensely through the lantern projection. For snow and ice scenes use a very slight tint of azure blue. There is in all cases no shading, simply smooth even washes of colour, as the shading is already furnished by the photograph.

In regard to moonlight effects, it must be strongly recommended to omit the painting in the slide of an artificial moon, or, more properly, clearing a spot for this unnecessary luminary. In selecting a slide for moonlight effects, choose one with strong contrasts, deep shadows and bright high lights. Frequently a blue wash over the entire picture, carefully removed with a brush and water from the high lights, produces excellent results of this character, while a few red spots in windows or street lanterns will enforce the expression of a moonlight scene. Sometimes a sombre sky of a grey tint and properly stippled will produce the night effect quite perfectly. In colouring dresses, &c., brilliant colours are generally most effective and pleasing.

When the slide is finished, it will be dry in a few minutes, then flow a spirit varnish over the surface, drain, and set aside to dry. Then put on a mat of fair thickness, cover and bind in the usual manner. This mode is the most simple, practical, and effective. The second method, by the use of oil colours, requires much practice and experience, and is much more tedious and slow, and may be treated in another article.

In conclusion, I may suggest to make the reflector in the retouching frame a sheet of white cardboard instead of the ordinary mirror. Sit near a window in painting, without sunlight, and in every way avoid dust. Too much care cannot be taken in this last regard, as the prettiest and most painstaking efforts may be ruined by the intrusion of grains of dirt and floating hairs.

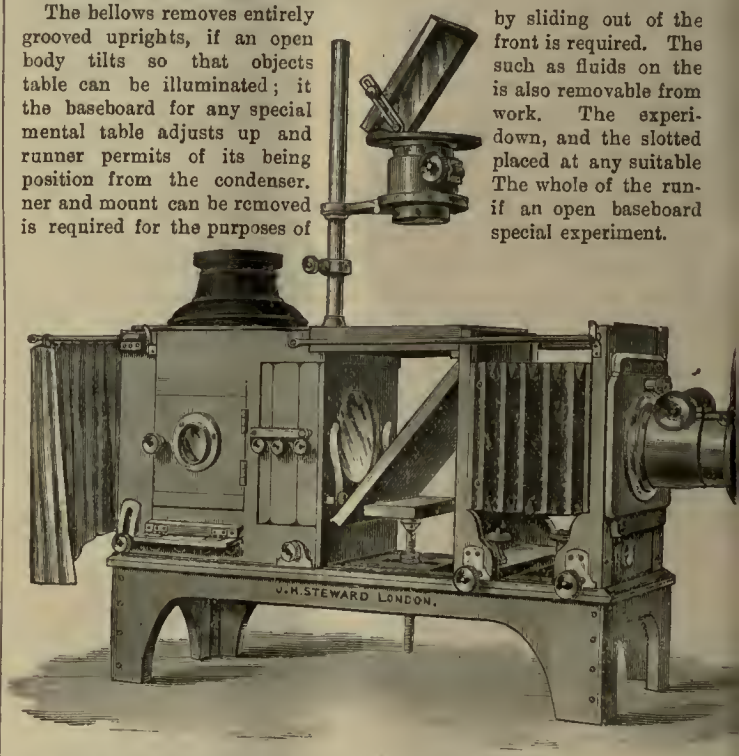
Let the novice practice first upon simple subjects, and by modesty in colouring reach a high ideal. So much rubbishy painting is extant, harsh, wild and sensational colouring, that, while the field is an open one to new aspirants, it is to be hoped that those who may be led to colour lantern slides from these remarks will try to restrain that childish appetite for lurid and glaring effects, and be guided by a chaste and educated taste.

The field of lantern-slide colouring is an excellent and tempting one. It can be made a profitable one. Of course, there are difficulties to be overcome but practice will gradually dissipate them, and, when the art is acquired, it will be found delightful in itself, and lucrative in its results.

STEWARD'S NEW OPTICAL PROJECTION LANTERN.

In this lantern, Mr. J. H. Steward, of 406, Strand, has introduced several points of novelty. The condenser is a triple form, and is made to separate, so that a short or long focus can be obtained at will, and the front lens of the combination can be supported on the ledge of upright as the condenser for the vertical attachment.

The bellows removes entirely by sliding out of the grooved uprights, if an open front is required. The body tilts so that objects such as fluids on the table can be illuminated; it is also removable from the baseboard for any special work. The experimental table adjusts up and down, and the slotted runner permits of its being placed at any suitable position from the condenser. The whole of the runner and mount can be removed if an open baseboard is required for the purposes of special experiment.



The rackwork extends the whole length of the board, and the double pinion permits either upright to be moved to the most suitable position. Clamps are provided so as to fix the upright when using the vertical attachment, or for securing rigidity for the support of the objective. The front rises and falls, and adjusts laterally, so as to give facilities for centering, especially when using an oil lamp. The objective can be used for either ordinary projection or the vertical attachment, or two separate lenses, of different foci, can be employed.

As a useful means of enabling a lecturer to apprise a lanternist when to change a slide, &c., Mr. W. I. Chadwick, of St. Mary's-street, Manchester, supplies a small metal clip affixed to a woodeu support, which, when slightly pressed by the thumb, emits sufficient sound for conveying the necessary signal.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*July 7, 1893*

THE LANTERN RECORD.

CONTENTS.

LANTERN NOTES AND NEWS.

At a special meeting of the Lantern Society, held recently, it was resolved that the subscription for all members should in future be ten shillings a year. Subscriptions are due on October 1, and members joining between now and that date pay no further subscription until October 1, 1894.

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Although Lantern matters are necessarily quiet at this time of the year, the preparation of novelties for the coming season must obviously engage attention a little while beforehand, so that we have no doubt manufacturers and the trade generally, notwithstanding the fineness of the weather, are already devoting a portion of their energies as a provision for the future. Messrs. Archer & Sons, of Liverpool, inform us that early in the autumn they will be putting a species of double jet on the market, one lime only being employed as with the ordinary jet.

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Messrs. Sharp & Hitchmough intend sending out a lantern which, according to a few details of its construction, will lack nothing on the score of portability. It will close up to eight inches by eight inches by six inches, and will give such an extension as will allow of a fifteen-inch lens being used. Another of its features is to be that it will open out instantly. It is designed to take Lawson's Saturator. The stage will be made adjustable so as to tilt and centralise the carrier, and when in position will fix it permanently by means of a screw.

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Mr. Sharp informs us that he worked Lawson's Saturator all last winter with perfect success, this, doubtless, being one of the reasons why the portable lantern above mentioned is to be adapted to take it. When using a lantern, it is Mr. Sharp's practice to have the cylinder suspended on the tripod, which is thus steadied, the arrangement simply consisting of three stays and a ring for the cylinder. This stiffens as well as steadies the tripod.

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We have heard it said, and we have sometimes thought, that the man who takes the lantern at a public entertainment is something like the engineering staff of an ocean liner; he does all or most of the hard work, and, being neither seen nor heard, does not come in for his legitimate share of the credit, as the lecturer does. An experience, possibly not small, of public audiences has persuaded us that in nine cases out of ten it is the gentleman with the voice whom it is thought should deserve the applause, while the poor lanternist is left out in the cold. Where the entertainment is a gratuitous one, the concentration of all the glory upon perhaps the less-deserving partner is all the more calculated to test one's powers of philosophic endurance.

In the following instance, however, it pointed the moral of not hiding one's light under a bushel, which was not lost upon the individual most desirous of profiting by it. A friend of ours was solicited by the vicar of a remote country parish, without considerations of payment, to provide an entertainment on a quasi-sacred topic, and the invitation was cheerfully complied with. A good set of slides and an interesting book were provided, and our friend worked the lantern himself while the clergyman gave the book. The entertainment was a most successful one, and at its close a "hearty vote of thanks," as the society reports have it, was passed to the vicar for the exhibition, and graciously acknowledged by him. Our friend who had provided and conducted the entertainment gratuitously was quite ignored, and had the piquant pleasure of beholding the vicar appropriate all the credit and praise for doing next to nothing. "Henceforth," said our friend, "wherever possible, my place is at the screen! I don't see the fun of that kind of self-sacrifice."

* * * * *

Lantern-slide competitions are so popular among amateur photographers, that for their proper and successful conduct some universally recognised rules are much to be desired. The method sometimes employed of simply judging slides by ocular inspection is not so satisfactory as could be wished, and we are glad to notice that the recent meeting of Judges convened by the Affiliation Committee of the Photographic Society of Great Britain recommended that no award shall be made for a slide without its having been projected on the screen. This is as it should be. Also to the point, in this connexion, is another recommendation that no production from the same negative, whether ordinary print, *lantern slide*, or otherwise, can receive more than one award.

* * * * *

The optical lantern was greatly in evidence at the Convention, in spite of the summery surroundings of the gathering. A display was given on the opening night; again on Wednesday; Mr. Cunningham's marine biological slides were to have been shown on that night, and Dr. C. L. Mitchell was also down to read his paper on "Lantern-slide Making." This is no inconsiderable tribute to the popularity of the optical lantern among the photographic bigwigs and others assembled this week at Plymouth.

* * * * *

The admirable paper on "Standard Screw Attachments for Lenses," &c., which was recently read before the Photographic Society of Great Britain by Mr. W. Taylor, of Leicester, gained not a little in lucidity from the use which was made of the optical lantern to show the meeting diagrams illustrating the delicate points of screw manufacturing and economy involved. As an adjunct to the imparting of information on various departments of photography the optical lantern enjoys an increasing degree of favour.

* * * * *

A month or two back we ventured to hazard the opinion that our friends on the other side of the Atlantic were somewhat behind us in the quality of their lantern-slide work, &c. Mr. Milligan, of *The Exhibitor*, quotes our opinion, and at the same time prints a letter to him from the Rev. W. H. Clagett, dated from "Glasgow, Scotland," in which he says: "By the above address you will see that I am in

Scotland. I want to get a number of slides of English subjects, but find it difficult to get *good* coloured slides here, as a rule they do not compare with American slides." This inspires our *confrère* with the *tu quoque* allusion to the "beam in the brother's eye." The "Rev. W. H. Clagett's" difficulty in obtaining here good coloured slides of English subjects is open to explanation on several grounds, among which we are sure our readers would not permit us to include the one that such slides are not to be had.

METOL AS A DEVELOPER FOR TRANSPARENCIES AND NEGATIVES FOR ENLARGEMENT.

Of all the new developers introduced during the past few years none have gone so near displacing pyro as metol—indeed, I fancy it will only be a question of time for it to supplant all the rest. So far as my own experience goes, which, though necessarily short, has extended to several dozens of negatives exposed under almost every variety of circumstances, there is nothing that pyro will do that cannot be done in better style with metol. It seems to be absolutely free from any tendency to stain the shadows of the negatives, and that is a point on which hinges the only fault that can be found with pyro. Even when the acid-alum bath is systematically used, it is impossible with some plates to obtain shadows free from some slight yellowness, but with metol I have never yet seen the slightest symptom of colour.

The rapidity and yet regularity of action of metol is another strong point in its favour, as, even when used with a fairly large proportion of bromide, it brings out the picture with greater rapidity than pyro; when employed without bromide, if there is the slightest over-exposure, it is almost too rapid for proper management, for which reason I prefer to invariably use a small quantity. On first using metol I was inclined to think that pyro offered greater facilities for the treatment of cases of over and under-exposure, but a closer familiarity with its action, and especially with the addition of bromide, has led me to believe that it is in every respect as elastic as the latter. If employed without bromide, there is a strong tendency in forcing for detail an under-exposed plate to produce veil, or even fog, before the detail is obtained; but under the restraining influence of bromide, and by the exercise of a little patience, I think even better results can be got from a short exposure by metol than by pyro. In instances of over-exposure the free use of bromide is, of course, compulsory, owing to the extremely rapid action of the developer, and I prefer to rely mainly on the checking action of bromide rather than to dilution of the developer, although this may sometimes be resorted to with advantage in addition to the bromide.

I have said that I have met with no symptoms of colouration of the shadows of a negative when using metol, but I must make a slight reservation in favour of two of the finest specimens of "green fog" I have seen for years. I do not blame these on to the developer, but solely on to the plates, for the conditions under which they were produced were entirely normal, and I mention the case only to put on record the fact that green fog is producible with metol, and, moreover, in conjunction with sodium carbonate. Plates that show green fog badly with pyro and ammonia are generally free from it when one of the carbonates is substituted for the ammonia, and these have come to be looked upon as almost a panacea for the evil. But my two examples were both obtained with carbonate of soda, and that the plate was to blame is, I think, proved by the fact that in one case while there was no attempt at forcing, the exposure being quite "normal," the result was obtained with the same quantity of solution that produced, both by previous and subsequent development, images perfectly free from green fog.

I may remark that, although the fog was most pronounced by reflected light—so much so, in fact, as to show almost as a negative by reflection—only the very faintest and scarcely perceptible tint of pink was apparent in looking through the plate, which was a most excellent printer, and suffered not the slightest from the fog.

But, perhaps, the greatest advantages in the use of metol will be found in a direction in which the readers of the "Lantern Record" are most especially interested, namely, in the production of lantern slides and of negatives for subsequent enlarging; and this, of course, brings the whole body of hand-camera workers into participation. For lantern slides, not only in the clearness of the lights, but the colour of the image, metol gives a purer and better black than can be obtained by any other developing method with which I am acquainted. Ferrous oxalate, in colour, runs it very closely, but it is entirely out of the running when transparency and gradation are considered. Indeed, two transparencies, developed with metol and ferrous oxalate respectively, present quite as great a difference as a highly enamelled and an entirely matt surface print.

In the last number of the "Record" I made some remarks upon the advantages of translucency of image, both in lantern slides and in negatives intended for enlargement. It is in these two departments where opaque or non-translucent images will make themselves most seriously apparent; but it is obvious that for any style of printing the gradation must be materially affected by the translucency or otherwise of the deposit forming the negative image. The image produced by metol is remarkable for its delicacy of gradation; but whether this is due to the production of a wider scale, or to a larger number of steps in the existing scale due to the translucency of the image, I cannot decide. Certain it is that a good metol-developed negative seems to contain a larger number of gradations between high light and deep shadow, and to be capable of reproducing them, which is of greater importance, than any other sort of negative I have seen. The nearest approach is to be found in some of the earlier pyro-developed gelatine plates, in which a peculiar softness of gradation was produced by the excessively fine state of division of the bromide of silver. But these negatives would be handicapped in a competition with metol by the comparatively yellow colour and the consequent prolongation of time in printing.

It is a most noticeable fact in connexion with metol-developed images that, although apparently thin, they possess great printing value. The perfect freedom from stain, combined with the excellence of gradation, produces this result, which further means great rapidity in printing; and it is not unusual with some of the more rapid printing papers to obtain a fully exposed and vigorous print in two or three minutes, where on albumen paper, and using a pyro-developed negative, possibly twenty minutes or half an hour would be required in the same light.

An image of this character is, of course, admirably suited for enlarging from, because, in addition to the fine gradation it gives, the gain in curtailment of exposure is of especial value, particularly when artificial light is employed. The combination of delicacy, translucency, and at the same time vigour—I say nothing here as to colour—is also of marked value in a lantern slide in obviating the necessity for a very powerful light, for, although a strong dense slide absolutely requires a correspondingly powerful illumination, a *good* thin slide will show well with almost any light.

I need not go any further to show the value of metol for the special purposes indicated, but will conclude with what I have found to be the most convenient formulæ, simply premising that, under the head of convenience, I class as a not unimportant condition that the figures shall be readily divisible and easily remembered, which is scarcely the case with the formulæ issued by the manufacturers of the new developers.

For negative work, the two-solution formula that I gave at page 326 of the Journal will answer well, but it is improved by the addition to solution B of a little bromide, and also, for the sake of ready calculation, by the increase of the quantity of soda from the somewhat indefinite "two ounces" to 1000 grains. The formula will then stand:—

A.

Metol	120 grains	or	6 grains.
Sulphite of soda	1200 „	„	1 drachm.
Water	20 ounces	„	1 ounce.

B.

Carbonate of soda (crystals)	1000 grains	or	50 grains.
Bromide of potassium	20 „	„	1 grain.
Water	20 ounces	„	1 ounce.

For use, take one part each of A and B, and dilute with from one to two parts of water according to circumstances. The more concen-

trated solution gives greater density, and different plates require very different treatment in regard to dilution, as well as in the proportions of the two solutions. The above, however, will be found to answer with most good plates.

For transparencies the proportion of bromide may be doubled with advantage, and, as it is comparatively easy to secure uniformity of exposure, a one-solution developer may be prepared consisting of—

Metol	120 grains	or	6 grains,
Sulphite of soda	1200 „	„	1 drachm,
Bromide of potassium	40 „	„	2 grains,
Carbonate of soda	1000 „	„	50 „
Water	20 „	„	1 ounce,

dissolved in the order named. For use, dilute the part with from one to three parts of water. For line work or where great density is required, two parts of stock solution to that of water. The "one-solution" stock solution may be used for negatives if preferred, the bromide being reduced to twenty grains instead of forty, and the part of solution being diluted with two or three of water.

Personally I prefer ammonia to carbonate of soda; but the undoubted convenience of the latter renders it a general favourite, hence I give above formula. W. B. Bolton.

LANTERN MEMS.

With the thermometer standing between 70 and 90 degrees in the shade on a June day, it requires some great attraction or special enthusiasm and love for work to shut oneself up in a semi-dark room at four o'clock in the afternoon; but, when a number of professors and gentlemen of the press and others interested in science can leave the fresh if somewhat hot air of the London parks, and, ignoring the gaiety of Piccadilly in the height of the London season, turn into the rooms of the Royal Society, it is not difficult to understand something unusual is to be seen or heard.

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The fact is, a rehearsal or private view of the lantern portion of the exhibits for the *conversazione* in the evening is to take place, including an exhibition with the lantern stereoscope, and also of photographs of the eclipse of the sun and the instruments used by the members of the expedition, in addition to some photographs of mountain scenery taken at very high altitudes. As the lantern stereoscope was the *pièce de résistance* as far as I was concerned, I will say a few words about that first, for it is one of the ideas that have occupied the minds of men, and who have been striving to realise it for years past.

* * * * *

Descriptions and drawings of the apparatus used have already appeared, and so I do not propose here to give a detailed description of Mr. John Anderton's invention, but express my own opinion of same and impressions of the results obtained by polarising the two halves of a stereoscopic transparency.

* * * * *

This is done by cutting the stereoscopic photograph, and mounting the right and left half separately in carriers, and placing them in the two fronts of a biunial or in the stages of any pair of lanterns, and projecting them on the screen so that they appear as one (or nearly so) to the audience. In front of each nozzle or objective is placed what is known as a bundle of glass, placed at the polarising angle, and the separate plates arranged to prevent blur from refraction.

* * * * *

The effect of the combined projection is not pleasing to the unaided eye, for there is naturally considerable confusion, due to the pictures forming the stereogram being taken from different points of view, and therefore not including the same amount of subject in each half; but, when the polarising is completed by analysing the light, the same as usually has to be done in ordinary lantern or micro-polariscopes, then a marvellous change takes place.

This analyser is quite novel in its application, for it is not attached to the instrument, but is in the form of a binocular, and held up to the eyes. Each of the audience must have one, and the best effect is obtained near about the centre of the room, or rather somewhere near the optical axis of the apparatus. The analyser may be made of two Nicol's prisms, or two tourmaline plates; but in this case preference was given, on account of economy and the difficulty of getting large Iceland spar prism or clear tourmalines, to moderate-size glass bundles set at the proper angle, so that light after polarisation passes in one position and is stopped at right angles. Hence it follows that, if one of the halves of the stereogram is polarised in a vertical plane and the other half in a horizontal, and the binocular analyser arranged to pass vertically, and the other horizontally polarised rays, the observer will only be enabled to see one picture with each eye, and this the corresponding one right or left, as the case may be, the same as he would in the hand stereoscope to get stereoscopic vision.

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Although there may appear eight legs on the screen for a quadruped to the unaided sight, the superfluous legs disappear when the binocular analyser is held to the eyes, and the animal stands out with marvellous stereoscopic effect. The illumination of the picture on the screen, considering the amount of stray sunlight coming from the venetian blinds at the window, was by no means bad.

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This stereoscopic effect is altogether different to the very fine results sometimes produced from ordinary lantern transparencies by strong contrast of light and shade, and which have such a pleasing effect on an audience, in that the space between foreground and distance is so real and great solidity apparent everywhere objects are portrayed.

* * * * *

The important part played by the screen may be gathered from the fact that a professor, well known for his researches in optics and electricity said that stereoscopic projections had been his constant dream for years past, besides causing him to resort to practical experiments, and after trying polarisation of various kinds he was baffled because the screen he used (linen or surfaced opaque material as ordinarily employed) only returned him the two images as projected, and not the one stereoscopic projection required and now accomplished.

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The screen used at the Royal Society looked from the distance as if faced with parchment, but it is stated to be a silver-paper-faced screen. It is, however, certain that something of the nature of a reflector must be used to send back the polarised beam to the eyes of the audience, for, with an ordinary surface absorbing the light, there would be no visible polarisation; but how would a transparent screen do with the audience on the other side?

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This opens up a very enjoyable field for experiment and it is to be hoped that the inventor (Mr. John Anderton) will shortly see his way as patentee of the system of putting the adjuncts on the market for adaptation to all existing biunial lanterns so as to reap the benefit of his labours; for there is nothing whatever to prevent, in my humble opinion, any one using polarisers as described or adapting analysers to their use for the purpose of amusing friends, providing in doing so they do not attempt to make money by entertainments or offer the apparatus for sale.

* * * * *

Some wonderful specimens of photographs of glacial scenery were those taken by Mr. Wm. Conway in the Karahoram Mountains, Kashmir, India, those at the great height of 22,500 feet being from the summit of "Pioneer Peak" and others known as the Golden Throne, Maderbrum, and Gusherbrum, with K. 2, being probably the highest group of mountains in the world. So interesting were these that one regretted the time allotted to each lecturer did not permit of their remaining on the screen very long.

The *Daily Graphic*, which one looks for regularly of a morning as one does one's breakfast, is to be congratulated on the information it gives on scientific subjects, for not only did we have at the time it was of interest good illustrations and descriptions of the apparatus to be used during the eclipse of the sun, but since then of the work done by the expedition; and, comparing these with the photographs shown at the Royal Society's *soirée* by the electric lantern and explained by Professor J. Norman Lockyer, F.R.S., one sees how accurate as well as interesting these particulars are.

* * * * *

As lately as the first of July we are shown how the optical lantern and technical education and industries go hand in hand. The "Bee Van," built to be suitable for travelling round the country from village to village, after demonstrations in daylight are given by experts in bee-keeping as to hiving and transferring a swarm of bees, is converted into a lantern van, the end holding a transparent screen, the limelight projecting on the screen the photograph illustrative of bees and hives, &c., and the natural history and value of bees explained, not only for honey but for fertilisation of flowers and fruit.

* * * * *

I should have liked to have referred again to sulphuric ether and "Free Lance's" kind reference to my previous Mems., but must leave it over for next month, or some period before the winter session commences, as just now I am reminded by visions of ether of another kind, from preparations for a life under canvas for three weeks, where, with fresh breezes from the Surrey hills bringing its pure ozone, I trust not to be troubled by any thoughts of comparative smells of sulphuric or any other chemical ether, but get the necessary health and vigour to go into lantern matters practically as the season comes round. I trust that my readers may enjoy their summer or autumn trip, of which one is reminded this week by the meeting of the Photographic Convention at Plymouth. G. R. Baker.

THE INCANDESCENT ELECTRIC LIGHT IN THE LANTERN.

Whilst lanternists in England have been enjoying the latest modern conveniences in the shape of compressed gas, gauges, &c., the worker in the colonies has had to put up with all the old cumbersome system of gas bags, pressure boards, &c., not, too, without accidents in this part of the world, so that insurance companies have put restrictions on the method of using it. Happily the time is not far distant when the larger centres of population—nay, even some small towns which in England would rank as mere villages—will have the means of putting their pictures on the screen with no more trouble than that involved in coupling a switch or two. When a suburban village is lit with electricity, and the church is illumined in the same manner, as is the case within two miles of where I am now writing, it is reasonable enough to look to that source of light to make our lantern shows a very simple matter. Electricity is making its way here, where coal is dear. Messrs. Siemens Bros. have undertaken a contract to illumine Cape Town by electricity derived from water power, and before many years are over every building of importance and many private houses will have it laid on.

The arc light is troublesome and unsteady in the lantern, even when used with every convenience at hand. Within the last few years incandescent lamps have been made specially adapted for lantern use, but one hears very little of them. It is not every one who has a private installation, and electricity as an illuminant has made comparatively little headway in England. Sooner or later it must come, and hence a little experience with the incandescent lamps in question may be of interest.

In company with Mr. Torrance, an electrical engineer well known in Cape Town, I visited the house—at Newlands, on the mountain side—of Mr. Rudd, of British South Africa Company fame. I took my own lantern with me, and some of my most familiar slides. The lamp we were to try was an Edison-Swan "Focus" lamp, to give a light of 200 candle-power with a voltage of 100, such as could be got with fifty storage batteries of two volts each. The globe enclosing the filament is about five inches in diameter; the filament is a flatted spiral of about four turns, the breadth of the filament being about one-sixteenth of an inch, and the whole space covered by the spiral being about one inch by three-quarters—rather a large surface compared with the limelight, but small compared with the oil-light. Looked at edge on the spiral would be about three-quarters of an inch by one-quarter; but as the light given out in that direction is comparatively small, the very first time the current was turned on told us that we were to use it broadside towards the condenser. We suspended the lamp in the lantern in a very primitive fashion, by coiling the conducting wires over a metal rod stretching across the lantern, and steadied it with a wire rod and ring encircling the pointed end of the glass bulb, which was, of course, downward. A few trials up and down, to right and to left, and to and from the condenser, gave us the right position, and there we fixed it. As the glass bulb or globe was then but little more than a quarter of an inch from the surface of the condenser, it was evident (let me italicise this point) *that no lamp of higher power could be used in an ordinary lantern with four-inch condenser unless the greater lighting power was obtained without enlarging the containing bulb.* Mr. Torrance informed me that the batteries would soon want recharging, and that we were only working the lamp at ninety-eight volts, a little below the voltage for which it was made, and therefore at a slight disadvantage.

In describing its practical value under those conditions, I wish to be as explicit as possible, and to leave no uncertainty in the mind of the reader. Let me therefore state what I consider good lighting with the oil lamp. My own lantern, wicks properly trimmed, best oil used, top of chimney carefully adjusted, lantern allowed to warm up, flame high, but not to smoke, working under the best conditions in short, satisfies me with a full size two and seven-eighths inch square, enlarged up to six feet square. My lantern is a little inferior to some, and a little superior to others. I am familiar with most patterns, and mine is a fair average sample. A six-foot *picture*, not circle without carrier, satisfies me when it is working at its best. Others may try eight, nine feet, or more, but I like a well-lighted picture with a clean slide.

Now, first we tried a picture of eight feet, and I considered the lighting equal to what I get with my oil lamp. We reduced the size, however, to a little under seven feet, and liked it so well that we left it at that, and proceeded with an exhibition. I may say, that before the carrier was put in, we got a perfectly illuminated circle, no unevenness, and no bright or dark streaks, in spite of the gridiron-like shape of the incandescent filament. The reader will, however, be surprised to hear of one defect, the great heat thrown out. Of course, I am not one of the uninformed public to expect no heat with the light, but I was certainly surprised. Whether the vacuum was not good, or whether the heat was no greater than might have been expected from a lamp of 200 candle-power, I will not venture to say, but the mahogany casing of the lantern got hotter than it does with the oil lamp, and some pent up fumes of damp and oil escaped into the air. The use of an oil lamp means, however, a great circulation of air in the lantern. With the electric lamp the circulation of air is practically *nil*. Practically *nil*, also, is its heating power on the air of the room, and literally *nil* its power of rendering the air impure. The fumes already mentioned would not have occurred with a new lantern; but the heating of the lantern I particularly mention, as good workmanship in the woodwork must be looked to.

The result of the trial was, so far, satisfactory. Had the dynamo been running we could have done more. As already stated, the lamp was working at a disadvantage. By increasing the intensity of the current beyond 100 volts a more brilliant light can be got, only the lamp will be destroyed sooner. If, however, this is not carried too far, the danger of a lamp giving out in the middle of an exhibition is not great, and is quickly replaced if a spare lamp is at hand, nor is the extra expense involved in the more rapid consumption of the lamp a serious one. By increasing the current to 110 volts the light may be increased fifty per cent., nor is this the only advance that may be made. The greater portion of the light given out by the lamp is given out in two directions; one half of this goes to the condenser, the other half is thrown to the back of the lantern, and much of it might be saved by a reflector.

Concerning reflectors, as usually met with in the optical lantern, they are simply a delusion and a snare. Whilst they do not greatly increase the available light, they are one of the prime factors in producing the bright ribbons of light shown on the screen. They are frequently in the wrong position, and often of the wrong curve. The curve is really a difficult matter to fix on where a large body of flame is concerned. The luminous film in the lamp referred to is not outrageously large, but if the makers can reduce its size, we shall have much to be thankful for. Given a luminous point, the question of curve to the reflector is a simple one; it should be purely spherical, and the point of light should be situated at the centre of curvature. Then every ray from the point will strike the reflector perpendicularly, and be reflected back to the point. If the point is trans-

parent, then through the point on to the condenser, properly reinforcing the rays which the condenser receives direct. And here it is that the incandescent lamp lends itself well to lantern work. All that is necessary is to deposit a film of silver on one half of the bulb. A large portion of the otherwise wasted light will then find its way back through the gridiron-like spiral, and should not cause much, if any, unevenness of illumination on the screen. We shall see. I impressed this matter on Mr. Rudd, and feel perfectly confident that, what with a silvered lamp, and what with slightly increased voltage, a ten-foot picture will be simply a matter of drawing the lantern from the wall and turning a switch. C. Ray Woods,

Photo. Assist., Royal Observatory, C. G. H.

INDURATION OF THE GELATINE FILM—A SUBSTITUTE FOR VARNISHING.

The following formula has been used for two years, and found to give uniformly good results:—

Alum	2 ounces.
Tannic acid	1 drachm.
Water	16 ounces.

The negatives, after fixing and washing, are immersed for three or five minutes in the above solution, rocking the tray to ensure uniformity in action. The colours of the negative become darker, the appearance more brilliant, and the surface of the film glass-like to the touch. The negative is washed for fifteen minutes and dried.

The induration should not be prolonged beyond the time given, lest the adhesion of the film to the glass be destroyed. It is impracticable to intensify an indurated negative.

Treated in this manner, the gelatine film is nearly waterproof, so much so that water may be poured over the plate and wiped off with a cloth without injury. Indurated gelatine is transparent and slightly elastic, resembling parchment in appearance.

The indurating solution may be used repeatedly until the strength is exhausted. The employment of induration with films that it is desirable to strip from their supporting surface is suggested.

W. P. Jenney, Ph.D.

LIGHTHOUSE ILLUMINANTS.

[Science.]

In *Science* for February 6, 1885, a sketch was given of the progress of lighthouse illumination in Great Britain and Ireland, together with a short description of the strongest lights and apparatus utilised up to that time. Since that article appeared the conflict between the advocates of electricity, mineral oil, and gas, respectively, has not decreased, nor has any settlement satisfactory to all parties yet been reached. The matter has on several occasions been brought before the Imperial Parliament, and in February last some further correspondence on the subject was laid before the House of Commons.

A consideration of some of the points lately elicited will be an interesting addition to Mr. Kenward's notes on lighthouse apparatus in *Science* for April 21 last.

The lighthouses of the United Kingdom are under divided control: the English lights are managed by the Trinity House, the Scotch lights by board of commissioners, and the Irish lights by a separate commission—all under the general direction of the Government Board of Trade, and each anxious to maintain lights of the highest efficiency, almost regardless of cost.

The English authorities, from the observations made in 1885, are satisfied of the superiority of electric arc lights where the highest possible power is required, and consider oil lights the cheapest and most easily managed for ordinary purposes. The Scotch commissioners endorse this view of the case; but the Irish board seems to favour the use of illuminating gas.

The chief opposition to the decision of the English Trinity House appears to be instigated by Mr. John R. Wigham, of Dublin, the inventor of the gas system. He claims that he did not get fair play in the trials of 1885, because a rule was adopted restricting the size of the lenses and lanterns within limits that prevented him from obtaining the best results from his gas lights. Since that time he further claims that, by enriching common gas with hydrocarbon, a greater amount of light can be obtained from it than from the richest cannel-coal gas. Actual experiments have shown that cannel-coal gas has an illuminating power of twenty-eight candles, nearly double that of ordinary Newcastle coal gas—sixteen candles. By passing the ordinary gas through the vapour of solid naphthaline, or albocarbon, a perfectly safe and inexpensive material, it is enriched with hydrocarbon to such an extent as to give double the illuminating power of cannel gas. He also suggests, as an improvement in lighthouse illumination, placing lenses so as to form a quadrilateral or trilateral figure, which would permit the use of lenses of much larger illuminating surface and of much longer focal distances than is possible with the six, eight, or even sixteen-sided lenticular apparatus heretofore used, thereby immensely increasing the illuminating power of the lighthouses.

Mr. Wigham has had a lens of long focus made, with a bull's-eye or central portion nineteen inches in diameter, and two concentric rings, one four inches and the other four and a half inches wide, giving a total diameter of thirty-six inches, all in one piece. This is surrounded by a belt of prisms two feet ten inches wide, consisting of ten rings, outside of which is a third portion, consisting of eight rings of totally reflecting prisms, partially surrounding the second portion, so as to complete a lens about ten feet ten inches wide by about eight feet high. In the focus of this lens is placed an "intensity" burner composed of 148 fish-tail jets, grouped to burn the enriched gas, which, when lighted, forms a solid flame of fourteen inches diameter by six inches high. The illuminating power of the burner is calculated to be about 8500 candles, which should give an actual intensity of light through the lenses of about 2,300,000 candles. Experiments made with this apparatus showed splendid results at a distance of six and a half miles. In full moonlight the beam cast a strong shadow, and was very large and dazzlingly bright, reducing a neighbouring first-order fixed light to what seemed by comparison a remote and feeble glimmer.

The case for and against gas as a lighthouse illuminant seems to be as follows:—Its advantages are facility in increasing or decreasing the power of the light to suit the various states of the atmosphere, and also speed and sharpness in eclipsing lights by cutting off the supply of gas, and thus occulting them, while at the same time saving the illuminant; as well as the fact, that where gas is used for illumination it can be utilised at a minute's notice to operate a gas engine in connexion with a mechanical fog alarm, while with any other source of power delay must occur in putting the fog alarm into operation. It is further claimed that the large size of the gas flame, giving an unusual number of extra-focal rays, has a better effect in illuminating a large area of fog, and consequently makes the light more readily visible.

The weak points of gas are the difficulty of manufacturing it at some isolated stations, and also the necessarily large size of the flame, which involves the use of very large lenses, and a long focus, to prevent a wasteful distribution of extra-focal light.

The arrangement of illuminating apparatus proposed by Mr. Wigham for a most powerful light is a battery of four giant lenses, surrounding a central burner, intensified by having similar lenses with additional burners arranged one over the other in three tiers, or "in triform." To accommodate such an apparatus would require a lantern with glazing at least twenty feet in diameter by twenty-four feet high. The lenses alone would cost 8400*l.*, an expenditure which would only be justified by the necessity for an exceptionally powerful light.

Mr. D. A. Stevenson, Engineer to the Northern Lighthouse Board, in a report on electric light as an illuminant, claims that the complaints against the penetration of this light in fogs are not well founded, and that many criticisms of its power are due to prejudice, partly owing to the persistent way in which it is decried as a lighthouse illuminant by certain writers to the press, partly from a misunderstanding of the fact that, being very rich in the most refrangible rays of the spectrum, that is, very white, it suffers a greater percentage of diminution in passing through fog than oil or gas light, which is redder; but, nevertheless, owing to its enormously greater initial power, the electric light is always a better penetrator of fog than the others. He claims that sailors, on their ordinary courses, are never in a position to form an opinion of the subject that is worth anything, because they cannot see different lights in the same conditions of atmosphere. He adduces observations, made by keepers in his service on each other's lights, which go to prove that the electric light is in all cases the more powerful. These are observations from one station burning an oil light to another electrically lighted, and the reverse. Three pairs of such stations are instanced, in every case the electric light being visible in fog that totally obscured the oil lamp. Wm. P. Anderson,

Chief Engineer of Marine Department, Ottawa, Canada.

LANTERN SLIDES IN SUMMER.

[Canadian Photographic Journal.]

Why do I select this subject on which to give a little good advice to my amateur brethren in the April number of the Journal, a time when those who possess lanterns and are interested in lantern work are thinking about laying them aside for the season? Well, it comes about in this way. I have, during a pretty long intercourse amongst lantern-loving and slide-making folk, become the fortunate possessor of a tolerably large collection of slides, gathered from "A' the airts, the wind can blaw,' and including almost every conceivable subject. During the recent gloomy winter that will now soon be away, it occurred to me that I could do something to break its monotony to the villagers amongst which my lot is at present cast, by occasional lantern exhibitions, and the first attempt was so successful that they were repeated weekly, to, on each occasion, as many as could be packed into the largest room of the house; and so thoroughly were the pictures appreciated that many drove, or rather sleighed, again and again distances varying from two to four miles.

Now, with such an audience—perhaps, spectators would be the better word—it is not always the best pictures, either artistically or technically, that are most highly appreciated, although I noticed that even with them glaring errors in composition had a dampening effect; but one thing was particularly noticeable, viz., the enthusiasm evolved by recognisable bits of local scenery, snap-shots at children playing in the village streets, or pictures of the various operations incident to the farm, with which most of them were practically acquainted.

If, as I suppose it may be taken for granted, the average amateur photographer derives as much pleasure from the exhibition of his work as he does from its production, he may increase that pleasure a hundredfold by making a lantern slide from each suitable negative and either, or both, showing them himself or lending them to others who may have opportunities of doing so.

But although the making of lantern slides by camera copying from negatives of any size, or suitable portions of any negative, is a simple affair, I know very well that for various reasons it will be adopted by only a very few, while the mistakenly supposed to be simpler and easier printing by contact would be employed more than it is if the average output of negatives were generally suitable.

Here, then, is the *raison-d'être* of this article! An earnest plea to the amateur photographer who would secure for himself a happy winter by making others happy, to begin now the preparation for that desirable consummation, by seeing in every pretty bit or interesting group a possible slide. Those who confine themselves to sizes not exceeding 5×4, need do little more than see that they focus carefully, as there are few negatives of that size that may not be utilised by contact printing; indeed the same may be said of sizes up to 8×5 as made by probably a large majority of the amateur fraternity, their object apparently being to get as much as possible into the plate. Negatives of the kind illustrated in my January article, that not only bear but need heroic cutting down, are, of course, available, but such wilful waste is not to be commended, and the more nearly negatives from 5×4 upwards approach perfection artistically the more they become unsuitable for slide-making by contact.

The remedy is obvious. Of every suitable subject make two negatives, one from which to print by any of the ordinary methods, occupying the whole of the plate, not with scattered masses of uninteresting, or more frequently actually injurious and distracting material, but only with the principal subject and its necessary adjuncts, never forgetting that in all probability the beauty and effectiveness of the picture will be in proportion to the simplicity of the composition.

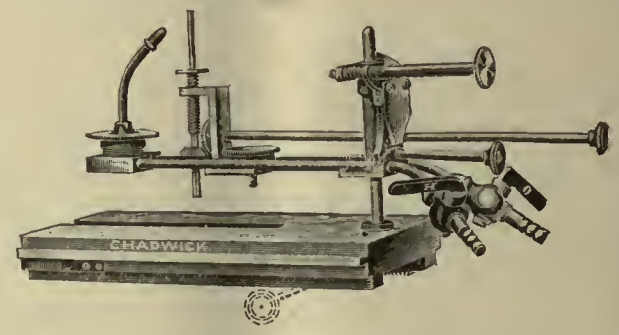
If the photographer is thoroughly satisfied with the composition, all that he has to do in exposing a second plate for lantern-slide purposes is to move back to such a distance that the whole will be included in a pencil-marked opening of about three inches square on the ground glass. But the impecunious amateur, or the careful amateur whatever may be his financial position, will not waste forty inches of plate where fourteen will answer the purpose as well or better, and those of them at least who employ double dark slide or plateholders, will furnish each with a *kit* or carrier for a $4\frac{1}{4} \times 3\frac{1}{4}$ plate on which to make the slide negative. This, at least, is how I managed before I adopted reduction in the camera; and, although, on the whole, better results may be got by that method than by contact printing, I have many contact slides that not even an expert could distinguish from my best made by the camera.

I may add, that to prevent mistakes the dark slides should be numbered on both sides, and the large plates put, say, in the odd, and the small ones in the even numbers. John Clarke.

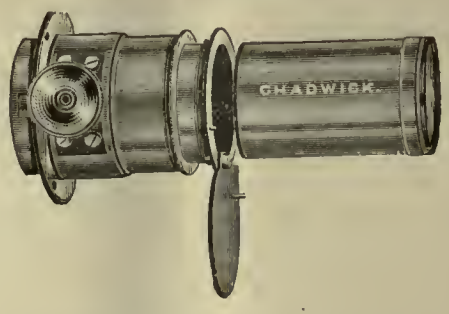
CHADWICK'S LANTERN SPECIALITIES.

Prominent among those whose theoretical and practical knowledge of projection photography has helped to elevate the optical lantern to its present height of favour is Mr. W. I. Chadwick, of Manchester, with whose name, as our older readers are aware, many valuable writings on

lantern matters that have appeared in The British Journal of Photography during the last twenty years are identified. Some fifteen years ago these writings were in a measure concentrated in book form: the *Magic Lantern Manual*, a little work in which Chadwick gave what was then a highly useful fund of practical information, and most of which, notwithstanding the mild revolution which compressed gas, gelatine plates, and other recent advances have effected in applied lantern work, remains of enduring value to this day.



Mr. Chadwick's skill as a lanternist in ordinary slide projection, as well as in the somewhat more involved and difficult branch of scientific projection embracing photo-micrography, optical and scientific phenomena generally, is often called into requisition and appreciated in the North of England, and, it need hardly be said, stands him in good stead in the

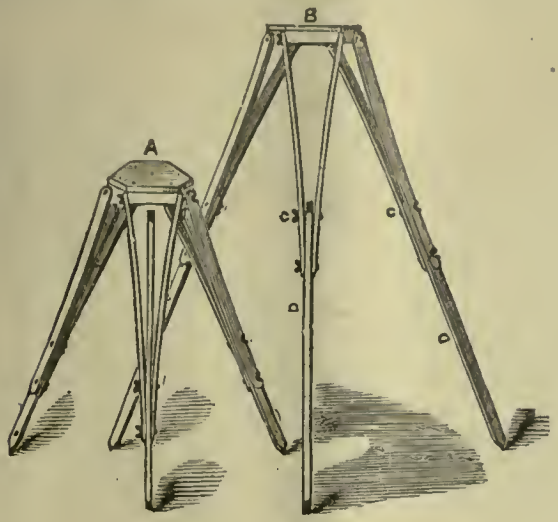


conduct of his business, besides being freely placed at the disposal of those who ask for it. In the field of lantern work which Mr. Chadwick has commercially occupied for the last few years, this well-cultivated, practical knowledge has accompanied him, and its influence can be plainly traced in his numerous lantern specialities, a few of which it is our present purpose briefly to notice.

The type of lantern which Mr. Chadwick favours has the initial merit of simplicity, and dispenses "elaborately polished brass slide stages with spring plate," "brass studs and milled heads," "telescopic draw tubes," the objection to the latter being that rigidity is frequently imperilled.

The "No. 2" optical lantern is an evolution from the "Perfect" form introduced a few seasons ago, and may be briefly described as follows:—(The illustration shows the lantern with Leach's lantern microscope and polariscope attachment, to which we shall advert; the lantern, however, is that ordinarily used.)

It has a metal body, with doors on each side and a flat top, convenient for warming slides or apparatus. The slide stage is open at both sides and top. The objective holder is an upright (which by preference should rest upon the top of cabinet or on a table), attached to which is a long



guide sliding in grooves in the polished wood base. It may be extended to suit the longest foci objectives, and is perfectly rigid at its greatest extension. The space between the condenser or slide-carrier and objective may be left open, as shown in the illustration, for projecting scientific apparatus and experiments, the application of the vertical attachment, and for use with the lantern microscope and polariscope. Light in the room, by reflection from the lenses, is cut off or closed in by an opaque velvet curtain, which is provided with suitable "drawings" to slide on two brass rails hinged (or socketed) to the body of the lantern and projecting forward. When not in use, these rails may be turned back to lie flat with the body of the lantern.

The lantern takes either limelight or any standard oil lamp, the three-wick Refulgent lamp or Stock's patent four-wick lamp being equally well applied.

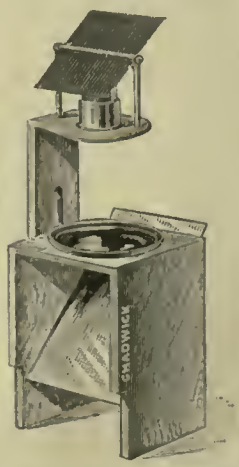
Having examined the lantern as sent out, and being favoured with a projection demonstration when in use, we can confirm what is claimed for it on the score of simplicity and efficiency.

The Chadwick Jet has several mechanical adjustments which are a great convenience to lantern workers, and its advantages can be appreciated from the following short description of how it is used in actual operation. The top milled head permits of the adjustment of the jet sideways; the one projecting beyond the tap rotates and raises the lime; the milled head beneath it elevates and lowers the jet, and the milled head shown by the dotted portion below the stage is attached to a pinion head extending through the lantern body, and racks the jet in and out.

We may here pause to quote Chadwick as an uncompromising opponent of mixing chambers, which he contends do not prevent hissing or roaring, which he attributes to defectively constructed nozzles.

The lantern is fitted with the now well-known triple condenser. The objectives are supplied with foci varying from four to twelve inches. Each combination is in a separate tube, which is made to slide in the rack front, and can be changed from one to the other instantly without unscrewing the front. The focal length of each objective is engraved on the mount.

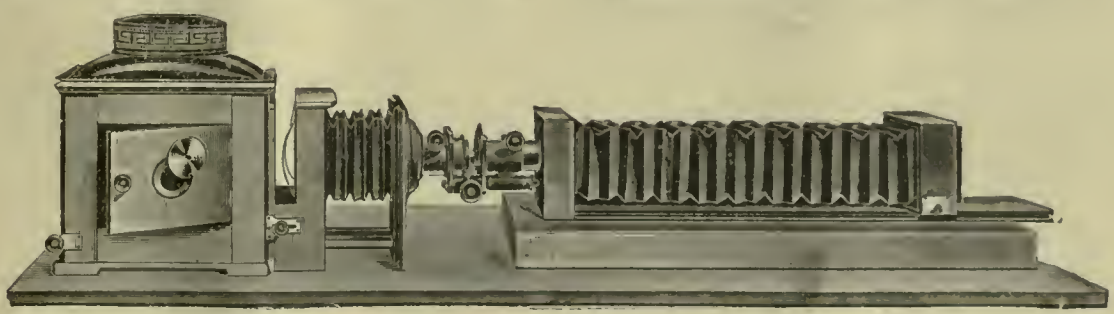
The lantern packs in a box or cabinet of pine, varnished black, with door on side, and the necessary fittings for extra objectives, carrier, and lime case. When the lantern is in use, it can be placed on the top of the cabinet, and the door pushed into two grooves, to form a convenient shelf for slides and apparatus. The whole can also be mounted on a tripod stand. In the next illustration we show a tripod stand supplied for the purpose. More often than not, this useful and one would think necessary adjunct finds no place in the lanternist's outfit, a makeshift arrangement of boxes and tables being frequently made to do duty for it. This tripod has the power of adjustment to work at various heights, either at standing height or at five to nine feet high when the exhibitor wishes to show over the heads of the audience. At A the stand can be adjusted to a height of from four to five feet, and at B it will stand nearly double that height. In order to alter the stand from single to double height, the screws at C are taken out, and the last joint of each leg, D, is turned down, and the screws, C, replaced. Each leg is pointed at both ends.



From an inspection of the front of the No. 2 lantern as shown in the first illustration it will be apparent that a vertical attachment, for showing on the screen objects in a horizontal position, such as fluid surfaces, cohesion figures, camphor motions, magnetic and other experiments, can be easily applied to it. The one supplied by Mr. Chadwick is made in walnut with mirror and five inch plano-convex condenser, six inch water-condenser, glass disc, and adjustable slide for carrying the objective.

The photo-micrograph camera, as here shown, extends to thirty-six inches on a sliding baseboard, and has fine rack-and-pinion adjustment, dark slide, and two focussing screens, one plain and the other ground.

The lantern microscope, which is shown attached to the lantern in the first illustration, is that known as Leach's. It is fitted with rack-and-pinion movements to both sub-stage and objective-holder, and fine screw focussing adjustment; all the necessary fittings for entirely rotating the polarising and analysing prisms of the polariscope, compound wheel of diaphragms,



concave sub-stage field lens, two sub-stage condensers, Barlow-lens amplifier, three objective adapters, the whole being fitted in a polished mahogany cabinet, with water trough.

In Chadwick's Slide Catalogue are given particulars of a large collection of slides for sale or hire, many of them being made from his own negatives. These include British scenery, foreign scenery, popular science, humorous stories, and the customary religious subjects, which find so much favour with clergymen and others who make use of the optical lantern for imparting Biblical and sacred knowledge to their flocks. The Lantern Catalogue is prefaced by a few words of practical advice to lantern aspirants, the worth of which is in the inverse proportion to its brevity. One piece of advice we should like to see more frequently borne in mind by lantern-makers and lantern-users. It is

this: "If the reader decides to purchase an oil-light lantern, let it be so constructed that limelight can be supplied at some future time without alteration." All the oil lanterns catalogued by Chadwick are so constructed, and the list further includes particulars of lantern accessories generally, selected with the judgment we should expect in such a case, and entirely unencumbered with many of those useless and obsolete appurtenances to lantern work which are contained in so many catalogues. Yet a third catalogue of scientific apparatus for optical projection is devoted to polariscope accessories and illustrated descriptions of the apparatus and objects required in scientifically instructive and entertaining experiments. Finally, another pamphlet gives a tersely written and clear little guide to lantern-microscopy and photo-micrography.

The lantern specialities of Mr. Chadwick are conceived with a leading desire to combine simplicity with efficiency, and those undertaking projection work would in his hands be sure of safe and practised guidance. For amateurs this is a recommendation of special value.

THE OFFICIAL PHOTOGRAPHER AT THE WORLD'S FAIR.

[Chicago Tribune.]

Mr. C. D. Arnold, the official picture-maker of the Exposition, posed yesterday as a bigger man than Director-General Davis, the National Commission, and the Board of Control. He defied the authority of all these, and a permit which the Director-General had issued to a publisher to take photographs on the grounds he coolly placed in his pocket and refused to return it to its rightful possessor. The fact that it was signed by the Director-General made no difference to Mr. Arnold, and the bearer of the permit was arrested, and, in order to prevent the confiscation of his private property, hurriedly left the grounds.

Mr. Arnold and Harlow D. Higinbotham, son of President Higinbotham, are jointly the possessors of the photograph concession for the grounds, and a concession out of which the Exposition Company expects to reap at least $250,000. Of the net proceeds of the concession Mr. Higinbotham and Mr. Arnold are to receive 10 per cent. each, besides a salary of $2000 each per annum.

Mr. Albert Brodie Stone was the owner of Director-General Davis's permit. Mr. Stone is the editor of a souvenir volume of the dedication exercises last October. The volume was authorised by the Ceremonies Committee, the Board of Control, and the Ways and Means Committee of the local directory. Mr. Stone, it is understood, is to pay five per cent. of the receipts from the sales of this volume to the Exposition Company. In order to enhance the value of the work, Mr. Stone desired to secure some views of the buildings with which to embellish it. In accordance with the action of the National Commission and the Board of Control, he asked Director-General Davis for a permit to take the pictures. This permit was granted June 2, and yesterday Mr. Stone, accompanied by Mr. C. S. Pinter and two photographers, visited Jackson Park. Mr. Pinter and the photographers were sent to the pier at the south-eastern portion of the grounds, and were taking photographs of the peristyle and other structures when one of Captain Bonfield's detectives approached Mr. Pinter, and asked him if he had permission to take photographs. Mr. Pinter said he had, and produced the order from the Director-General.

"I guess that won't go," said the detective, after examining the document. "You will have to go before Mr. Arnold, and get a permit from him."

"I am not violating any rules," replied Mr. Pinter, "and I will not go before Mr. Arnold. If you wish to take me before President Higinbotham, Director-General Davis, or any other official, I will accompany you, but Mr. Arnold is not an officer of the Exposition."

"I guess there are guards enough here to take you before Mr. Arnold," was the response of the detective, and thereupon he called two Columbian guards. All the violence necessary was the laying on of hands, and then Mr. Pinter was marched by the detective to Mr. Arnold's office, where, somewhat in the character of a magistrate, he passed upon the case. In relating the circumstances here, Mr. Pinter said, yesterday afternoon: "Mr. Arnold asked me what right I had to take photographs without a permit from him. I told him I had a permit from Director-General Davis. He asked to see it, and, drawing it from my pocket, I handed it to him. Mr. Arnold read it, and then, saying, 'That's no good,' put it in his pocket. I demanded the return of the permit, but he refused to give it. I explained that it was private property, to which he had no more right than he would have to my watch. He said that was all right, and kept the paper.

"I was next walked to Captain Bonfield's office. The captain was out, and I explained the situation to his sergeant and asked him what right his men had to arrest me and haul me about the grounds without any warrant of authority. I further asked him what he wanted to do with me. He said 'Nothing,' and told me to go. Thereupon Mr. Arnold asked for the plates, and an officer was sent back to the pier for the two cameras and the photographers who had been left there under guard. When the instruments were brought to the photograph building, Mr. Arnold told me that if I would destroy the plates I could go. I told him I would do nothing of the kind, that they were private property. He reached for me, but I warned him to be careful, and then he withdrew and we left with our cameras."

Director-General Davis, when informed of the action of photographer Arnold, declined to make any further statement than that his orders would have to be obeyed. Mr. Stone, Mr. Pinter, and members of the National Commission's Committee, which investigated the photographic concession, called upon the Colonel, and will to-day present their case to the Council of Administration.

This photographic concession, which permits Mr. Arnold and Mr. Higinbotham to charge illustrated newspapers $2 a day for the use of a Kodak, and so much for pictures of larger size, has caused a great deal of annoyance, and yesterday's arrest will be used as a test case to discover whether Mr. Arnold or the Director-General is the greater in Jackson Park.

The concession for the exclusive right to take pictures in the park was not granted until a few months ago. By the approval of the Executive Committee, April 5, 1893, Harlow D. Higinbotham was let into the benefits of the concession by the following resolution:—

"*Resolved*, That the Ways and Means Committee does hereby recommend that Harlow D. Higinbotham be appointed Official Photographer jointly with C. D. Arnold at the same compensation, viz., a salary of $2000 per year and ten per cent. net of the receipts of the Bureau of Photography after deducting all costs, charges, and expenses, the powers and duties of Mr. Arnold and Mr. Higinbotham to be equal and co-ordinate, and to be defined by a written contract fixing the details of their rights, powers, and duties, the execution of which shall nullify this resolution."

"I understand," said Mr. Stone, yesterday afternoon, "that Herbert Booth King, a photographer of New York, offered $250,000 for the concession, and also to bear all expenses. This offer was made several months before the concession was granted to the present owners."

Official Photographer Arnold, before whom Mr. Pinter was taken, came forward, cool and smiling, to explain the circumstances.

"In the first place, I think Mr. Stone is a fool," he said. "One of the detectives found his man down near the Casino with a camera, and, as he had no permit from me, they simply gathered him in, that's all. If I understand anything about the facts, I am the only man who is authorised to issue permits to photographers on these grounds."

"But how about the written permit of the Director-General?"

"He showed it to me and I put it in my pocket, and I've got it yet. I took the plates from the camera and exposed them to the light, so that, if any views have been taken, they are spoiled now. Stone was around here, talking about getting out a writ of replevin for the plates, but I'm not at all alarmed. Now he is beginning to talk about compelling me to give up the Director-General's order."

"Did not the Board of Control pass a mandatory order upon you to allow representatives of illustrated papers and periodicals to make photographs of the grounds and buildings?"

"I don't know anything about a Board of Control, and never saw its order. Somebody told me something of the kind was printed in the papers, but I never paid any attention to it."

"Did not the permit of the Director-General expressly state that Stone was to make views solely for the purpose of illustrating his souvenir volume?"

"I believe it did refer to him as a publisher or something of that kind, but I didn't pay much attention to it. I know what belongs to me and I mean to have it at all hazards."

"Was Mr. Pinter put out of the grounds?"

"No, he stayed here watching his instrument for several hours, and finally took it away with him."

It is extremely probable that inside of two weeks Mr. Arnold will no longer occupy the proud and exalted position he now holds. One of the men high in Exposition affairs said last night: "Mr. Arnold's concession and its management have been so detrimental to the Fair and its interests that we have been discussing the advisibility of paying him a bonus and letting him go. We recognise the necessity of making other photographic arrangements, and to-day's occurrence will, in my opinion, only precipitate the inevitable."

Lantern Queries.

Mat.—There is nothing novel in the idea of a combined mask and binder. Several such are obtainable commercially.

F. Penton.—Consult the advertising pages of the Lantern Record, where you will find the announcements of several who colour lantern slides.

C. Snelling.—Try the effect of reducing the slide with Farmer's solution (hypo and ferridcyanide of potassium). You must be careful, however, that the reduction does not proceed too far.

E. Bagster.—Mr. Baker, in his "Lantern Mems" last month described how the effect at the music hall referred to is produced. It is also employed at several theatres in Paris where the "serpentine" dance is given.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*August* 4, 1893

THE LANTERN RECORD.

CONTENTS.

LANTERN NOTES AND NEWS.

Apropos of stereoscopic effect on the screen and means suggested for obtaining it, it is interesting to note that the late Mr. Thomas Sutton suggested the projection side by side upon a large screen (by means of a pair of lanterns) of the two views composing the complete stereoscopic slide, and then getting them merged into one by the aid of a pair of prismatic spectacles, which were to be used by each person present. The effect, when tried, did not come up to expectations.

* * * *

Another plan proposed by a French experimentalist, as follows, may also be recalled. With a pair of dissolving lanterns, both images were simultaneously thrown on the same disc. This produced confusion in several parts, but a cap with a red glass was placed upon the objective of one of the lanterns, another cap with a green glass being attached to the other. The spectator now examined the confused picture on the screen through a pair of spectacles, one eye protected with the red, and the other with the green glass, the result being that the eye protected by the green glass saw only the image projected from the green lantern, the red covered eye doing the same for *its* colour. The combined image composed of the two colours—each complementary to the other—formed a true stereoscopic picture, not a very brilliant one, but otherwise perfect.

* * * *

In exchanges, says an American contemporary, we frequently find suggestions in regard to lantern-slide mats, and it is scarcely a wonder. The "regulation price" is altogether too much. Moreover, the sizes do not seem to be just what they ought to be, and the "gilt lines" which recommend them so highly are anything but desirable on account of the bronze which sifts off between the slides and the cover glass. Mr. Humphrey, in the *Photo-American*, makes a suggestion which appears to be good. He marks the size of the opening wanted on a piece of thin wood (cigar box fills the bill) and with the papers clamped between this and another piece saws out the mats with his bracket saw. A paper that is white on one side and black on the other for mats, together with white binders, assists considerably in the manipulation of the lantern.

* * * *

In a treatise on optics, published at the comparatively recent date of 1835, the optical principles of the lantern are discussed and dismissed in the following paragraph: "The magic lantern: The construction of this instrument is precisely similar to that of the solar miscroscope, except that the object is illuminated by a lamp placed behind it in a box instead of sunlight. The objects are generally grotesque figures of men, devils, &c., and are thrown upon a white wall or sheet."

* * * * *

We understand that Messrs. Newton & Co., of 3, Fleet-street, are supplying lantern slides from the negatives taken by Mr. W. Saville-Kent to illustrate his lately published book, *The Great Barrier Reef of Australia*. From the collotype reproductions it is evident that the negatives, of corals and coral reefs, pearl and pearl shells Bêche-de-Mer, and the marine fauna of the Barrier Region, are of great beauty, and should make equally beautiful slides of interest to others besides biologists, &c.

* * * * *

A new system of lighthouse signals has been tried experimentally, the idea being that, with a system of shutters to cause flashing lights, a number may be designated as far off as the light can be distinctly observed, and by reference to a "port book," the light-houses being all numbered and recorded, the master of any vessel approaching the coast at night could ascertain for certain what locality he was in. Some consider that this would be a more unmistakable system for the recognition of lights than the present style of so many flashes per minute or differences of colour, height, &c.

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The *South Australian Photographic Journal* has the following remarks in reference to the dilatoriness of certain societies in contributing lantern slides to a projected set for transmission to this country:—"The Intercolonial Slide Exchange is not progressing as rapidly as we anticipated when the invitation to contribute to the collection was given in these pages. The Photographic Societies of New Zealand and Tasmania are slow in responding—we are at a loss to understand why they do not do so—but, having been asked to fix a date on which the slides may be forwarded to London, it becomes necessary to obtain definite replies from each Association. The South Australian Society is collecting lantern slides with a view to sending a set, first to the Australian Societies, and then forwarding them on to England; but they are quite willing to fall in with our idea, and to subscribe the required number of slides, together with a full description therewith. Surely no hesitation is needed for other Societies to follow their example; all must be aware that united action is required to make the collection worthy of the Land of the Golden Fleece."

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As an outcome of the Edinburgh Convention, held last year, a large crop of lantern slides resulted, Newhaven fishwives figuring on the screen at the lantern nights of several London Photographic Societies with a frequency that very nearly begot a feeling of monotony. From all accounts, though the number of hand cameras at Plymouth was large, it does not appear that a great deal of photographic work was done. Nevertheless, the peculiarly festive nature of the gathering gave opportunities for the hand camera's facility in securing amusing groupings and situations, which, if shown on the screen, would doubtless be productive of great mirth. The ease with which, in these matters, the bounds of good taste can be passed should, however, give the slidemaker, anxious to raise a laugh at the expense of somebody else, a little caution in the choice of his screen subject

During the exhibition of the Photographic Society of great Britain, the lantern exhibitions form such an exceedingly popular item with the general public that it is to be hoped those Societies and individuals who have been appealed to for loan sets for display will not fail to supply them. The summer has, on the whole, been an excellent one for outdoor photography, so that, no doubt, any number of good negatives have been obtained suitable for reproduction for projection purposes. We may just hint that, possibly a little variety in the choice of subjects would be welcome, most sets having an undue preponderance of landscape and architectural views.

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Of the new developers, glycin seems to us to have special recommendations for lantern-slide development, its clearness, evenness of action, and richness of tone marking it out as eminently suitable for this kind of picture. Experiment would, doubtless, point out a ready way of accelerating its rapidity of working without impairing its good qualities.

MAKING TRANSPARENCIES AND ENLARGEMENTS WITHOUT A CONDENSER.

Many amateurs are deterred from attempting enlarging or the production of lantern slides in the camera by the want of proper apparatus and the supposed necessity for a condenser of considerable dimensions and great cost; but in reality very satisfactory results can be obtained with the simplest and least costly of appliances, if intelligently applied.

Of course, the possessor of a lantern is in many cases in a position to make enlargements at any rate from quarter-plate negatives by artificial light, but the vast majority of optical lanterns for projection purposes have condensers too small even for this, and there is, therefore, no other alternative than to use daylight, which, in turn, involves the fitting up of a special enlarging room or camera at some cost and inconvenience.

By far the greater number of amateurs, too, are so placed that the hours of daylight are not available for the purpose except at rare intervals, while the evenings are, if only the means of utilising them were available.

Many plans have been put forward from time to time for securing evenness of illumination without a condenser by the employment of a number of different lights placed behind a translucent screen, in order to blend and diffuse them; but, apart from the great heat given off, and the difficulty of securing uniformity in the lights themselves, the results have never been eminently satisfactory. A single light of great intensity employed in a similar manner with a diffuser presents the difficulty, that it is next to impossible to subdue the extra brilliancy of the centre of the illuminated screen without placing it at such a distance from the source of light that most of its power is lost or wasted. Cutting off the direct rays of the illuminant by means of an opaque, or semi-opaque, disc has been tried to obviate the last-named difficulty, but this has been in connexion with a parabolic reflector, which is in itself an expensive piece of apparatus and difficult to obtain.

The necessity for such a reflector is, however, imaginary, for very satisfactory illumination can be obtained with no more elaborate an appliance than a billiard lamp shade, if it be properly used. I do not mean that the best results can be got with such a reflector, I mention it simply as the type, but by constructing one on the same lines with a definite object in view the illumination is all that can be desired for practical purposes.

The points to be considered are, first of all, the light to be used; then the material, shape, and dimensions of the reflector, the position of the light, and the size and position of the opaque discs and of the translucent screen. As regards the light, nothing seems better or more convenient than magnesium ribbon, on account of its actinic value, the comparative absence of heat, and the compactness of the apparatus required for its ignition. Its price nowadays, too, is so low that it is practically as cheap as gas or paraffin, especially when its convenience is taken into account.

The reflector may conveniently be of tin, and could be made of suitable dimensions by any worker in sheet metal for a shilling or two; but, if the amateur prefers to manufacture it himself, he can easily do so out of stout cardboard or paper pasted in successive thicknesses until a sufficiently stout shell has been formed. The precise details of procedure I will describe presently.

The shape, however, is the most important point, for on this, taken in connexion with the position of the light, disc, and screen, will depend the character of the illumination obtained. If a rough diagram be made upon paper, showing the section of a conical reflector, with the light and disc in position, it will be found, by tracing the direction of the rays, both direct and reflected, that there is one position for the translucent screen, which is the best for that particular set of conditions. It is not necessary to adhere to any particular shape or dimensions; but it must be understood that, whatever they may be, there is only one proper position for the screen. I will attempt to explain this as briefly as possible.

It will be found, on tracing the direction of the rays proceeding from the illuminant, that a portion of them fall directly on the screen, a portion strike the reflector, and are thence thrown on to the screen, while still another portion are arrested by the opaque disc, or fall on portions of the reflector where they are practically lost. If the screen be placed too close to the light, a shadow of the opaque disc will be formed in the centre, and probably it will show two distinct zones of lighting—the direct, at the edge of the screen; and the reflected, midway between that and the centre spot. As the screen is moved further away, however, the central shadow grows gradually less, until a point is reached at which it disappears, the reflected rays gradually overlapping the opaque disc until they meet in the centre. At the same time, the bright zone of direct illumination grows larger; but this we have nothing to do with, as it is only the reflected rays that can be relied upon for equality of illumination.

It will be seen, then, that, according to the position of the light and screen and the angle at which the sides of the cone meet, we can calculate, by means of a diagram, precisely the size and all other details for any purpose, but space will not permit of my entering very fully into that part of the question. Generally speaking, though, it will be found that, the relative position of light and disc being the same, the sides of the cone must meet at a more obtuse angle in proportion to the size of the available disc required; and, further, as a matter of necessity, the shallower or more obtuse the reflector the larger it must be.

I will give two instances. Suppose the light to be placed 3 inches from the point at which the apex of the cone would be if it were complete, and a 3-inch disc be placed 2 inches in front of it, a reflector whose sides meet at an angle of 90° would have to have the screen placed 9½ inches from the apex or 6½ inches from the light, perhaps practically a little more. The total diameter of the front of the reflector would then be about 19 inches, and the available circle of equal illumination 9 inches, or enough for a half-plate negative. If a larger circle of illumination be required, the angle may be increased to 120°, when, keeping the light and disc in the same relative positions, the screen would have to be 14 inches from the back of the reflector, which would entail a total diameter of about 4 feet, with a circle of illumination of 15 inches, or nearly sufficient to cover a 12 × 10 plate.

Such a large reflector is, of course, out of the question, but it is not necessary that it should be so constructed. Even supposing the screen to represent a circle of 4 feet diameter, only 15 inches of that is of any practical use, and if the reflector be limited to the latter dimensions, and placed at the proper distance from the translucent screen, every purpose will be served. But the space between the reflector and the screen should in this case be covered in with blackened material, to prevent irregular reflection from the work bench and surrounding objects, and while this task is being performed it is worth while doing it properly, so as to reap every little advantage that is to be gained. If a rough cylinder of cardboard or tin be placed between the reflector proper and the screen, of sufficient length to bring the latter into proper position, it will arrest and throw on to the screen much of the light that would otherwise be lost, and thus increase its working value.

I have spoken of making the measurements from the apex of the cone, but in practice the back of the reflector will always be

cut off as in an ordinary lamp shade. A certain portion immediately surrounding the apex is always useless space, the light it reflects falling behind the opaque disc, and this part may therefore be cut away to permit of the insertion of the lamp and ventilating tubes should such be deemed necessary. These may, in fact, be so placed as not to interfere with any portion of the useful reflecting surface. The "lamp" I use consists of two brass tubes arranged in a somewhat similar manner to those of an oxyhydrogen jet, the one carrying a cotton wick soaked in spirit, the other a strand of magnesium ribbon driven from the back between a pair of rubber-tube covered rollers, in the same way as the useful little magnesium lamp introduced by Mr. F. W. Hart some years ago.

The inside of the reflector should be painted dead white, whatever material it may be composed of, as the illumination is far more even than is the case from polished tin. The screen may be of ground glass for small sizes, or tissue paper or tracing linen for larger; but the latter is rather too transparent in a single thickness.

Those who wish to make their own reflector may be glad of a plan for cutting the cardboard or other material to the proper shape to form a cone of the right dimensions. First plot out on paper, to scale, the section of the reflector and find the position of the screen. Measure the distance from the apex to the margin of the screen—that is to say, the side of the reflector, and strike a circle with that distance as radius. Next measure the diameter of the screen, and, having calculated the *circumference* of that circle, measure it off on the circumference of the larger one, and cut away the section representing the remainder. If the two edges be brought together and carefully joined, the desired cone will be obtained. Before joining up, however, a circle should be cut from the centre to join the back opening. It then only requires strengthening by the addition of successive layers of paper or card.

It is not to be supposed that a reflector, such as I have attempted to describe, gives absolutely uniform illumination, or even as near an approach to it, as a well-worked parabolic reflector; but in actual use, if it be put together with due regard to the points I have indicated, it is difficult within the limits of permissible error—or latitude—to find any serious fault with the results obtained photographically. Theoretically, of course, the illumination is a little stronger in the centre of the screen, but in practice the difference is inappreciable.

W. B. Bolton.

LANTERN MEMS.

I had hoped this month to have given some particulars of the optica lanterns on exhibition at the Chicago "World's Fair," for a friend who has just returned has been good enough to place his note-book at my disposal; but, unfortunately, there is nothing in this respect to chronicle, for the Optical Section of the Great Britain Exhibits is in such an out-of-the-way place, and so poorly representative when found, that there is little to see or to repay one for such a long journey.

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As the traveller is a member of a well-known optical firm, and during his hurried visit for pleasure really *tried* for three days to discover all that was noteworthy in optical and meteorological exhibits, there must be a screw loose somewhere for so barren a result, and it will be of interest if some other visitors to the "greatest Exposition the world has ever known" can enlighten lanternists who are not so fortunate as to be able to visit the United States this year, what *they* have seen that shows novelty or advancement in the optical lantern or optics generally.

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No doubt the heavy duty of forty per cent. or so has had the effect of stopping many English (and Continental) makers from exhibiting; for the time occupied in getting out and home, even if a lengthened attendance was not contemplated, is enough to contend with, without being debarred from doing business with sales of duplicate exhibits on account of the prohibitory duty.

Unless there has been a decided alteration of ideas lately, the fashion with American lanternists does not give the English style of optical lantern and dissolving-view apparatus much chance in the States, for different models altogether are adopted for the "Stereopticon," as they call it; and as in many other instruments, notably surveying instruments, microscopes, &c., it takes a long time to get popular ideas modified so as to accept new, and what are supposed to be improved patterns, in place of those that have become familiar. In fact, nothing short of a "boom" produced by some special success of illustrated lectures will do it, as far as the lantern is concerned.

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With the perfecting of the stereoscopic lantern invented by Mr. Anderton, or, should I say, its development, so that there is no reasonable limit of size of picture producible, and that a very large audience can witness in ease and comfort the pictures so marvellously rendered solid by means of polarisation, a new era may be created, and English models made more acceptable to our American cousins.

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I am indebted to the inventor for some extra information respecting the lantern stereoscope he has courteously sent me, in which he says he is now making arrangements for supplying the parts necessary for converting ordinary biunials into stereoscopic lanterns by the addition of polarisers, silver-faced screens, and the analysing eyeglasses.

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Regarding screens, Mr. Anderton reports he has tried many transparent materials, and has discovered only one that does not depolarise the light; and this possesses three serious drawbacks, it being expensive, unportable, and lacking in brilliancy. This being so, he has decided only to have silver-faced screens made.

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The making of the eyeglasses, or analysers, that each one of the audience has, to view the pictures on the screen and get stereoscopic effect, has given an immense amount of trouble. In fact, giving his own words, "I have made thousands of experiment and trials, and although they are now of simple construction, I rather fancy that an ordinary amateur would find it extremely difficult to make them. Very much depends upon the analyser, and I have spent countless hours in trying to produce them at a low price, and in this I have succeeded."

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As the makers, Messrs. Field & Co., have always co-operated with the optical trade in placing on the market any of their specialities, lanternists who think of trying this addition to dissolving apparatus will do well to get their optician to supply Messrs. Field with the necessary sizes and information, that there may be no chance of failure, for Mr. Anderton justly says, "with low price, there will be little inducement for amateurs to make them for themselves, and less chance of the lantern stereoscope getting a bad name." Personally, I know the value of a good "send-off" with all new inventions, and the effect of reports of practical trials by experts on the popular mind.

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During this month or next, lanternists should make up their minds what alterations they intend to make in their apparatus, so that they may be ready in good time for the lantern season. If the body or brass work requires renovating, it is better for it to be done before the lantern-makers get busy, and, if all goes well, they should be by October.

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New designs in limelight jets and electric light lamps are on the *tapis*, and they will be matured sufficiently for full particulars to be published next month. It will therefore be well for those that contemplate radical changes in apparatus to hold their hand for a short space, for something worth waiting for will be announced by a well-known firm of lantern-makers.

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Our friend "Free Lance" referred to my remarks on sulphuric ether as to specific gravity and smell. My authority as to the denser kinds being strong-smelling was the well-known firm of Messrs. Alfred White & Sons, and by their list I see they have Æther. Sulph. Methyl. ·750 ·730 ·735, washed redistilled, and what they recommend

for the Oxy-ether Limelight ·720, or Anæsthetic ·717. These latter are specially marked on the list they gave me for the purpose of lantern operators. Messrs. White will be pleased to show "Free Lance" their various samples, and explain how they get the light kinds of methylated ether practically free from smell.

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As photographic holiday-makers are availing themselves of all opportunities to get pictures, no doubt the coming lantern season will be enriched by a large addition to the lantern sets. I saw several enthusiastic amateurs busy with hand or stand cameras at Bisley Camp, taking the groups of the Headquarter Staff from Aldershot, the Queen's Prize-winner, Miss Leale the lady shootist, and also pretty bits of scenery on the canal close by. No doubt photographs in which life is depicted are always appreciated, and the improvement in sensitive plates and apparatus make this possible and easy.

G. R. Baker.

SOME NOTES ON AMERICAN AND ENGLISH LANTERN PRACTICE.

[Photographic Society of Philadelphia.]

In a recent issue if the "Lantern Record," a monthly supplement of The British Journal of Photography, devoted to the interests of the optical lantern, the editor, in referring to the visit of a London dealer to the United States, and his probable intention of keeping an eye on lantern matters here, with a view of picking up any unconsidered trifles in the way of novelties for next season, added, "That is, if there *are* any lantern novelties to be met with in America." The writer went on to say that, from what he "can gather by a study of the literature of the subject, our friends across the water are somewhat behind us" with regard to the lantern and its accessories, both in quantity and quality.

I have been struck by another English opinion of American lantern matters, which is implied in the selection of an illustration for Mr. Lewis Wright's admirable work on *Optical Projection*. This is a cut of a lantern which Mr. Wright would have his readers believe is an American type of lantern, but which, so far as my knowledge goes, is about as far from being a fair illustration of lanterns used in this country as could well be imagined. It is of a clumsy, antiquated pattern, cloth curtains taking the place of back and sides, and is such a box as one might have expected to find in use thirty years ago—if then.

My purpose in calling attention to these matters is not so much to defend American lanterns as it is to bring to your notice one or two points in American and English lantern practice, and to account, in part, perhaps, for adverse opinions such as have been quoted. There is no question but that we are far behind our English friends in the matter of lantern literature; so far behind, in fact, that I am led to wonder whether the writer in The British Journal of Photography did not form his judgment from the absence of a lantern literature rather than from an actual reading of it! Not only do the English lantern men enjoy the advantages of an excellent monthly journal devoted exclusively to this subject, and also ably conducted lantern supplements to two of the best of the photographic periodicals, but the journals *all* devote more or less space to lantern matters.

On the other hand, here in the United States, with the exception of a little quarterly, issued with more or less regularity in Philadelphia, we have no lantern journal, and the American photographic papers give their readers far less lantern news than its importance and its close association with photographic work would seem to deserve. I cannot think that this is because there is any less interest in the optical lantern in America than in England, or that, in this country, we fail in any respect to recognise the great importance of the lantern as an aid in educational and scientific progress.

It would be impossible, I imagine, to get at any statistics which would enable us to make a comparison of the number of lanternists —to borrow a modern word—as of the number of lanterns in use in this country and England, but it cannot be that we are very much behind in these respects. The only explanation will be found, I fancy, in the fact of the "magnificent distances" over which our population is distributed, and the difficulty of frequent comparison of notes on details of practice; and in the further fact that, in America, a far larger proportion than in England of those who use the lantern are busy men, who take it up as a recreation or in connexion with other lines of work, and who have not the time to indulge in the refinements of detail which, to judge from the literature of the subject, are so dear to the hearts of English lantern men. (I do not wish to imply, however, that one can become truly expert in these matters without attention to detail.)

To leave the question of the literature of the lantern, my observation of American lanterns leads me to believe, as already indicated, that our type of lantern is very unlike that selected by Mr. Wright for illustration. His book is so valuable, and, with its companion volume on *Light*, has been of such great help, that I cannot but hope that this blemish will be removed in any future editions which may be issued. It is but fair to say that the author had particular reference to lanterns for scientific projections, but even in that case the type shown is no more American than it is English, French, or German.

Without attempting to say what *is* the American type of lantern, if such a thing exists, I have been struck in "the study of the literature of the subject"—in this case the catalogues of the makers —by the fact that American lanterns tend more and more to portability, and that, except in rare cases, where the lantern does not have to be moved, we are fast drifting away from the massive structures of mahogany, and walnut, and brass, so popular among our friends on the other side. When dissolving views and "effects" were novelties, the general public, knowing less of the methods employed than they do to-day, looked with a certain amount of awe and wonder upon the lantern and its operator, a feeling which was systematically encouraged. Details of working were, for a time, profound secrets, and there was therefore some reason for the ponderous and showy apparatus. To-day, so far as the showing of views is concerned, the ideal to be reached by the lantern operator, according to my view, is to have everything work so smoothly and perfectly that the audience will not know, so to speak, that there is a lantern in the room. How far from reaching this ideal most operators are, it is needless for me to point out.

For scientific projections the heavy type of lantern is unsuitable, so that in the adoption of more portable forms I think we are ahead. A glance through the catalogues of five or six representative makers here and in England will show what I mean.

In the production of oxygen by cheaper and better processes, and in the adoption of the drawn steel cylinders and their accompanying appliances, it must be admitted that we are compelled to take second place. But there is a curious fact in this connexion which is very striking. Prior to the introduction of pressures of 1800 pounds, gas tanks in which the gas was compressed at from 200 to 300 pounds were in much more general use in America than in England. Here, for the past decade at least, gas bags and blow-through jets have been almost unknown, while in England they were and are frequently met with, particularly among professional operators. These gentlemen prefer the clumsy and troublesome bags because of the slightly greater expense of compressed gases, while in the United States the vastly greater convenience and safety of cylinders is regarded as overweighing every other consideration. Furthermore, those who depend on the use of bags on the score of expense seem to take no account of the element of time, as if that was of no value, nor of the uncertainties and danger attending the process of making oxygen. They tell us "there is no danger with bags, in experienced hands;" but this very qualification, "in experienced hands," upsets their argument. If we had to devote the same time which they do to the preparation of the gas, and were obliged to build barricades around our cylinders as a safeguard against possible interference and a disastrous explosion; if we had to test the contents of each tank before the opening of an exhibition, and suffer the other inconveniences which the advocates of bags submit to, then and only then would the difference in cost be worth considering, even though we are "not all millionaires."

It is also to be noticed that, while in England the so-called "safety jets" are listed in every catalogue and are recommended to beginners by all the text-books, here in America they are almost unknown. Few, if any, dealers keep them, and I remember some years ago when I used such a jet here at the Society it was examined by the members quite as a curious relic of the past.

While it does not do for any one to stop work, and rest on past laurels, American lantern men have no reason to be ashamed of their record in this connexion. Our English friends have given full recognition to work of Mr. Marcy, of Philadelphia, whose oil lamp, introduced twenty-five years ago or more, is the type upon which nearly all oil lanterns have since been based, and who by this invention probably did more than any other one person to popularise the magic lantern. And we also know what has been done in the field of optical projection by our own member, Frederic E. Ives, not only in connexion with the ether saturator and his folding lantern, but in one of the details of his greater invention—Composite Heliochromy.

The purpose of this very hasty and crude communication has simply been to emphasise the fact that, while we gladly recognise our indebtedness to England in matters of lantern practice, we also in America have contributed our share; and, if visitors from abroad this summer fail to find any novelties in minor apparatus, they will at least see a marked improvement in the style and form of the lanterns themselves. But, after all, the matter of size and form is one of taste, and I have but expressed my own preference, and that of most American lantern men, as I believe, for the lighter and more compact forms. If Englishmen like the formidable specimens of the work of the cabinet-maker and the metal-worker, well, to quote Abraham Lincoln, "that's the sort of thing they like."

EDMUND STIRLING.

RURAL TECHNICAL EDUCATION AND THE LANTERN.

IN the last issue of the "LANTERN RECORD" Mr. Baker makes reference to the use of the lantern in connexion with the tour of the Herefordshire Bee Van, supported by a grant from the County Council. As I have had the arrangement and making out of this matter, and as I think that outdoor technical instruction with the aid of the lantern on summer evenings is a new departure, a few details may be of interest to readers.

The general plan adopted is to send a properly equipped travelling van from village to village giving lectures and practical instruction in bee-keeping at each place.

In the afternoon the expert gives a demonstration in the garden of some local bee-keeper, illustrating the method of subduing and handling the little insects.

About 7.30 in the evening a practical talk is given, illustrated with examples of modern bee-keeping appliances. Then, as the shades of evening fall (about 9 o'clock, as the work is done only in the summer months), a transparent screen is let down in the open end of the van, and a short lecture on the natural history of the bee and some important points in practical management is given.

The van, built to order early in 1892, is a one-horse one, about 11 feet long and 6 feet wide, thoroughly ventilated at the top, and fitted with sleeping bunks. In the front is a central door. The back ends lets down, like the tail-board of a wagon, to form a lecturing platform. The end of the van is, therefore, perfectly open, and in the open end a muslin screen is let down from an ordinary blind-roller. The lath at the bottom of the screen catches under two deals on the floor, and three tapes on each side strain it tight. The lantern is placed in the open doorway, about 10 feet 6 inches from the screen, and a picture a little over 5 feet is shown. A 40-feet cylinder of gas is used with Beard's regulator. A Turnbull's spirit jet is used with great success, hardly a hitch having occurred in the two seasons' use, although the instructor had never seen a lantern at work before starting. With this jet the spirit reservoir is inside the lantern, a good deal depends upon the careful opening out of the wick, which by the way is not even charred. The jet is charged from a quarter pint measure of spirit, which lasts for the lecture of about 40 minutes (25 to 30 slides shown), and any residue is always thrown away. About 2 feet of oxygen is used for each lecture. The lantern lecture, which is always given as near the centre of the village as possible, always draws good and attentive audiences, considerably larger this year than in the first season when the work was less known.

The slides shown are all my own photographs from nature (I have been making up the set for some years), such as queen, drone, and worker bees on one and on separate slides, every stage of the development of the bee from the egg to perfect insect, queen cells, photo-micrographs of different parts of the bee, some special photographs of fruit blooms to illustrate the use of the bee in fertilising them, various operations in bee-keeping and illustrations of various appliances.

In the course of some years' experience in lecturing on the subject, I have found the need of impressing certain first principles by pictorial means, and have therefore devised pictorial mottoes for the purpose, such as "Never kill the bees," "Give room to get honey," "Don't let your bees starve," "Bees bring fruit," &c.

Perhaps the method of producing these mottoes may be of interest. A suitable photograph is suited for a background, and a rather lightly printed bromide enlargement (12 × 10 or 15 × 12) made from it; this is fastened to a board. The letters forming the motto are formed in rustic fashion of twigs of wood (larch twigs chiefly), cut and bent to shape, and fastened in their proper places on the enlargement by means of needle points. A negative is then made of the whole composition, and the lantern slides printed from this. I have used this same method with success for the frontispiece of a book.

The van method of technical instruction has been, to my mind, a decided success. In my experience there is a freedom in these open-air meetings, where all are free to attend or depart at their pleasure, which is very delightful, and, with the aid of the pictures, the instructor is able to keep "in touch" with his audience, even although the subject is rather beyond the usual scope of their knowledge.

I am sure that there are other subjects (horticulture, &c.) which could be most efficiently taught by the same methods, and I am glad to say that the lead of the Herefordshire Bee-keepers' Association has this year been followed by the Berkshire Association, who have had a bee van built in Hereford, and are now engaged on a similar lecture tour with the lantern.

The lecturer travelling with the van requires a lad as assistant (his son in our case), who changes the slides while he talks at the front. They find a Rippingill paraffin stove most efficient for cooking their meals.

The season's work concludes this week, and sixty-five of these village lectures will have been given since the commencement.

ALFRED WATKINS.

OPAQUE LANTERN SCREENS.

"LIMELIGHT" writes, in the *Photographic Record*, the organ of the Manchester Amateur Society, "It is often urged against the ordinary sheet screen that it does an injustice to the pictures that are thrown upon it. The stretching of the material on all sides tends to open the cloth, and to a considerable extent filters the image away, destroying its brilliancy." There is a great amount of truth in this. The ideal screen should retain the whole of the scene on its surface, for every ray of light that finds its way to the back reduces the strength of the picture, and detracts from the general effect. It is quite evident that nothing short of a thoroughly opaque surface will give the best results. The importance of this, to some lanternists a trifling imperfection, is such that a few well-known lecturers, such as Mr. Paul Lange, refuse to show their slides unless they can be accommodated with something better than bleached cloth, and will take the trouble of providing their own screen rather than put up with the old time-honoured sheet. Photographers must move on with the times, and our Society is behind. The opaque sheet has its difficulties, I admit, but they are not insurmountable. The roller screen is inconvenient for stowing away because of its length, but it offers the advantage of being quickly erected and taken down. As for its tendency to irregular stretching at the margin, that is but the fault of bad construction. There is an opening for new ideas on this subject, and I would suggest that our members be invited to contribute their notions upon the best form of screen suited to the purposes of the Society. The subject might be introduced at one of the monthly meetings for discussion, or suggestions might be sent to the Council, written on paper, with rough diagrams. Certainly something should be done before the next lantern season comes round."

COLOUR PHOTOGRAPHY.

AN INTERVIEW WITH MR. FREDERIC IVES.

PHOTOGRAPHY in colours is a dream that has inflamed many besides the mere amateur and the enthusiast (says the *Pall Mall Gazette*.) Like several other delusions that will never die, it has been reported a *fait accompli* over and over again; yet the world still waits for coloured photographs, and waits in vain, if what it expects are correctly tinted reproductions, taken direct from nature. There are no such things, and, in all probability, there never will be.

The best that has ever been done in this respect, and it is very wonderful, is the so-called "composite heliochromy" of Mr. Frederic Ives, which was exhibited last year by special request at the Royal Institution and at the Royal Society and the Society of Arts. In this process three pictures are taken simultaneously on one plate, through coloured screens of special construction, by means of which each image is made to represent one of the three fundamental colour sensations produced on the eye in accordance with the vision theory of Young and Helmholtz. These three images are superimposed one on another by a triple optical lantern, or in an instrument of highly ingenious construction called the "heliochromoscope," of Mr. Ives's own invention, by means of which the original object is shown not only in apparent relief, as in the familiar stereoscope, but also in the exact colours and shades of nature.

No one who has seen Mr. Ives's picture could fail to be impressed with the beauty, the brilliance, and the absolute faithfulness to nature of these reproductions, which are based upon scientific principles of a very high order; but, speaking vulgarly, they are not coloured photographs.

The three actual images on each plate are black and white as usual, with a difference merely as regards the distribution of light and shade in each; it is only when they are combined, and when the proper conditions are restored, that the illusory effects of colour are given.

Recently there have been wild reports of colour photography emanating from France. The Messrs. Lumière, working on a process known as Lippmann's, with dry plates of their own manufacture, are said to have eclipsed this roundabout method entirely, and, by a new system, to have succeeded in reproducing exactly in one picture all the delicate tints of nature. M. Léon Vidal, who is recognised as an authority on the subject in France, writes —

"The great characteristic of these projected pictures is the faithful representation of landscapes. The effect is extraordinary, on account of the admirable reproduction of the colours of nature. The blue of the sky, the greens in their various tints and gradations, with all the most delicate greys and whites—all is here depicted with unrivalled exactitude."

Similarly glorified accounts have appeared in other papers, English as well as French, and a representative of the *Pall Mall Gazette* called upon Mr. Ives one morning in order to find out how much had really been done in this direction. Mr. Ives, it should be explained, is a Philadelphian, and was recently on a visit to England. He had engaged to exhibit specimens of his work at the Royal Institution on the occasion of Professor Thorpe's lecture.

When the business was explained to him, Mr. Ives smiled his faintest. He is a tall and somewhat delicate-looking man, with eyes that show the lines of patient study, a thin, black beard, and the hand of a born experimenter.

"I have read M. Vidal's remarks," he said, "and several others besides, notably those of Dr. Vogel, by whom I have had the honour of being personally vilified."

"Why so?"—"Well, because I am inoffensive, perhaps, and not a member of a close corporation like the French savants."

"Is that an adequate reason? Well, what do you think of this Lippmann-Lumière process?"—"A scientific friend of mine who has been to Paris to see it says that the results are pure humbug. I have studied the process myself, and I am inclined to think that M. Vidal has either seen a miracle, or is stating what is not. The colours got by it are due to interference of light by thin films on plates backed with mercury. They are what we call iridescent simply, and are such as you can often see on the surface of stagnant pools. Even if they possessed no other drawbacks, the fact that white light in these photographs comes out a deep brown would be sufficient to condemn them; but it happens, besides, that the colours in the rest of the photograph are merely a matter of the length of exposure, so that, although perhaps once in the course of ten tries a tree may come out green, it is just as likely to be pink or blue or anything else in the remaining nine. The colours are an accidental effect, and vary according to the light in which they are looked at."

"How does M. Lippmann print his photographs?"—"They are not printed at all. By inclining the plate at a suitable angle to the light you can get a coloured effect; that is all. And the colour varies with the angle. Those beautiful greys and whites that M. Vidal spoke of were nothing more than the ordinary reflection of the sky off a glossy surface.

"What led you to the idea of heliochromy?"—"It is not new. Mr. Collen, the Queen's painting master, suggested the idea of photographing three images to represent the three primary colours twenty-eight years ago, and various methods of carrying it out have been tried abroad, by Cros & Du Hauron in France, and Dr. Vogel in Germany. But they did not hit the true idea. It has taken me eight years to perfect my three-colour screens in such a way as to make each image, when taken, a true representation of one of the fundamental colour sensations, so that, when the three were once more blended in a common image through similar screens, the actual colours of nature would be returned to the eye."

"And have you succeeded in this?"—"Look at these specimens."

Here Mr. Ives brought down his heliochromoscope, a small square box with an eyepiece, somewhat resembling a camera. After turning it towards the light, he slipped in front of it what appeared to be an ordinary photographic negative, with three pictures on it, arranged in trefoil. This however, he asserted, was not a negative, but a simple positive, taken on glass instead of paper. The images were not coloured, but merely differed from one another in regard to the arrangement of light and shade. On putting one's eye to the eyepiece, there appeared in full relief an absolutely perfect representation of a dish of fruit; glossy red apples, mottled yellow bananas, and a luscious bunch of green grapes, covered with a tempting bloom, that made one's mouth water more than all the efforts of Dutch *genre* painters could ever do. Several similar objects followed; then came photographs of coloured pictures of oil paintings of Swiss scenery in all the living colours of nature. "How is it," one exclaimed, in breathless amazement, "that the world knows nothing of this?"—"Perhaps because I am not quite ready to supply cameras to the world. I have only just succeeded in perfecting my own. However, they are very welcome to know all about the process, and how it is done. I have no secrets from them."

"Can you print your photographs in colours?"—"I can, but it is a difficult and expensive process. Besides, the results are not nearly so beautiful as I can get with a little relief, and I have preferred to devote the greater part of my attention to reproducing them in this way. The Washington Museum possesses a set of lantern slides in colours, which I gave them. These were made by printing on gelatine and cementing the three images in layers in a particular way; the colour was not touched by hand."

"Can any one take coloured photographs by your process, or does the apparatus need special adjustment?"—"None whatever. You take photographs in the ordinary manner, develop in the ordinary manner, and print in the ordinary manner, except that for purposes of heliochromy you print on to glass instead of paper. Here is my camera attachment. The light which comes from the object is split up automatically by an arrangement of transparent mirror, so that part goes to a circle covered by a red screen, part to one covered by a green screen, and part to another covered by a blue screen."

"But white light is made up of more than three colours, is it not?"—"With three colours you can reproduce perfectly the *sensation* of white."

Here Mr. Ives projected on to a sheet from a lantern a red disc; to this he added a green disc, and then a blue disc, and, lo! the effect was a white disc.

"My photographic screens," he said, "are based upon Maxwell's diagram of the curves of colour sensation. The most remarkable fact shown by this diagram is that the rays which represent a fundamental colour sensation are not the ones which most powerfully excite that sensation. The *red* sensation is excited by all the spectrum rays from red to green, but most powerfully by the orange. Thus, in order to get the effect of the red sensation on my negative, I must use not a simple red glass, but one which will admit (in definite proportions) the red, orange, yellow, and yellow-green spectrum rays. Similarly, to get the effect of the *green* sensation, I must admit on to my negative the joint action of the orange, yellow, yellow-green, and green-blue spectrum rays, but only in proportion to their power to excite that sensation. So with the *blue-violet* sensation. Allowance is, of course, made for the difference in sensitiveness of the eye and the photographic plate. No one has attempted to do this before, and that is where my work differs so widely from that of the French people, who have proceeded on these lines. They have simply been content to use the ordinary red, green, and blue-violet screens to produce the effect."

"In concentrating the three images back again into one image, do you use the same coloured screens?"—"No, that is rather strange. For this purpose the pure colours must be used, which represent the fundamental sensations."

"The heliochromoscope is arranged like the reverse of your camera, I suppose?"—"Practically it is. I use a pure-coloured screen to each image, and the three images are superimposed at one focus by means of an arrangement of mirrors. The three rays, so to speak, are interfered with by the lights and shades on the photographic plate, through which the light passes, and the composite effect of these interferences is to produce the original colours of the object photographed. You will see, if no plate intervenes, the rays passing through the three coloured screens of the heliochromoscope produce a white disc merely."

"Does your camera reproduce every colour and shade in nature?"—"Certainly. That is more than the Lippmann process can claim. Or less, perhaps I should say; for the Lippmann process is certain to photograph in colours, whether the object is coloured or not. My camera does not do that. Here is a photograph of an ordinary photograph pasted on to bands of bright colours; you see the photograph remains in brown monochrome while the bands are bright. One photographic worthy has described my process as 'looking at ordinary photographs through coloured glass.' I can't think why people should wish to detract from it. It is a perfectly honest scientific process, and I have not forced it on them. Since Captain Abney and other of the leading scientists have taken it up, however, this pettiness has ceased."

"Is colour photography your principal work?"—"No; it has been little more than one of my favourite hobbies. I am best known in

America as the inventor of the first successful system of half-tone block engraving."

"Why do you call your process of colour photography by such a long name?"—"Because, popularly speaking, it is not colour photography at all, and I do not wish to mislead. Colour photography, in the sense of reproducing directly the colours of nature in a camera, I believe to be an impossibility, and certainly no such picture has ever been produced. Besides Lippmann's results, I have seen hand-painted affairs masquerading as colour photographs, and in Paris I went to see some marvellous results which I had read about in three columns of fulsome print, and found they were nothing but lithochrome reproductions from collotype plates, touched up by hand. I would not go a yard aside to see a 'coloured photograph' now."

"When do you expect to be ready to supply heliochromoscopes and chromograms?"—"Can't say. I have promised my friend Mr. Swan the first. I have had a great many requests. A dealer in Oriental rugs in America when he saw my pictures offered me a hundred dollars for a heliochromoscope and a set of photographs of the rugs that he used to carry about with him to show their colours and patterns. There are many uses that could be found for the instrument, quite as many, at all events, as there ever could be for the phonograph, which does the same service for sound as this for sight, and does it far less perfectly."

HOW TO TAKE STEREOSCOPIC NEGATIVES.

Mr. F. Dunsterville says: My camera is a half-plate one of the usual pattern, with double swing back (vertical swing only is necessary), rising and falling front, bellows extending to thirteen inches. It has a centre partition of very thin leather, with folds one-quarter inch wide, kept flat by a bit of thin elastic. There are six double dark slides.

For lenses, I have a pair of Ross's portable symmetricals for interiors and architectural views in confined spaces, and a pair of Wray's six-inch rapid symmetrical lenses for general work and quick exposures.

On the rising front of the camera I have permanently fixed a Thornton & Pickard's stereoscopic shutter, with centres of holes three inches apart. The lens flanges are screwed on to the front of the shutter, and both pairs of lenses fit the same flanges. Focussing is done by pulling the cord and opening the shutter half way. Exposures from, say, a quarter of a second to sixty seconds, are easily given by using the "time" movement of the shutter; very quick exposures are given by the "instantaneous" arrangement; and those over one minute are given by putting the caps on the lenses, opening the shutter as for focussing, and then removing and replacing the lens caps as nearly together as you can manage it. I find absolutely no vibration whatever in either the "time" or "instantaneous" movements, freedom from which I have found in no other shutter (and they are many) that I have tried.

For plates, I use Wratten & Wainwright's "ordinary" and Thomas's "extra rapid, thickly coated," both $6\frac{1}{2} \times 4\frac{3}{4}$. For the usual *outdoor* photography of buildings and scenery there is, in my opinion, no plate in the market that comes within reach of Wratten's "ordinary." In the Christmas holidays of 1890 I exposed some six dozen of them, 12×10, travelling some 4000 miles, and there was not a spot or blemish on one of them. They are dearer certainly, but they are worth every pie of the cost.

When it comes to taking a stereoscopic negative, you will find that the focussing screen, after making allowances for the rabbet plus centre partition shows two spaces for pictures each $4\frac{1}{2} \times 3\frac{1}{16}$. Now, if you intend to confine yourself to making paper prints, you should mark out on the ground glass two spaces $2\frac{3}{8} \times 3$, inside which the pictures should be composed. For transparencies by reduction in the camera to the size of the masks usually sold (aperture $2\frac{3}{8}$ inches square), you should rule lines on the focussing screen with a space $3\frac{1}{16}$ inches between them; if you are going to use masks $3 \times 2\frac{3}{8}$, you can then rule lines $3\frac{1}{2}$ inches apart, and the spaces then enclosed, $3\frac{1}{2} \times 3\frac{1}{16}$ will reduce to $3 \times 2\frac{3}{8}$ exactly.

It will be noticed that the lenses are permanently fixed with their centres three inches apart. This is a good average distance for ninety-nine out of every hundred subjects one comes across in this country, and up to the present I have had no occasion to regret having fixed upon it. For taking stereoscopic portraits, the lenses should not be more than two and a half or two and five-eighths inches apart, and, if you wish to photograph very distant mountains, the distance between the lenses may be *increased* to the greatest extent possible in the camera.

With the shutter fixed as mine, it is, of course, impossible to vary the distance; but, for those who wish to have the power of alteration, I can recommend the use of a very ingenious front sold by Mr. Gotz, 19, Buckingham-street, Strand, the London agent for Suter's lenses.

Having decided upon the subject, and placed the camera at a suitable distance, ascertain whether the baseboard is perfectly level. To do this it is absolutely necessary to use a proper spirit-level, either let permanently into the baseboard or carried loose in your pocket. A very good one, made of brass, about four inches long by five-eighths of an inch diameter, packed in a nice little wooden case, can be got for about a shilling.

The next thing is to get the picture very accurately focussed, and I strongly recommend the use of a strong magnifying-glass for the purpose. In my opinion, *all* stereoscopic pictures should be of the very sharpest focus possible; no blurring, out-of-focus, or fuzzy-type views are good when looked at in a powerful stereoscope. Having settled this to your satisfaction, pull the cord of the shutter so that it is set for "time" exposures, put in the proper stops and cap the lenses; put the dark slide in the camera, draw the shutter, take off the lens caps, and squeeze the pneumatic ball for the length of time; let go, replace the caps, push in the shutter of the dark slide, take out of the camera, and put the slide back in its case. If you have no shutter, you must take the caps off and put them on again at as nearly as possible at the same moment, for it is, of course, necessary that the two halves of the plate should both have the same exposure.

The proper exposure is generally the rock upon which our novices get wrecked, and, to help them, I may say that my standard exposure for almost any building which contains a range of tones from the brightest white to the deepest black, and which takes up about two-thirds the length of the plate, using a lens with stop No. 128 (f-45), and Wratten's "ordinary" plate, bright sunshine, between 8 a.m. and 4 p.m., is *six* seconds. This may sound somewhat crude to the expert, but may be the means of saving many a plate to the novice. I should give the same exposure to a building like the Taj—a pure white tomb framed in dark foliage—or to a red-brick building surrounded by trees—the development, with all due deference to Messrs. Hurter & Driffield, gives one the power of producing excessive contrast or flatness, and also of avoiding those extremes.

To develop stereoscopic negatives, of course, you follow the same procedure as in ordinary negatives. I advise you to use the developers recommended by the manufacturers of the plates, only reducing the pyro to one or one and a quarter grains to the ounce of developer, and beginning with half the alkali, adding the rest as requisite. If you intend to devote yourself to the production of transparencies only, keep your negatives rather thinner than necessary for brilliant silver prints. When you have developed, fixed, and washed your negatives, dry them very carefully in a place free from dust (I have a sort of muslin mosquito curtain on a frame which surrounds the drying frame, and effectually keeps out all dust); and, if you varnish your negatives, filter the varnish as if you were going to use it for lantern slides.

Having produced the stereoscopic negatives, you are in a position to make therefrom the finished pictures to be viewed in the stereoscope; these can either be on paper or on glass. I strongly advise you to keep to transparencies on glass; but, as paper prints are very much cheaper, I give directions for turning them out with little trouble. Cut your sensitised paper into strips, say $6\frac{1}{2} \times 3\frac{1}{4}$. In placing the paper on the negative in the printing frame, see that the bottom edge of the paper (which may be cut straight) touches the same spot in each half of the negative, which spot should be in the nearest foreground of what will be the finished print. Print for the necessary time, and do not aim at getting a brilliant picture, or it will look very snowy in the stereoscope; the prints should be full of detail, with very few spots of white in the picture, and, compared with ordinary silver prints, look somewhat flat. Tone, fix, wash, and dry as usual, then flatten them by passing a wooden or ivory paper-knife with one straight sharp edge over the *backs* of the prints, and cut them out as follows.

Firstly, I may say, that, when mounted, the centres of the two pictures should not be more than two and three quarter inches apart, and therefore, allowing an interval of one-eighth of an inch, each half can be only two and five-eighths inches wide. This restriction, however, does not apply to the height of each picture, which may be of any convenient height possible on the mount, but should not, as a rule, exceed three inches.

My meaning is that, allowing an interval of one-eighth of an inch between the two pictures, the distance between their centres should not exceed two and three-quarter inches, and therefore each picture cannot be more than two and five-eighths of an inch wide; the height may, however, be the full height of the card (three and a quarter inches), but is better kept down to three inches as a maximum, allowing a margin of one-eighth of an inch top and bottom.

COPYING PHOTOGRAPHS BY ARTIFICIAL LIGHT.

[Manchester Amateur Photographic Society.]

The title is rather misleading, as I intend to give you a brief account of the way in which I copy not only photographs, but also maps, engravings, lithographs, woodcuts, and book prints.

Apparatus.—With regard to the apparatus, if you have occasion to take a great number of copies, it would be advisable to have special apparatus such as the copying apparatus sent out by Middlemiss, which I can recommend; but, if you only intend to make copies now and again, then the arrangements I intend to explain this evening will do equally well.

I shall not inflict upon you a long account of the many experiments I tried before I settled down to my present arrangements, but shall try to confine my remarks to why I have adopted the different parts I now use.

The apparatus consists of three parts, arranged on any flat surface that may be at hand, such as a table, bench, or long board. First, the camera, with its lens, dark slide, and stand; second, the holder on which the object to be copied is placed; and, third, the source of illumination.

Any rigid, light-tight camera will do, providing it has bellows long enough to allow of the extension required when copying same size, viz., twice the focal length of the lens used, or a longer extension if an enlarged copy is required. I say a rigid camera, for swing back, rising front, and complicated movements are not necessary for copying purposes, as I shall show presently. The size of the camera must be in accordance with the size of the copy you desire. In my case (as I required the copies to make into lantern slides for lecture purposes), I used a quarter-plate camera, but even for them a larger size can be used by using a carrier. I also use a single dark slide, because I find it handy, but a double slide may be employed for this purpose.

The lens should be rectilinear, if you desire accurate copies. I use a rapid rectilinear or a wide angle, but prefer the longer-focus lens wherever I can use it, and employ the largest stop that will give me the definition I require.

I mentioned, as the first part of the apparatus, a camera with its lens, dark slide, and *stand*. This stand is a case of the survival of the fittest, at least of the best of the ones I have tried. It consists of a board on which to place the camera, having a hole in the centre to allow the screw out of the ordinary triangle to be passed through, and the camera is thus fastened. The board is supported at each end upon a block of wood.

In copying, it is essential that the centre of the lens should be opposite the centre of the object being copied; therefore before we can say what height the wood blocks to support the camera should be, we must try to decide what will be the vertical distance from top of the table to centre of the largest object we think of copying when the object is placed vertically on the holder, and then place such blocks under the camera in order to raise the centre of the lens to the same distance from the table. I say the largest object we think of copying, because we can place a smaller object higher up on the holder, when we cannot place a larger sheet lower down.

Secondly, as to the holder or stand on which the object is placed. If we desire to have our copies anything like accurate, it is necessary to have the object to be copied and the plate on which it is being copied in parallel planes and with their centres opposite, and the lens placed on a straight line drawn from the centre of one to the centre of the other, and at right angles to both. Assuming our table top to be horizontal and our camera back vertical, we require to place our object vertical. To accomplish this, I use an ordinary box having its side at right angles to its base.

If the print, engraving, &c., is in a bound book, I simply place it with the page on which is the object to be copied against the side of the box, and allow the opposite page to lie horizontally on the table. The vertical page is fastened against the side of the box by passing one or more pieces of narrow tape over the page, then around the box, and tie up the ends. If the object is mounted on cardboard, fasten it with drawing pins to a small drawing board, which is placed against the side of the box. In the case of a thin, limp object, such as an unmounted photograph, place it on the drawing board (laid flat) and cover it with a sheet of plate glass before raising it vertically against the side of the box.

Thirdly, the source of illumination. After repeated trials I prefer gaslight to any other form of artificial illumination. If I was in the country where I could not get gas, I should use paraffin lamps. I prefer gas to daylight, because I get a more constant light and one which I can move about to adjust for equal illumination. I use two ordinary burners on stands connected with a gas bracket by indiarubber tubing, and get fairly equal illumination by placing one on each side of the lens, at about the same level as the lens.

Having described the apparatus I use, I will conclude with a few words as to the actual working.

I use ordinary slow plates, and employ the developer recommended by the maker of the plates; it is used normal strength without any modifications, altering the length of exposure by trial till I get satisfactory results. In the case of highly coloured lithographs, in which true colour values are to be secured, I have used isochromatic plates and a yellow screen with very good results, but for all ordinary work ordinary plates and the yellow light of the gas are quite sufficient.

In using the apparatus, I first fasten the object to the holder and then test with a try square to see if the holder is at right angles with the top of the table and the edge of the table. Then I place the gas jets one on each side of the object, at a distance equal to about twice the length of the object, and opposite the ends of the object.

In screwing the camera to the stand, see that the back of the camera is at right angles with the side of the stand and the top of the table; adjust your lens opposite the centre of the ground glass, then slide the stand up to the holder, and see that the centre of the object is opposite the lens. Draw back the camera and adjust the distance, focussing so as to get the copy the size you require.

In exposing, try to give the shortest exposure that will develop out, as a short exposure gives a vigorous negative, such as in a landscape we should term soot and whitewash, but that is just what we require in a copy. A long exposure tends to a negative with great detail, but this also brings up the grain of the paper on which our object is printed, a feature we wish to avoid.

F. W. Parrott.

THE LANTERN IN SCIENTIFIC STAGE EFFECTS.

Some new scientific stage effects were introduced into a recent performance of Wagner's *Die Walküre*, at the Grand Opera House, Paris. The scene where the sons of Wotan, mounted on steeds and brandishing their lances, are seen in the clouds, is described as very realistic. The foreground is wild and rocky, and the clouds are seen to scud across the sky. This effect is produced by projecting the image of a cloudy sky by an electric lantern on a curtain of translucent blue cloth. The continuous movement of the clouds for half an hour is produced by painting them on the edge of the disc of glass twelve inches in diameter, and rotating the edge past the lens of the lantern. Three lanterns are employed to blend the clouds. The wild cavalcade of Wotan's heroes is produced by a line of mechanical horses, full-sized, and carrying real performers. They are supported on a scaffolding, and drawn by means of a cable across the scene at a suitable elevation. The mounted men are strongly illuminated by the electric light, and thus rendered visible through the translucent curtain representing the heavens. The scene terminates by a conflagration, in which great flames run along the rocks, while thick fumes, reddened by Bengal fire, spread through the atmosphere. The flames are due to fulminating cotton placed in advance on the rocks, and lit by the machinists. Lycopodium powder is also blown through holes in the stage. Weird cloud effects are produced by steam.

Lantern Queries.

Silex.—No; two similar lantern slides will not do "for making stereoscopic transparencies." The subjects must be dissimilar, that is, taken from different points of view.

L. E. F.—Messrs. Newton & Co., Fleet-street, we believe, supply chlorate oxygen.

P. Wood.—You refer to a Salter's balance. Enquire of a firm of scale-makers, or of Messrs. Avery, Digbeth, Birmingham.

Doubtful.—No; most, if not all, the commercial lantern slides are made by the wet-collodion process.

Novice.—Yes; there will be a lantern-slide competition in connexion with the Exhibition of the Photographic Society of Great Britain, and at most of the other exhibitions, particulars of which are given week by week in The British Journal of Photography.

C. Paul.—Rectangular condensers are ordinary articles of commerce. You would have no difficulty in procuring one from a dealer.

Secretaries of Societies will oblige by sending us their Lantern Night Fixtures for the ensuing autumn and winter.

We have received the *Annuaire de la Photographie* for 1893, edited by M. Abel Bugnet (Paris: Société d'Editions Scientifiques, 4, Rue Antoine-Dubois). It is in the main a directory of French and foreign Photographic Societies, industries, journals, &c. The information as to English Photographic Societies is singularly meagre; it enumerates only about sixty, whereas there are about four times that number.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*September* 1, 1893.

THE LANTERN RECORD.

CONTENTS.

LANTERN NOTES AND NEWS.

The optical lantern is often used in the teaching of Pitman's shorthand, the characteristic outlines of which are more easily impressed upon pupils on a large scale than when drawn by hand on the board to a necessarily restricted size. By the employment of projected positives, made from carefully prepared originals, greater accuracy of outline is also obtained—no small advantage.

* * * * *

Judging by the experiences of last season, and deducing therefrom a forecast for that about to open, single lanterns are likely to have an enhanced degree of popularity in the near future. As we stated two months ago, several new forms, all aiming towards the acme of portability and simplicity, will shortly be introduced. The ease of manipulation of the single instrument, especially in comparatively inexperienced hands, is not the least feature in its favour.

* * * * *

A well-known authority on the optical lantern says: "It has been stated that lamps with four or five wicks give more illumination than those with two or three wicks, but this is not correct so far as lantern illumination is concerned. Of course four or five wicks will produce a *larger* flame, but in lantern illumination it is intensity, not volume, that is required; the intensity, too, must be in the right place, which is the optical centre and the focus of the condenser, and is limited to a small area, and any illumination out of this area is considerably worse than useless."

* * * * *

Mention of oil lanterns reminds us of the following story, illustrating the combination of ignorance and carelessness so often found in the beginner. A gentleman purchased an oil lantern of a celebrated lantern-maker, and in a day or two returned in a state of wrath at his inability to obtain a light with the lantern. He said that he had placed the lantern in position before the screen, inserted the carrier, applied a lighted match to the wick, and failed to obtain any light whatever. After much talk he was asked, in the last resort, whether he had filled the reservoir with oil? On discovering that oil was necessary in order to obtain illumination, he was both surprised and disgusted. He evidently fancied that the lantern carried a supply of gases, which gave light by means of a wick!

* * * * *

Messrs. Mawson & Swan, in their useful little pamphlet on *How to Make Transparencies, Lantern Slides, &c.*, have the following practical remarks on the qualities of lantern slides for different illuminants, which makers of slides would do well to bear in mind:—"The first requisite is perfect clearness of the lights and freedom from fog; a slight veil that would pass absolutely unnoticed in a negative would utterly mar an otherwise good lantern slide. Full detail and gradation must also be secured, without over-density or hardness; indeed, the deepest shadows of the picture should be penetrable by the light. With regard to the degree of density necessary, this will depend upon the kind of light to be employed in the lantern. oxyhydrogen requiring greater strength than oil, and also upon the size of the enlarged picture. A transparency, suitable for an oil lantern, would, upon the same-sized sheet, be rendered very weak and flat by the greater penetrating power of the limelight, but would improve as the enlargement became greater. Conversely a transparency, specially made for the limelight, might, on a ten-foot or twelve-foot disc, be too heavy for an oil lantern, though it would show well on a much smaller sheet. This it is well to know, as i enables the amateur to have private exhibitions at home, on a small scale, with slides that are, perhaps, specially made for public exhibition."

* * * * *

Daylight is a cheap illuminant whenever it can be obtained, which, during the lantern season, is not so frequent as it might be. For contact slides the Paget Company's print-out lantern plates should be popular, as they are manipulated in practically the same way as the now favourite gelatine papers. Mr. W. J. Belton, who has been demonstrating the Paget plates before numerous societies, informs us that the idea of a print-out lantern plate has been received with a marked degree of favour by slide-makers.

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Many a lantern slide of good quality suffers no slight deterioration, when cast on the screen, from some defect in the cover glass. Good quality glass should always be used for the purpose, and pieces with bubbles, prominent scratches, ineradicable dirt marks, and other faults, rejected. The glass should, of course, be carefully cleaned and polished before being bound up with the slide. Another point to note is to select glasses of uniform thickness, any great variation in this respect sometimes being responsible for the slide refusing to fit in the carrier.

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The exhibition season will soon be in full swing. At most of those to be held during the autumn and winter, lantern-slide competitions will be included. Particulars of the principal exhibitions are given week by week in The British Journal of Photography.

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In the popular serpentine dances, wherein comely young ladies twirl voluminous folds of diaphanous drapery into elegant shapes under variously coloured limelights, little, if any, credit has been publicly given to the individual quite as much entitled to it as the dancer—we allude to the limelight man. Recently, however, due recognition was made of his services, the lady taking a call in company with the limelight man. This is as it should be.

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A *New York Herald* telegram reports that four members of the Lyceum Company—Mr. G. Biggs, gas superintendent, Mr. James Alexander, Mr. G. Powell, and Mr. William Templeton, calcium-lightmen—who arrived on Saturday at New York, have been detained

at Ellis Island on the ground that they are labourers, and come under the contract law. The men admit they came to America under contract, but at the same time claim that they are artists, and are indignant at the treatment to which they are subjected.

SOME POSSIBLE CAUSES OF LANTERN EXPLOSIONS.

In the recently published proceedings of the Photographic Club for 1892 will be found a discussion on the gas explosion in the club-room last November. The observations of the expert lanternists who took part in the discussion are full of matter of practical interest to users of compressed gases, and we therefore make no apology for reproducing in brief the essence of what was then said. The information, we hasten to say, should be regarded as of assistance in a preventive character, rather than as affording the slightest necessity for alarm.

It will be remembered, from a paper on the subject which was read by the Hon. Secretary of the Club shortly after the occurrence, that that gentleman, in turning on the gas from a twenty-foot cylinder of oxygen, was disagreeably surprised by an explosion, attended by flame, while the gauge attached to the cylinder burst, and parts of the regulator were blown off. We had an opportunity of inspecting the fragments, among which was a gauge dial that had lodged in the ceiling of the club-room, while at the time of the explosion we were present and heard the report, which was a loud one, and caused no little commotion among others who were also present.

The Photographic Club, at one of its meetings, discussed the subject, and several explanations of the occurrence were given. Mr. A. M. Levy directed attention to one or two points. There was a rupture in the pipe of the gauge, the cause of which had to be explained, and there were also fragments which had apparently been ignited. In the neck of the bottle was a screw pin, which had been melted off. The heat in the valve must have been at least 1800° Centigrade. There was a connexion between the regulator and the bottle, lined with copper tube, which appeared to have been in a semi-fluid state. In the regulator the heat appeared to have been small, as the bellows were not damaged except by rupture. The brass tube which contained the whole thing showed signs of heat on one side, the lacquer being burned and the solder removed where the flame went up. Mr. Murray (of Brin's Oxygen Company) had said that his Company used water as a lubricant in compression. Oxygen by itself was incapable of explosion, but, in the presence of a small quantity of an organic body, such as grease or oil, it was explosive. Egress of gas took place at a very great speed, and sufficiently so to heat the sides of the tube. Oil would set fire to metal, especially to the more easily ignited metals such as copper. For the last three years the makers had used water, not oil, as a lubricant, but some greasy matter was probably there, and the leather was saturated with it. With gas in the bottle at a very high pressure, one could imagine the effect of a considerable amount of heat. No wonder the gauge gave way.

Mr. K. S. Murray agreed with Mr. Levy that a small trace of oil would be sufficient to cause the explosion. Such accidents invariably occurred when gauges were used. With regulators there was not the euddden impact of air when the oxygen was turned direct into the pipes leading to the burner. To obviate these accidents, he (Mr. Murray) suggested doing away with gauges. Oil undoubtedly did get in gauges, and consequently danger arose, but how the oil got in it was impossible to say. When gauges were tested with water, there was practical immunity from danger. As regards the valves, for which his company were responsible, no oil was used, only water. He recommended beeswax as a safe lubricant. It was absolutely impossible that there was more gas in the bottle than there should have been.

In reference to the latter point, Mr. G. R. Baker mentioned having just previously tested a bottle, the gauge in which registered 125 atmospheres, when the glass went, and the gauge then registered 150.

Mr. T. E. Freshwater was opposed to gauges. He would not advise anybody to use them, but would recommend trusting to the people who supplied the oxygen. Gauges were dangerous to use, and were not at all necessary. If one wanted to know how much gas was left, it was easy to weigh the bottle. If the caps of the regulator were bored with holes in them, there would not be the chance, when anything went, of an explosion, as the gas would escape.

Mr. R. R. Beard said that he supplied the fittings in question, and therefore knew something about them. With regard to the gauge, it must have been tested with oil. He had only heard of one accident occurring where there was no gauge used. With a regulator on the cylinder there was perfect safety.

As the lantern season is approaching, the experiences of the above able lanternists as to the danger of oil in proximity to compressed gas in cylinders, as well as the *pros* and *cons* involved in the use of gauges, may be of service to many less familiar with lantern manipulations. And with this idea we feel that we may be pardoned for having drawn upon the interesting proceedings of the Photographic Club for the above abstract of those gentlemen's views.

A COMBINATION LANTERN FOR THE DARK ROOM.

Ten or a dozen years ago, when many amateurs made their own plates, lanterns of the "combination" type I am about to describe were far more frequently met with than at present, since they served a variety of purposes for which they are not now required, illumination, in conjunction with compactness and portability, being chiefly sought after. But though the necessity no longer exists for warming emulsion and plates before coating, or creating a warm current of air in the drying box, there are still circumstances, especially in connexion with the making of lantern slides, in which a combination of lantern and stove will be found useful in the dark room, and in winter-time such an arrangement is particularly valuable in keeping the dark room and its contents at an equable temperature.

There are several lanterns on the market that, either intentionally or by accident, fulfil the dual conditions, but they are mostly of the more expensive and elaborate description, while the modern tendency is in the direction of simplicity and economy. The apparatus I am about to explain partakes, to the fullest extent, of these qualities, is as efficient as the most expensive and elaborate, and has the further advantage that it may be constructed for a shilling or so by any one with the most elementary acquaintance with the use of tools.

The only principle involved is the utilisation of the top of the lantern as a hot plate, and in its simplest form I used it for many years for the rapid drying of collodion plates and for heating negatives previous to varnishing. It consisted of a tall, rectangular box, something like a curtailed "grandfather's" clock case, in the front of which a sheet of non-actinic glass slid in rather deep grooves, so as to prevent egress of white light. The top was open, but at each corner a nail or screw projected about half an inch or more above the general level, and on these rested a sheet of stout tin plate, bent into the form of an inverted dish, and fitting loosely over the outside of the box, the sides being deep enough to hang about an inch below the top of the woodwork, so as to permit the heated air to escape, but not any light. This was effective enough for its particular purpose, and its only fault was that, unless made considerably higher than was otherwise necessary, the heated air in the upper portion was liable to crack the glass.

For drying collodion lantern plates after coating, for heating the slides before varnishing, as well as warming the room, a much better arrangement can be constructed at no more cost. In most households there will be found to accumulate, with unpleasant rapidity, a variety of canisters of one sort and another that have contained mustard, cocoa, canned fruits, and the like, and these come in very conveniently for this and similar purposes. With two such empty tins, properly selected as to size, a most perfect "light trap" may be constructed, which, at the same time, forms a useful and efficient warming apparatus for the purposes named.

The body of the lantern may be of any form. I shall have a few words to say about that presently, but just now I shall deal only with the top or roof, which in this instance must be closed in with wood, instead of being left open, as before described. Select two canisters, one of the short and "squat" form, the other tall and narrow; or a can of the requisite diameter may be cut down in

length to suit the dimensions of the narrower one. In the wooden top of the lantern case cut a circular aperture a little smaller than the diameter of the smaller canister, and carefully finish it off with a half-round rasp or file or with coarse glass paper, until the tin will slide tightly into it. It is not absolutely necessary that it should fit perfectly light-tight, though it is better so.

Round the circumference of the tin, at a distance of about half an inch from the bottom, punch a series of holes, to allow the heated air to escape from the lantern, and then push it into the circular aperture, open end first, until one half projects on each side of the woodwork. The portion projecting inside acts as a chimney, and prevents the heated air accumulating in the upper portion of the wooden box, which would otherwise be charred. Now take the second and wider canister, and punch a similar series of holes round its circumference, but at the lid end and just clear of the lid itself, and cut an aperture in the latter to fit loosely over the other canister. When the second one is placed in position over the first, a perfect system of ventilation is provided, without the least escape of light.

The above is the simplest and easiest mode of construction, but a more elegant one is to make the light trap complete in itself by fixing the two canisters together instead of having them disconnected. In one arrangement I have I was fortunate enough in finding a couple of canisters that just suited one another, the outer one being one of the patent "air-tight" cans, with flanged top, in which "Lyle's golden syrup" is put up, and the other an "Embden groat" tin, the latter fitting nicely into the flange of the former. But where matters do not happen so fortunately, it is easy to run a little solder round the junction of the two canisters, or to get a tinman to do it for a penny or twopence, and the thing is perfect. In any case the lid of the larger tin should be removable in order that the inside may be accessible in case of its getting choked with soot. The outer dimensions of this "trap" are three and three-quarter inches diameter by four inches high, rather too small for a lantern slide, but capable of sending out a good deal of heat. A three-pound tomato can is just the size required, namely, four and three-quarter inches in diameter.

The dimensions of the case will, of course, depend upon the lamp or light employed, but should be so arranged that the portion of the canister projecting inwards comes sufficiently near the flame (or chimney, if such be used) to lead off the heated air. A small paraffin lamp is advantageous, on account of its chimney, which, however, must not reach into the canister or it will soon crack; and, if sufficient ventilation be provided, *i.e.*, if the apertures made for the egress of the hot air are sufficiently large or numerous to let it escape quickly, the inside of the lantern will keep perfectly cool, and there will not be the least danger from the paraffin heating. That is more than I can say for some of the best (or more expensive) commercial lanterns.

I have spoken of the casing as being of wood on three sides, but all four sides may be glazed if so desired. I have one in which four uprights of one inch square wood are fixed on to base, consisting of two pieces of wood, separated by about half an inch, to form a ventilating trap, the top being formed of a single piece. Grooves are provided in two sides of each of the uprights to receive the glass, one square of which is made removable in order to get to the inside. This forms a lantern suitable for the centre of a room, and a simple wire handle permits it to be hung up if desired, when it shows its light in all directions. If for hanging on a wall, one side may be solid.

There may be amongst the readers of THE LANTERN RECORD those who are not sufficiently *au fait* in wood-working to put together a simple box; if so, let them procure a sheet of stout millboard, and make a framework of that, making the joints by glueing strips of paper over them. The tin canisters can be attached in precisely the same manner as in the wooden box, and the bottom may be made detachable, in order to get at the lamp inside.

Such a lantern has proved most useful to me in making, drying, exposing, and varnishing collodion emulsion slides, and, if left burning with an ordinary benzoline lamp in the dark room in winter, it will keep the temperature several degrees above freezing point, and prevent a great deal of trouble and annoyance, at a cost of not more than a penny for twenty-four hours. W. B. BOLTON.

LANTERN MEMS.

To say that the optical lantern is a popular instrument is only to repeat a truism, but to realise how much it has developed in the last twenty years one has only to refer back to the photographic almanacs and year-books and the various trade catalogues.

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I HAVE before me as I write THE BRITISH JOURNAL PHOTOGRAPHIC ALMANACS from 1885 to 1893, and the improvements in pattern of those illustrated in the advertisements is very marked, while the augmentation of the number of makers and sellers of magic lanterns and dissolving-view apparatus speaks much for the popularity of the instrument and its great uses for scientific and commercial purposes.

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IT is to be hoped that each and all who have embarked in this branch of the optician's business find it answer, but personally I cannot help thinking it is a little overdone, for, although a certain amount of change is rendered necessary by advanced ideas and modern requirements, the life of the ordinary type of optical lantern continues fairly long, and, not being like articles that wear out, is, with a few exceptions, purchased to do duty for many years.

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THE few exceptions are, fortunately, the optician's friends, and encourage him to make the improvements, so that, should his new design of apparatus not be a commissioned order, there will be a reasonable chance of disposing of the apparatus when completed. If it were only like the cycling mania—a new machine every year, or every second year, at least—one would have no anxiety about the great increase in the army of lantern-suppliers.

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IF an apparatus is not to be soon changed for another, and is to do good service while in the hands of the purchaser, care should be taken that attention has been given in fitting up as well as in construction to those points of detail that make a lantern practical and convenient.

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NEW departures are constantly being made in the lighting arrangements of lanterns, and, the limelight being always a convenient source of illumination, a great deal of ingenuity has been displayed at various times in the construction of jets, notably for the adjustment and fixing of the jet in position from the outside of the lantern, and regulation of the gases by means of screw-down valves and cut-offs.

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THERE is shortly to be placed on the market a jet that not only fulfils the lanternist's requirements in this way, but studies the audience as well, for it will effectually prevent the light streaming out of the back of lantern. This jet, which will be named the "Anti-glare" mechanical adjusting jet, is the subject of a patent, and will be ready during September. Mr. Barton is the inventor.

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LANTERNISTS will find some excellent information in the "Light" portion of *Sound, Light, and Heat*, by William Lees, M.A., in Collins's "Advanced Science Series," and many of the phenomena clearly explained there are capable of being demonstrated by means of the optical lantern. I came across a copy of this work quite accidentally, and was quite interested and pleased with it.

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ALTHOUGH the magic lantern is dismissed in one paragraph, and dissolving views and the solar microscope have each the same small space devoted to them, there is an excellent chapter on the Interference of Light and Diffraction, and two chapters on Polarisation of Light, so clearly expressed that students should find these generally little understood subjects much more easy to grasp.

As a question has been raised as to the invention of dissolving views, and the date they were first used, the following may be of interest. It is copied from "Optics," in *Chambers's Information for the People*, the preface to which is dated November 1, 1848, and, after describing the magic lantern, adds: "Lately the mode of representing scenes has been further improved by using two lanterns placed at equal distances. In this case, while the view in one is being withdrawn, the view in another is coming on, and the eye is charmed with seeing, for example, a scene in winter dissolve and assume the appearance of a similar scene in summer."

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From the writer saying "lately," one would think that in 1848 it was considered a novelty, and this date would agree with the generally accredited date of the invention of Mr. Childe's in 1846, although earlier phantasmagoria effects were undoubtedly produced not only by Childe but also by Phillipstall. From the particulars published Childe, it seems had the assistance of his pupil and partner, Mr. Hill, in producing the effect of dissolving.

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There is no doubt that dissolving is a very agreeable effect if not over-indulged in, and, as in modern biunial and triple lanterns the operator has the alternative of rolling up one view and revealing the next, or can show photographic or other transparencies panoramically, there is no reason for letting the entertainment get monotonous by continuously showing slides either way. G. R. Baker.

PRINT-OUT LANTERN SLIDES.

The practice of making lantern slides from negatives has become so popular since the advent of the commercial lantern plate, that it may need some little excuse for drawing attention to other and perhaps more charming methods of producing them. At the same time, also, the habit of using the ready-made article has become so ingrained into both amateur and professional, that one is almost afraid to put forward a process which involves the trouble of the preparation of the sensitive material for oneself. For such as will take this effort, however, there are several methods of making lantern slides by printing-out methods which have much to commend them. In addition to a very fine grain, which may be better described as an absence of texture—a point of the very first importance in a good slide—there is the additional advantage of the possibility of a considerable range of colour—warm red, purple, and blackish-blue, to warm blacks. As these variations in colour are produced by means of the ordinary gold toning baths—borax, acetate, or carbonate—and are therefore under a reasonable amount of control, the process is free from the disagreeable uncertainties which nearly always attend an effort to secure variations in colour of deposit by restrained development and a corresponding increase in the exposure.

On the other hand must be placed a disadvantage on the score of sensitiveness, or rather, I should say, on the score of lack of sensitiveness, for, as far as my experience goes at the moment, I have been quite unable to secure sufficient sensitiveness to light to make print-out plates workable in the camera, even when only a faint original image is looked for, and subsequent development with gallic acid relied upon.

But, as far as this is concerned, I do not know that any very great disadvantage occurs, for I think it is pretty certain that the majority of lantern slides are made by contact. Professed slide-makers use the camera method almost entirely, but, by the rest, the bulk of the work is done by contact, and it is a small point whether the routine be to print right out, or, on the other hand, to give, as with the commercial bromide lantern plate, a brief exposure, and subsequently develop.

As a matter of fact, there are certain advantages in a printing out over a pure development process which cannot rightly be overlooked. In printing-out processes, the exact progress of the image can be closely watched, local exposure or retardation may be effected, and the precise result aimed at—subject only to an allowance for decrease of density in the fixing bath—can be secured. Combination printing, whether it be the addition of figures to a landscape, or simply the addition of a sky, can be effected with greater ease and more certainty; whilst, when it comes to such *tours de force* as adding the reflected image of the sky to a sheet of water, so as the more truly to simulate the effects of nature, it is infinitely more easy—I might almost say more possible—to do this by a printing-out method where the effects can be judged, because they can be seen and valued by the eye, than to be obliged to guess or estimate both the position and the exposure required, as obtains in a pure development process.

It may also be a moot point whether the warmer tones obtained by very restrained development do not alter in character with time or the action of light. At least, I have heard the statement made that such may be the case.

With this apology for the process made, I propose to give a brief description of a simple method of making sensitive lantern plates to print out, and I shall add to it an easy method of making a registering frame for holding the slide whilst printing, so that an examination of the progress can be readily effected from time to time. And I shall close the article by a few well-tried methods of toning the images, so as to secure pleasing and well-coloured slides free from the double colours not infrequently met with ingelatino-chloro-citrate papers.

To begin with, a room which can be set apart—it may be only temporarily—for the purpose of coating and drying the plates is necessary. I do not advise, or at any rate insist upon as necessary, a drying box, although such a piece of apparatus is useful though cumbersome. Any of my readers who desire to go in for such an *article de luxe* will find plenty of drawings and detailed descriptions in past issues of The British Journal Photographic Almanac. As, however, our plates will not be more sensitive to light than a reasonable blocking out of the windows with yellow paper will suffice for, I shall recommend the use of an ordinary room, protected by having the blinds well and carefully drawn. Then, supposing our plates to have been prepared over night, they will be dry enough, and ready for storing away in the morning.

The next necessary piece of apparatus is a square glass, or slate, of the dimensions of, say, twenty by sixteen inches. This must be carefully levelled up upon a table, so that, when the glass plates are coated with emulsion and placed upon it, they (the plates) will set with the gelatine emulsion quite evenly distributed over them. The best and simplest way to effect this levelling is to make three little wedges of wood, measuring, say, three inches long by one inch wide and one inch high, but tapering down to one end. These wedges are to be placed, two of them under one long side of the large square of glass, one at each end, and the remaining one under the opposite long side of the glass square, but in the middle. To adjust the square slab, first level it is necessary to use a carpenter's spirit level for the purpose—the glass plate between the two wedges which are on one side, and then, with the spirit level placed at right angles to its first position, adjust the third wedge until the air-bell of the level shows that in that direction also the plate is flat. I need hardly say that it is not absolutely necessary to have a setting slab so large as twenty by sixteen inches. An old twelve by ten negative, or waste plate, or even a ten by eight, will answer the purpose. The only advantage of a larger plate is that, if the weather or temperature of the room be warm, say, over sixty degrees Fahr., the work will proceed more slowly with a small setting slab.

Two or three jugs, a graduated measure, a chemical thermometer, and a pair of scales capable of accurately weighing to half a grain, will enable us to make a start with the emulsion-making.

Of course, with an emulsion of this kind a very considerable amount of light may be used without disadvantage of any kind. Probably, as I may surmise the making of the plates to be an evening occupation, the use of gas or other artificial light (except electric arc lamp) will be most convenient, but if daylight be used it must be filtered through a yellow paper, and, in fact, be of the same character as would be suitable for changing sensitised prints in.

Before commencing to prepare our emulsion, it will be advisable to clean the glass plates, and have them all quite ready for coating. This may seem a small matter, but, in point of fact, it is not. The cleaned glass may well wait for the emulsion, but it is quite inexpedient that the emulsion should have to wait for the glass to be prepared. The best way to clean the glass is to place it upon a flat piece of board, and to rub it with the following compound:—common whiting, water to moisten, methylated spirit, liquor ammonia.

The whiting must be made into a thick paste with clean cold water, to which is added sufficient liquor ammonia (or carbonate ammonia) to make it smell fairly strongly. A little methylated spirit is added to make the cleaning paste dry more readily upon the glass. In cold weather more spirit will be useful, in warm weather less. The function of the liquor ammonia is to counteract the grease which is always found in considerable quantities upon new glass. If old lantern-slide glasses are to be used, they must be cleaned up quite free from gelatine, in some hydrochloric acid and water, sufficient acid being used to cause the last traces of adhering gelatine to be thoroughly removed. If new glass be used, it may as well be purchased in pieces either $6\frac{1}{2} \times 3\frac{1}{4}$, or six and a half inches square, unless, indeed, the use

of a glazier's diamond for cutting the plates afterwards be a bogey sufficiently formidable to counsel the use of pieces the actual size required. What I really mean in this connexion is that it is little, if any more difficult to acquire skill in the coating of plates with gelatine emulsion of a size of six and a half inches square, than it is to coat the smaller dimensions of $3\frac{1}{4} \times 3\frac{1}{4}$. A steady hand, and a regular flow of the liquid emulsion—always in one direction—and the thing is done. But of that more anon.

Having then rubbed off all the grease and dirt from our plates with the whiting compound, they must be thoroughly rinsed under a stream of running water to get rid of the whiting. If the water flows and drains easily from the plate, it is a sign that it is clean and free from grease, and fit for coating with emulsion. If the plates are greasy, it will be found more difficult to make the emulsion flow over the plate.

The plates must now be set up to drain and dry. When dry, they may be dusted with a broad camel's-hair brush, and packed away in clean white paper wrappings. S. Hennent Fry.

(To be continued.)

THE CAPABILITIES OF PHOTOGRAPHY NOT UNLIMITED FOR ILLUSTRATING ALL CLASSES OF OBJECTS.

The comparatively recent departure from old methods in various fields of scientific research (says M. O. G. Mason in *Science*) has called into action agencies for solving problems of initial progress and results not known or utilised by earlier workers. Discoveries within the last few years have so advanced the lines of study, and an active scientific press has scattered so broadcast the knowledge of progress made that, although the field is boundless, he who reads has little excuse for reworking ground from which all reachable fruit has been gathered. In eagerness for the new, a desire to find some hidden shorter paths into the mysteries of nature, do we not often fail to recognise obstacles, or to sufficiently consider the best means for their removal? With pen and pencil our predecessors sought to leave a record of their work. What they thought and what they saw have been handed down to us through the best means at their command. For the physician, the botanist, mineralogist, and the geographer, the artist sketched, elaborated, and finished illustrations having a more or less amount of truth, often obscured by some personality, which rendered them valueless or even misleading. In no class of objects have such defects been more conspicuous than that requiring the use of the microscope. Therefore, he who had used with dissatisfaction the hands of the draughtsman was eager to utilise the means offered by photography. He had seen the results obtained in other fields, and, without knowing the difficulties in the way, believed it easy to obtain all desired brilliancy, detail, and amplification. It may be asked, Why have not these expectations been more fully realised? When we pause to consider that colour is a most important feature in photographic work, and that a majority of objects studied under the microscope reflect or transmit the least actinic rays of light, red, orange, green, and yellow, we may well understand why we do not secure brilliancy. Again, when the microscopist studies his subject for detail, he mentally eliminates all those parts which do not belong to the special point under observation. A crystal, cell, or fibre which over or underlies his object, or forms a full or partial background in the field of the objective, is left out in the mental summing up of his study. The laws of chemistry and optics do not permit such selection and elimination from the photographic image. A slight tremor conveyed to the microscope by a passing vehicle in the street, a step about the room or house, may be annoying to the observer, but does not prevent securing results by longer application. But when we consider the necessity of absolute immobility of the instrument, often for a considerable length of time, in order to impress upon even the most sensitive plate the image of many-coloured objects, we can well understand one of the greatest causes of failure to secure detail; and this obstacle of motion becomes far greater as the amplification increases. It is plain that motion is multiplied equally with the diameter of the object; or, in other words, if we magnify an object one thousand diameters, a motion of that object to the extent of one-thousandth of an inch becomes in the amplified image a motion of one inch, which very readily shows why good results cannot be obtained under such conditions.

When observing with the microscope, it is possible and quite feasible to focus the instrument above and below the general plane of the object, in order to study any projecting points which may be within or without the general plane. This feature is not possible with the photographic process, save in so far as diaphragming the lens and modifying the light may effect the result. *Over*-estimation of the possibilities of photography and *under*-estimation of the careful preparation of objects have occasioned much unnecessary labour and great disappointment by failure to produce results which should be sought through different channels. When the investigator contemplates the employment of photography for illustrating his work, let him consult his photographer before preparing his objects. No one human being has yet encompassed *all* that is known. When the anatomist takes to his photographer a *thick* section of muscular or ossified tissue, and asks to have the individual striæ and cells isolated and delineated with distinct outlines and minute detail, he will fail to realise his expectation. When the mineralogist or geologist prepares his sections of crystallisation or deposits, he must not calculate that *all* his various planes will be perfectly shown in one photograph, even if the specimen *be* translucent. Colour, mass, and position are important factors in all photographic work. With orthochromatic plates many objects heretofore impossible of proper illustration may be quite successfully treated; but, with objects of this class, another factor, that of time of exposure, offers a barrier of limitation. The mobility of life, animal and vegetable, is a most important element, which cannot be ignored in exposures of hours, or even minutes, and seconds. A vegetable fibre, when placed in concentrated light, may make one or more entire revolutions during the time of exposure necessary to properly impress its image upon an orthochromatic plate; and especially is this the case when a high-power objective is used. Thin sections devoid of the less actinic colours, red, orange, yellow, and green in their darker tints, or admixtures, may be easily treated. Circulating fluids or objects changing size or position are susceptible of instantaneous exposures only. When such objectionable features as motion and non-actinic colour are present, the problem becomes far more complicated, and, if the photographer fails in its clear and complete solution, his patron sometimes looks upon such failure as a proof of incompetency or a lack of proper effort. Like her sister handmaids in the advance and illustration of scientific thought, photography stands ready to do her proper work. She has done much, and, it is believed, will do more, to enlarge the field of human knowledge and gather the harvest; but we should not ask her to accomplish the impossible.

ON THE USE OF ISOCHROMATIC PLATES IN PHOTO-MICROGRAPHY.

[Journal of the Quekett Microscopical Club.]

Some months ago a letter appeared in the *English Mechanic* from Mr. Lewis Wright, lamenting the smallness of the available supply of fluorite for the production of apochromatic objectives for the microscope, and further mentioning the difficulty of getting it, as a formidable obstacle to future optical improvement.

With regard to the truth of the charges made in that letter as to the firm of Zeiss having obtained nearly all the fluorite procurable I have nothing to do; but, having been engaged for some time past in experimenting with ordinary achromatic lenses as applied to photography, the conclusion I came to was that, given certain conditions, the total failure of fluorite might not be so disastrous as it seemed.

My reasons for arriving at this conclusion were that, when using lenses in which the visual and actinic foci were widely divergent when used on ordinary plates, the image came out in sharp focus when isochromatic plates were substituted, thus raising the possessor of an ordinary achromatic objective to the level, photographically, of the owner of the more expensive apochromatic.

Considering the number of microscopists who now register their results by photographing them, I thought this discovery of mine was so simple a one that I hesitated to announce it as something new, but further inquiries convinced me that it was not so known, and I believe the fact is placed in writing here for the first time.

Of course, I am aware that the advantage of using isochromatic plates has been several times mentioned lately, but, being always mixed up with the use of a coloured screen or other light-filter in conjunction with it, the impression conveyed is that the sharpness of the resultant image depended upon such screen or light-filter. To take one single instance. At the last meeting of this Club, Mr. Lees Curties exhibited a bottle to hold solutions for giving approximately monochromatic light—such as, for instance, copper chromic solution—and in the discussion which followed Mr. Houghton Gill said that, with this solution and isochromatic plates, he had obtained as good, or almost as good, results with a cheap achromatic as he had been able to do with an apochromatic objective, used without the absorption fluid.

Now, I cannot help feeling that there is some confusion here between cause and effect, and it is to the isochromatic plates, and not

to the solution, that is due the fact that the image in the negative came out in the same plane as the one placed on the screen, even when ordinary achromatic lenses were used. I agree with all that Mr. Gill stated with regard to the results obtainable with ordinary lenses, but the evidence of the effect of the solution to me is not conclusive, unless it can be also shown that the results were different when the isochromatic plates were used only without any ray-filter. I do not wish for a moment to deny that any monochromatic light will make a great difference in focus when ordinary photographic plates are used, but it is isochromatic plates we are here dealing with, and I wish to prove that, when these are used, no light-filter whatever is required to produce sharpness of focus; and for this purpose I beg to exhibit prints and negatives taken first on isochromatic and then on ordinary plates, to show the difference of result. The lenses used were all by one maker—Swift & Son—and I believe that the Jena glass is used, but no fluor spar; but I do not wish to imply from this that other makers' objectives will not give the same results.

Prints Nos. 1 and 1*a* show the proboscis of blowfly, taken with an inch objective at 300 diameters, first on an isochromatic plate, and then on an Ilford ordinary, and you will see that while the first is sharp in focus, the second is all fluff. I may say in justice to this lens that there is but little divergence of focus when used photographically up to fifty diameters on any sort of plate, but that does not vitiate my argument that whatever difference may exist is corrected by the use of an isochromatic plate only. It is not for me to say how this is brought about, but content myself with announcing it as a fact, and leave it to those with more special knowledge to explain why.

Prints Nos. 2 and 2*a* show the Podura scale, taken at about 1100 diameters, with a one-sixth inch, and shows the same difference of result when taken on the two sorts of plates.

Nos. 3 and 3*a* are prints of *Coscinodiscus asteromphalus*, taken at 1750 diameters with a cheap one-twelfth inch oil immersion, and here the difference in focus is simply that between a positive and a negative image of the same diatom when taken first on an isochromatic, and secondly on an ordinary plate, the former being the image produced on the screen of the camera.

All these were taken without any screen whatever, but I have other prints here, taken of histological subjects with the same lenses in which the yellow screen has been used, not, however, to produce a sharper focus, but to render certain colours in the objects more or less actinic. Here a screen certainly is necessary, but, as I have often found when leaving it out accidentally, it makes no difference in the focus whatever.

I can quite bear out Mr. Gill's experience that, on suitable subjects, almost, if not quite, as good results can be obtained with ordinary objectives as with the more expensive apochromatics, and I may add to this that I have found it a great convenience to be able to include more of the object by not using the eyepiece; but this, with me, only applies to the lower powers, as I find that, when using a wide-angled one-sixth inch or one-twelfth inch this way, the curvature of the field more than neutralises the increased image taken in.

In conclusion, I may say that I bring this subject before you in no controversial spirit, but only to elicit the truth, whatever it may be.

T. F. Smith, F.R.M.S.

ENLARGING BY DAYLIGHT.

Enlarging is one of the most fascinating and interesting branches of photography, says Mr. H. C. R. Harley in the *Journal of the Photographic Society of India*. It is, moreover, by no means difficult work. This does not, however, mean that from every negative one possesses a good enlargement can be made; but many negatives which are thin, from perhaps over-exposure or other causes, yet sharp and full of detail, will give excellent enlargements on bromide paper, although they may be of no use for printing on albumenised paper.

The introduction of bromide paper for enlarging has, within the last few years, opened up a comparatively new field of enterprise for the amateur photographer; this is due in a great measure to the simplicity of the process, and the permanent character of the results obtained by it.

Of the two methods of enlarging—viz., by daylight and by artificial light—the former only is here treated of, as being easily worked and presenting but few difficulties, and the process here given is the one which has been successfully followed by the compiler of this article, who gained his knowledge by consulting several periodicals, annuals, and works on photography. The principle upon which enlargements are made is briefly as follows:—

Rays of light are transmitted through a negative, an image of which is projected for a certain length of time on a sheet of sensitised paper by means of a lens placed in the path of the rays and then developed, fixed, washed, &c.

The first essential in making an enlargement is to secure a room to work in, which, if possible, should face the north, and have a window or opening on that side; the next thing is a table, which should be about eight feet in length, and a little wider than the largest picture which may be required. This table should be of such a height that the centre of the negative, when placed in position in the window, and the axis of the lens of the camera on the table, are in line. The table should have at its end furthest from the window an easel attached, to which is fixed the sensitive paper on which the enlargement is to be made.

The table used by me is in two pieces, and the focussing is first performed by sliding in, or pulling out, the front part of the table, and finally by the milled headed screw of the lens. But should the table be in one piece, it should have at its end furthest from the window, and for a length of two feet or so, a slot cut in its middle, to enable the easel to traverse backwards or forwards; to the easel a clamping screw should be attached, so that when the required adjustment has been made, it may be clamped tight and kept in that position; as a further precaution, two strips of wood should be fixed at either side of the table, which will prevent any movement of the easel.

The focussing should be first done on a sheet of white paper fixed to the easel, a sheet of bromide paper being afterwards substituted for it. As the negative to be enlarged should be well and equally lighted, it is necessary to have for this purpose a reflector on the outside large enough to illuminate the negative thoroughly, and which can be of white cardboard or a mirror glass fixed at an angle of 45°, and controlled from the inside by a string. As no light but that which passes through the negative should enter the dark room, it is necessary to close the whole of the window effectually, except a portion which should contain a frame. This frame should have on the outer side a groove for a ground glass 12 × 10 inches in size, and on the inner side, leaving a space of 4 or 5 inches from the ground glass, an arrangement for carriers to fit from the largest to the smallest size negatives to be used.

The negative to be enlarged should be well defined, and full of detail, with sharp definition, and with a slight tendency to thinness; fix this in the carrier in the window with the film side towards the lens and upside down. Then take your camera (I use the one with which the negative was taken), and taking out the focussing glass, push it up as near as possible to the negative, the lens pointing to the easel, and shut out carefully all light at the junction of the camera back and window; and having decided on the size of the enlargement, fix your lens and easel in position in accordance with the following formula, viz., multiply focus of lens by one more than the number of times of enlargement required. This will give the distance from lens to enlargement; then divide the product by the number of times the negative is to be enlarged; this will give the distance from lens to negative. For instance, suppose you are working with a lens of 12-inch focus and wish to enlarge your negative four times: then $12 \times 5 = 60$, or 60 inches is the distance of lens from enlargement or easel, and $60 \div 4 = 15$, that is, 15 inches is the distance from the lens to negative. Now focus sharply and accurately the image thrown first on a sheet of white paper pinned to the easel, and see that it is evenly and well illuminated; then cap your lens, insert the necessary stop, substitute a sheet of bromide paper for the white, uncap and expose.

To ascertain the correct exposure, expose and develop a small strip of bromide paper on that part of the picture containing the greatest contrasts; do this a few times till correct exposure has been attained, and regulate subsequent exposures from that negative by the result.

Should it be desired to vignette an enlargement, cut a suitable aperture in cardboard and allow the rays to pass through it, moving the card to and fro between the easel and lens during the exposure.

Alpha paper may also be used for enlarging, and yields prints of very pleasing tones, either with or without toning, to develop which, the instructions sent out with the paper, if followed, will give excellent results.

Several developing formulæ are given, all of which are well and highly recommended.

The paper after exposure and before development should be soaked in water till quite limp; the water is then thrown off, and the developer

poured over it. Should the exposure have been correct, the picture will appear in a minute or so, and gradually gain density and detail. After the image is well out, pour off the developer into a separate vessel for use again, and, without washing, flood the print with the clearing solution; let it soak for, say, a minute, then throw it away and repeat the dose a couple of times. The picture should now be well washed and fixed in the usual way. The object of the clearing solution is to prevent the precipitation of the iron in the oxalate of potash and iron developer on the film of the paper, and this can only be done by keeping the paper acid whilst washing out the developer.

Should the picture have been over-exposed, it will flash up quickly under the action of the developer, which should in that case be instantly poured off, and more bromide added to it and the development continued. The image on a correctly exposed print should appear gradually, and should never stop appearing; and, provided that details keep on appearing, they cannot come up too gradually, provided they follow each other steadily.

SCRAPS FROM MY NOTE-BOOK.

They do not appreciate art as applied to photography in the far Hebrides. I had an amusing experience recently when attempting to obtain a view of three Skye cottage-women. They were dressed in the curious fashion of the "Isle of Mists," their dresses being sufficiently short to show several inches of bare brown calves. With red handkerchiefs over their heads and tied under their chins, they were walking along a leafy, old-world lane, with their creels on their backs, chattering in their guttural Gaelic tongue like so many magpies.

As I was not carrying a hand camera, I had to crave permission to "make a picture of them." Only one of the three understood English, and she interpreted my request to her companions. They at once shook their heads and refused point blank. Pressed through the interpreter for a reason for their refusal, they said that they could not think of standing for their photographs unless they had their Sabbath frocks on! Some hours afterwards I saw them returning with their creels full of peat. Hastily getting my camera ready, I took a flying shot at them as they hurried by, swearing loudly in their Gaelic at my presumption. The result of the incident, as shown on the negative, is not without humour.

An amusing incident occurred whilst I was travelling through the Highlands with a camera a few weeks ago. Near Oban is the ancient Castle of Dunstaffnage—a somewhat picturesque old ruin, standing on the shores of Loch Etive, and dating back to before the Christian era. After duly "taking" the Castle, I, in company with a fellow-photographer, who had journeyed there on the same errand, glanced at the interior of the ruin, but finding there was nothing to see save bare, ivy-grown walls, we prepared to depart.

Outside the Castle, however, we were met by a burly Highlander, who promptly demanded, in the broadest of Scotch, threepence each for viewing the ruin. My companion, whilst grumbling that "the old Castle wasn't worth threepence altogether!" was about to comply with the demand, but I checked him, and remonstrated with the Scotchman. I remarked that I had visited Dunstaffnage on several previous occasions, and had never before had to pay toll, and that, moreover, as the local guide-books described the ruin as free, I did not intend to be imposed upon. "You won't pay the saxpence, then?" he queried, in the broadest of Scotch. "Certainly not!" I answered. He glanced at my camera and tripod for a moment, and gathering himself up for a crushing reply, he blurted out, "Then ye won't use yer old kemerra on my ground to-day, so there!" "Thanks, my friend," I rejoined, as I moved away; "I've got a picture of the Castle in my pocket already. Good morning!"

If amateur photography continues to spread and grow at its present rate, it will soon be necessary for every hotel proprietor, who wishes to keep abreast of the times, to set aside an apartment for his photographic guests. One of the pleasure-boats to Norway did this last year, and the idea was immensely popular. Why shouldn't "mine host" do likewise?

Photographers on tour are frequently puzzled to know how to safely carry exposed plates when luggage has to be limited in bulk or weight. Of course the tin or cardboard boxes usually recommended for this purpose are quite out of the question where much work is intended to be done. The plan I adopt is to use the thin cardboard masks sold by Wheller & Co. and other makers. When my plates are exposed, I replace them in the box from which I originally took them in their unexposed state, placing a mask between each plate. In this way very little space is occupied, and the plates carry safely and securely. It is an exceedingly simple plan I know, but it is really surprising what a large number of camera-carrying acquaintances to whom I have mentioned it had never heard of the plan before. A hundred masks can be bought for a shilling.

A Tourist.

EXPLOSIVE GAS IN HOT-WATER APPARATUS.

In the hot-water apparatus used in heating houses, says Mr. A. H. MacKay, in *Science*, it is well known that gas or "air" accumulates from time to time. This is let off from the radiators where it may collect by turning the "air" tap provided; otherwise the accumulation under ordinary circumstances would interfere with the circulation of water through the pipes. Being curious as to the nature of this gas, on a certain occasion I smelled it when escaping from the tap, and detected a peculiar odour of what I took to be a hydrocarbon compound. Collecting some of the gas, I cautiously applied a light to it, which produced an explosion.

The furnace was a small, upright one, with the water heated between its double walls, large enough to warm in winter time a house of seven or eight ordinary rooms. Anthracite coal was used.

With a larger upright furnace, having tubes for the smoke and heated gases to pass through in its upper part, in addition to the water-filled sides of the first, the amount of gas collecting in the highest radiator in the house was more abundant, especially when anthracite was used instead of bituminous coal, for which the furnace was also adapted. As a matter of fact, several litres of gas were produced each week in two neighbouring houses supplied with this latter style of furnace, during the period of observation—a few weeks during last winter.

A considerable quantity of the gas was collected for demonstration before a popular meeting of the Institute of Science. Jars of various sizes were filled with the gas, which was burned under various conditions. 1st, The peculiar odour of the gas was tested. 2nd, It burned in the jars when inverted, and otherwise very much like pure hydrogen, giving forth very little light, but much heat. 3rd, The products of combustion showed no trace of carbonic dioxide which could be detected by the lime-water test, which was sensitive enough to detect its presence in the room from the respiration of those present. From this it was inferred that neither carbon monoxide nor a hydrocarbon could be present in any considerable quantity. 4th, Pure nitrogen dioxide injected into the gas gave no ruddy discolouration. Hence, there was no oxygen in the gas. 5th, When mixed with air it would explode like air and hydrogen. 6th, It was not convenient at the time to apply any other tests, or any very accurate ones. The impression was formed that the gas must be nearly pure hydrogen.

If it was nearly pure hydrogen, it must have come from the decomposition of the water, which would apparently imply a corresponding oxidation of the iron piping, or of the heated iron in contact with the water within the furnace. The greater abundance of the gas when anthracite was used suggested that the origin of the gas was the rapid oxidation of the water tubing within the furnace when the heat was particularly intense. If so, every litre of hydrogen produced would mean the conversion of over one and a half grains of metallic iron into "rust."

Again, if a lighted match should be applied to the tap when this gas (pure) is being allowed to escape, the jet would catch fire and "roar" with a hot, bluish flame, of dimensions as terrific as the bore of the tap would allow. As by the "boiling over" of the furnace, the small tank and upper coils under some conditions of water pressure may be emptied and filled with air; what would the consequences be were the mixed gases allowed to escape at night with a lamp held in the hand carelessly near such a jet?

The discussion of these demonstrations revealed the fact that no one present ever knew or heard that the gas escaping from radiators might be explosive—not even the builders, plumbers, and founders.

Query 1. Is the formation of explosive gas within the hot-water apparatus of our houses rare, peculiar to certain furnaces, or is it common?

Query 2. Has an accurate analysis of such gas been made; and, if so, what are its constituents?

THE STATE OF THE LANTERN TRADE.

To one a long time in the business, says the *Exhibitor* (Philadelphia), the study of the peculiarities of each season is instructive and entertaining; from the merchant's point of view it is perplexing. One season is noted for the number of gas lanterns sold, while in the next the oil lantern will be in greater demand; one season will bring a great call for plain views, and in the following the coloured will be in the majority. The distinguishing feature of the season just closing has been the unprecedented demand for lanterns and views for society work. As the use of the instrument in this work is not for pecuniary profit, and the members of the societies cannot spend the time to manage a gas instrument, it followed that the demand was for the oil lantern. The cheapness of this form as compared with the other was also a strong influence in its favour. The marked improvements that have appeared within a few years in the quality of the oil lantern, especially in the important part of a powerful light, have aided this result. Another marked feature of this season has been the small demand for plain views as compared with previous seasons. Has

this been caused by amateur makers? Some dealers think so. To a certain extent, no doubt, it is a factor in the result, but we are inclined to think that its influence is over estimated. We are more disposed to suspect that the increase in the number of professional makers has affected the trade in the channels where it was wont to travel, and the system of hiring slides that has grown so in favour must certainly have cut off many sales, but not so many as on first thought would be supposed, for our experience is that the great mass of the customers that hire would not have had anything to do with the lantern if they could not have hired the views. This class of customers is of special benefit to the manufacturer of the lantern. We have a strong notion that the professional lecturers have not been so numerous this season as for several seasons past. The crop, no doubt, will be heavy in the season 1893 and 1894. The Columbian Exposition will be the incentive to spur them on. The cheap mechanical slides have been in less demand than usual; they seem to be gradually falling out of favour. Views of short stories that are illustrative of intemperance, history, poetry, and pathos are in growing demand. Illustrated song service is taking a foothold here, and will doubtless in a few seasons be as favourite a form of entertainment as it is now in England. There it has had marked success, and the makers of views have furnished many sets to meet the growing demand.

The makers of coloured slides are growing in number, and doubtless their work will improve in quality. We feel justified in saying this from various samples that have come under our notice; they have a wide field before them in this direction. We fail to notice the true artist in any of the work that has been turned out this last season by those that are new to the business, and while on this subject we would suggest that the unprecedented demand for views this season has not tended to improve the quality furnished by any—it was rather otherwise.

The advent of colourists opens up a new possibility to the dealer, and on him largely will depend the success of this spread of the business. It will be necessary for him to resist that continual pressure that tends to lower prices below a healthy profit both for himself and the artist, and in doing this he will be in a position to continually demand a higher grade of work, thus establishing the business on a more solid and independent basis. If the standard is kept high and the pay good, a better class of artists will be gradually attracted to the business. On the quality of the foundation depends the value of the superstructure; if the designs furnished are poor, then, no matter how expert the photographer, or skilful the artist, the result will be a low-grade lantern slide; so the dealer must realise that a fair profit is needed to enable him to procure suitable designs. The outlay in this direction will be heavy and continuous; but, if wisely and consistently pushed on the lines indicated, he will soon be in a position to furnish those subjects for which he finds good demand. What do you think of the lantern becoming a fad? When society takes it up it may. It tends that way now. Invitations to relatives and friends ensure a select audience, and they are treated to a graphic and interesting talk illustrated by the lantern. This talk is necessarily of an informal character, and at times becomes a general conversation, which, by reason of the interest and curiosity aroused in the hearers, leads to more and varied information being obtained than is possible from a set lecture. No one idea has been more forcibly impressed upon our minds than that the lantern has become a necessity—not a need to any one class of the community, but a want felt more or less by all.

A LANTERN-SLIDE EMULSION.

If old plates are to be used, says an American contemporary, the film can be removed by soaking the slides in a solution of concentrated lye and water. Let them remain in it no longer than is necessary. After the emulsion has been thoroughly removed, it is well to give them an extra soaking in a dilute bath of nitric acid and water. Wash them thoroughly, and place them in a rack to dry. If new plates are used, the nitric bath alone will do.

The emulsion is made as follows, and is about one quarter the rapidity of Carbutt B plates:—

Potassic bromide	56 grains.
Heinrich's gelatine	80 ,,
Water	3 ounces.

Heat in a water bath to 130 degrees, and, when all is dissolved, add slowly, with constant stirring, sixty grains of silver nitrate, previously dissolved in one ounce of water; put aside to set. When thoroughly set, shred by pressing through what is called coarse railroad canvas; wash in four or five changes of water; drain, remelt, filter through fine flannel, and coat plates, allowing one drachm of the emulsion to each plate.

We feel that the use of the following developer will produce the best results with the least liability of stain; in fact, it is reduced to a minimum. It is our experience that all developers are much improved by being made of hot water:—

Hydroquinone	10 grains.
Sulphite of soda	60 ,,
Carbonate of potash	40 ,,
Bromide of potash	1 grain.
Hot water	2 ounces.

The fixing bath is of more importance than is generally supposed, for it is an easy matter to stain a slide by fixing it in a dirty or not properly mixed hypo bath. We have used hypo, 1 pound; acid sulphite of soda, 3 ounces; and water, 2 quarts, with satisfactory results. It fixes quickly, leaves the high lights in good condition, and never stains.

Correspondence.

CONSUMPTION OF OXYGEN, ETC.

To the EDITOR.

SIR,—Would you please tell me about how much oxygen a single lantern, with blow-through jet, would burn in, say, two hours? I have an old oil lantern which I am adapting to take a jet, and do not quite know the best capacity cylinder to get. Also, what is an easy way of ascertaining the quantity of oxygen that may be left in a cylinder?—I am, yours, &c., J. PERKINS.

Kilburn, August 24, 1893.

[About six cubic feet of oxygen would be consumed in two hours. Taking that average as a basis, and knowing how long the oxygen had been turned on, you could always roughly estimate the quantity left. A more accurate way is to attach a pressure gauge to the cylinder, turn on the gas, when the index will point to the number of atmospheres of gas contained in the cylinder. Suppose the latter be a ten-foot, divide the indicated number by ten, and the result will be the number of feet contained in the cylinder.—ED.]

THE LANTERN-SLIDE TRADE AND AMATEUR SLIDES.

To the EDITOR.

SIR,—I have noted for some considerable time what has been said or written anent the harm done to the professional's trade by the amateur photographer, and, in my humble opinion, in many cases this is true. Much of it, no doubt, is caused, not by any desire on the part of amateurs to compete in taking the bread out of the professional photographer's mouth, but by the puffed-up self-conceit of the amateur. In the lantern-slide trade this has been felt of late, and the cause is not far to seek. The amateur trots about getting his views, &c., and making his slides from this and that, and, I suppose, naturally wants to get them projected upon the screen on every possible occasion at the lantern evenings of his club, and it is here where his thoughtless selfishness betrays itself, for at 90 per cent. of such exhibitions the whole of the slides projected are amateur work. Does this show a thoughtful or kindly feeling for the trade worker in this line who has to earn his bread by such work? No doubt, in most cases, it is want of thought, and I think it would be well for establishing a kindly fellowship between the two classes if presidents and secretaries of the clubs and societies brought this matter, in a friendly way, before their members; for, if only 20 per cent. of trade slides were used at such entertainments, it would be showing a sympathy for those whose living they are thoughtlessly taking away, and would certainly do some good in return for much harm that has been done during the past few years.—I am, yours, &c., DELINIAVIT.

Lantern Queries.

JET.—Barton's jet is, we believe, to be introduced by Mr. J. H. Steward, Strand, W.C.

J. RICE.—We have in preparation an article dealing with a method of enriching the illuminating power of oil for the lantern.

B. C. WAIN.—"Air-brush" pictures are produced by some operators in the following manner: A positive is projected by means of a lantern on to a sheet of paper, and the principal outlines faintly traced in pencil. The picture is then worked in by means of the pneumatic spray of Indian ink.

LANTERNOS.—It is not necessary to use coloured cover-glasses for the purpose. Coloured glasses for colouring the light may be obtained of lantern dealers.

MR. F. E. IVES informs us that he is engaged in making several improvements in the heliochromoscope, of which the photographic public may shortly have an opportunity of judging.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [October 6, 1893.

THE LANTERN RECORD.

CONTENTS.

LANTERN NOTES AND NEWS.

It is surprising that so few lantern-slide makers are to be found who include stereoscopic photography among their photographic work. The halves of binocular negatives on either 6½ by 4¼, 6½ by 4¾, or 6¾ by 3¼ plates, can easily be utilised for making lantern slides by contact, so that negatives for lantern and stereoscopic transparencies may be taken at one and the same time.

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One of the exhibits at the Exhibition of the Photographic Society of Great Britain is a revolving stereoscope, containing a number of choice stereoscopic transparencies, by that accomplished worker, Mr. F. Beasley. We ourselves spent a very agreeable ten minutes in examining these charming examples of one of the most delightful departments of photographic work, and considered the slight backache that was the penalty as having been more than compensated for. Not many visitors to the Exhibition, however, appear either to notice this stereoscope, or know what it is.

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Out of six applications for patents in connexion with photography during the third week in September, three were for improvements relating to lantern apparatus, &c.

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In the last number of The Lantern Record we answered a correspondent who wrote us asking for an easy way to ascertain "the quantity of oxygen that may be left in a cylinder," by recommending him the obvious plan of attaching the gauge to the cylinder turning on the gas, and noting the number of atmospheres indicated in the cylinder. "Suppose," we, said "the latter be a ten-feet, divide the indicated number of atmospheres by ten." The first "ten" was given in mistake for *twelve*. The rule is, in such cases, for a 6-feet cylinder to divide by 20, for a 10-feet by 12, for a 12-feet by 10, for a 15-feet by 8, for a 20-feet by 6, for a 40-feet by 3. By an accident these particulars were omitted from our reply.

* * * * *

Messrs. Sharp & Hitchmough, of Dale-street, Liverpool, will shortly place a twelve-feet, seamless lantern-screen on the market. There has hitherto been a difficulty, they inform us, of obtaining seamless screens of that size, but this has been overcome.

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Apropos of test slides for ascertaining the correct positions of lantern and sheet, Mr. A. P. Wire writes to the *English Mechanic*:—"To show a picture correctly on the screen it is necessary that the plane of the sheet should be at right angles to the optical axis of the lantern lenses. This position is not readily obtained unless one has a correct method of testing. The following simple plan will be found to answer admirably, and I send it for the benefit of your readers. In the first place, for the comfort of working, the lantern is better if placed at such a height that the operator can stand on the floor to exhibit. In this position the lantern must be tilted up in front to throw the picture above the audience, and the screen must be placed slanting, the top leaning forward if the picture is to be shown with every part in focus. To find the exact place of the sheet, use a test slide. To make it, take a piece of clear glass three and a quarter inches square, and rule on it with China ink vertical and horizontal lines about one-eighth of an inch apart. This may be done by using a ruling pen and China ink rubbed up with gum water. If the ink runs on the glass, warm the glass to thoroughly dry it. When done, mount it as a lantern slide with a circular mask. If, now, this slide be put in the lantern and projected on the screen, the eye will at once tell by the appearance of the lines whether the sheet be placed correctly or not. If all the lines are straight and clear even to the edge of disc, the sheet is right. If the lines appear curved or blurred at any part, the sheet requires adjusting, i.e., always supposing the lenses capable of projecting the picture without distortion."

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Messrs. Archer & Sons, of Lord-street, Liverpool, inform us that they are bringing out a new lecturer's reading lamp to burn benzoline, and which will have the advantage of perfect safety. During his visit to Chicago, Mr. W. J. Archer was busy with his "Combined" hand or stand camera, and was lucky enough to secure a negative of the Exhibition by night half an hour after the electric lights were lit, showing the electric fountains playing and the buildings and water illuminated. Slides of this negative will be sold by Messrs. Wilson, of Aberdeen, Mr. Archer's other negatives being reproduced by his firm.

* * * * *

On Thursday, October 12, there will be a special lantern display at the Photographic Society's Exhibition Gallery, 5a, Pall Mall, for members of affiliated Societies at eight o'clock. Members of those Societies can obtain tickets of admission from their Secretaries.

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We learn that, of the vessels using the Suez Canal during 1892 nearly 91 per cent. pursued their journey uninterruptedly at night by using the electric light, the percentage in the three preceding years being 88·21, 83·56, and 71·74 respectively. The Suez Canal authorities have now made it obligatory that, after October 1 next, vessels passing through the Canal by night shall employ an apparatus for dividing the light of the projector into two divergent rays. Approaching vessels may by this means travel right up to each other without their respective helmsmen being blinded by the light. One of the agents of the Company has invented the "diverging apparatus" which is to be used.

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Talking of the Photographic Society's exhibits, it may be remembered that last year we drew attention to the paucity of exhibits connected with the lantern. This year all that has been changed, very nearly half the apparatus exhibits having a direct connexion with the optical lantern. Apparently excellent slides are shown by Messrs. James Dore, E. Dockree, G. Hankins, J. H. Gear, T. H. Morton, A. Brooke

R. & J. Beck, C. L. Mitchell, Newton & Co., A. Watkins, Henry Little, J. D. England, and T. E. Freshwater. We have not seen them on the screen, so that detailed criticism of them would be worthless. Two exhibits of photo-vitro enamels are shown by Mr. G. Pendry and Mons. A. Guye. The former are of a warm tone, and the latter of a more subdued tint. Both sets are charming examples of a much-neglected branch of photography that would probably well pay for more cultivation among professionals.

THE LANTERN STEREOSCOPE.

In The Lantern Record for October 7, 1892, we were enabled, by the courtesy of Mr. John Anderton, to supply our readers with details of the system he employs for obtaining stereoscopic effect on the lantern screen, and to that account we now refer those of them, and they are doubtless numerous, who are interested in the subject. The following reference to it, however, though scarcely so complete as the former one, is sufficiently clear to let the lanternist get an idea of how the effect is produced. The description is Mr. Anderton's:—

"In adapting the stereoscope to the optical lantern, the problem to be solved is, to place upon the screen a pair of ordinary stereoscopic pictures in such a manner that, whilst the right eye can only see the right-hand picture, and the left eye the left-hand picture, yet the two are combined, and conveyed to the brain as one.

"In the invention this problem is solved in an exceedingly simple manner. The pictures on the screen are in full perspective, the various objects forming them standing out as if possessed of three dimensions, and appearing in their correct relative planes. A pair of ordinary stereoscopic transparencies are superposed on the screen as nearly as possible; the pictures not being identical, a perfect registration cannot be obtained. The light from each picture is polarised, one vertically, the other horizontally, and the combined picture is viewed through an analyser similar to a small opera-glass. This analyser is so constructed that, whilst the right eye can only see the image portrayed in horizontally polarised light, the left eye can only see that in vertically polarised light. An important part of the invention is the screen. It is a well-known fact that polarised light is apt to be broken up on reflection. The screen employed is faced with dull or matt silver, a long series of experiments having proved this to be the best material."

To this descriptive outline, which is in the nature of a "popular" one, it is only necessary to add that the super-position of the stereoscopic picture is effected by halving the transparency, and projecting the halves by means of an ordinary biunial lantern. The polarisers are placed before each objective.

The lantern stereoscope is being demonstrated each Monday, Wednesday, and Saturday evening during the lantern entertainments at the Photographic Society's Exhibition, 5A, Pall Mall, and on Friday evening last we, in company with others, were present at a special demonstration held to give representatives of the press an opportunity of witnessing the effects producible.

We may at once say that for our own part we consider stereoscopic projection as worked out by Mr. Anderton, and shown on Friday night, as perfectly successful. Indeed, our expectations never went within measurable distance of what we then realised.

The two pictures, when super-posed, show a duplication of outline, due, of course, to the fact that absolute registration of the two dissimilar halves cannot be got. When looked at through the analyser, however, the blur disappears, the image coalesces in the brain just as when a binocular slide is examined in the stereoscope, and the screen picture becomes at once well defined and truly stereoscopic, objects standing out in apparent relief and solidity with all the charm of reality.

It should be said that, while all the pictures shown yielded stereoscopic effect when viewed through the analyser, some were less successful than others. Interiors, flowers, land-capes, animals were shown, perhaps the most realistic being the picture of a tiger in a cage, the paws of the animal reaching, as it were, out of the picture, the bars of the cage separating from the animal beyond them, and the whole effect being remarkably good.

It is claimed that any subject taken with a binocular camera would be suitable for stereoscopic projection, but we are disposed to think that successful effects, not only to a popular audience but to those not unfamiliar with stereoscopic photography, would be best obtainable by suiting the treatment of the subject to the conditions of the case. Thus, it appeared to us that the most successful pictures shown were those which had been taken with short-focus lenses separated rather above the distance which strict theory demands, so as to obtain some little exaggeration of relief. This, however, is only a reflection in passing.

On the whole, Mr. Anderton is to be congratulated upon the undoubted success of his adaptation of certain optical principles to stereoscopic projection. The Lantern Stereoscope should be widely popular.

LANTERN MEMS.

"The Lantern as a Reformer." This, or a kindred title, has served lately as a text for some of the lay papers and magazines, while a leading article in a daily has enlarged on the subject of the paper read before the Chicago Convention by the Rev. Mr. Patten as if the services of the optical lantern in connexion with Church and mission work were an innovation.

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It is well known that in chapels and mission-halls during Lent and Advent, and especially for Good Friday and Christmas Day, illustrated services are regularly held, and thoroughly well attended and appreciated, and I know of at least one Church-of-England place of worship (not perhaps consecrated) where musical services, illustrated with dissolving views with limelight, form a positive item in the year's work.

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It has been reserved for the American Churches, according to these authorities, to have sermons "habitually preached" with "photographic" or other illustrations, and the result of same is the reclaiming of a "great number of sinners." Be this as it may, if it is permissible for a blackboard, with chalk drawings, illustrative of Biblical subjects, to be used in an English church on Sunday afternoon at children's services, I feel sure much more success would be achieved by the projection from a good lantern of photographic representations on a screen, especially during the winter time.

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The old objection to children having to be in the dark no longer answers, for, with the powerful lights now available, the radiated light from the screen is sufficient for the audience to be well seen by the teachers or those in charge, and overcome a certain amount of afternoon daylight if the screen was shaded by hoods or by the windows near it having the blinds drawn over them.

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Blackboard illustrations, even if executed by an artist, would fall short of enlargements from photographic productions of works of art, and naturally a very limited number could be done by the hand, whereas lantern slides at so low a price as one shilling each would enable the teacher to have as many as were necessary to illustrate the particular lesson of the day or moral truth he wished to bring forcibly home to the young minds.

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Are saturators superseding hydrogen for the limelight? This is a question often asked now, and it is difficult to answer; for, although ether saturators have become more popular, there are still a fair proportion of lanternists whose memory serves them, and who cannot help thinking of the troubles that occurred in connexion with this light a few years since.

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A complete *résumé* of the work done in connexion with ether and benzoline saturators would be a valuable addition to the literature of the lantern world, and I feel sure that personal experiences of your various readers, whether difficulties were overcome or not, would

help to elucidate the mystery and give greater confidence in the use of the oxy-ether limelight.

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I FEEL sorry that the compressors of house gas have not yet found out a way to purify the gas before compression so that it will last a reasonable time, and they will certainly have to look to their laurels, if an alteration is not soon made, for pure hydrogen gas will be a necessity, or else an alternative will have to be found.

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WHERE electricity is on supply, a lanternist will shortly be able to have an electric arc lamp that will fit in any ordinary lantern without alteration, and give an illumination about double that of the most powerful limelight, and as easily controlled, without any clock-work or difficult adjustment—in fact, capable of being worked by a novice.

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THE advantage of a cheap and small electric lamp for optical projection cannot be over-estimated, for with the polariscope, microscope, and other apparatus, where loss of light necessarily occurs, the extra candle power is of paramount importance, as also for demonstrations in daylight or partially darkened rooms.

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MR. ANDERTON, whose clever invention of the "Stereoscopic Biunial Lantern," and the projection of apparently natural solid objects, will, I feel sure, be one of the first to appreciate the advent of the new electric lamp invented by Mr. Davenport, of the Society of Arts, for by its means he will be able to increase the usefulness of the "Stereoscopic Lantern," and be able to show ordinary-size projections with increased brilliancy, besides having at command the power to give representations on a large scale suitable for very large buildings.

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LANTERNISTS on the look-out for novelty this season must not pass over the mechanical working figures of the "wrestlers" type. This slide and its companions in the series will afford a lot of amusement, for the metallic figures when projected on the screen have a wonderful amount of movement and lifelike effect; and, as a result of the application of the principle of leverage, a development has been made much in advance of anything hitherto done that has been sold commercially.

G. R. BAKER.

THE SEARCH LIGHT.

AN arithmetical error in THE LANTERN RECORD of last month has provided one of your contemporaries with material for "easy" copy. It points out that the way to ascertain the quantity of oxygen that may be left in a cylinder is *not* to divide the number of atmospheres indicated on the gauge by the capacity of the cylinder. Nobody said it was. The substitution of one figure for another in the directions given by you might have lent some colour to the supposition that a misleading rule was recommended, but a careful perusal of what was said, combined with a little reflection would, to anybody of the least intelligence have established the probability that a slip of the pen had been made.

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FOR, in dealing in figures, especially those of this subject, it is delightfully easy to stumble. You assumed the case of a 10 ft. cylinder, and told Mr. Perkins to divide the number of atmospheres by 10; whereas twelve is the divisor. Now, the rule may be expressed as follows:—Divide the number of atmospheres to which the contents of the cylinder were originally compressed, presumably 120, by the capacity of the cylinder, say 10, and let the result be the divisor of the number of atmospheres indicated, the answer (in this case 5 ft.) would be the quantity of oxygen in a 10 ft. cylinder at 60 atmospheres. The rule is so simple that it is readily committed to memory, and of course it works out that, where a 6 ft. cylinder is in question, the number of atmospheres indicated is to to be divided by 20; with a 10 ft. by 12; a 12 ft. by 10; a 20 ft. by 6 and a 40 ft. by 3. Absurdly clear as it all is, however, I can quite understand that it is easy for the photographic journalist, whose head has to be tolerably well stocked with the figures of formulæ, &c., to write down and "pass" the sign "0" for "2" on occasions, especially when it is remembered that press work often has to be got through under circumstances best calculated to render the attainment of accuracy the exception rather than the rule.

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BUT your contemporary, of course, is severely indifferent to such trifling considerations, and ought, therefore, to be able to point the finger of pride at well-written, carefully digested articles on the optical lantern, flawless in orthography and grammar, and always correct in their facts and figures. Unfortunately for what should be the eternal fitness of things, some wicked spirit frequently gets an opportunity of exercising his malign spells in his pages, the result being that this self-styled paragon of journalistic accuracy, this complacent monopolist of technical infallibility turns out to be, after all, just as many other men are, a brass idol with feet of clay, in fact, quite an ordinary common or garden ink-slinger, like me or you, Mr. Editor. It seems almost incredible to read that your critic, after inflicting a long and hoary disquisition on compressed gases upon his readers—there is no evidence that he has any of the latter, though—wound up by denying that the contents of a cylinder could be ascertained by any other plan than that of rule of three! So much for Buckingham (and Hastings)! "Gas" is the one thing of all others with which the organ of that mystical body, the National Society of Laternists, is peculiarly able to fill its pages; but it had best leave its estimation to others. The moral of all this is (and I commend it to the careful consideration of your contemporary), that people who live in glass houses should not throw stones. It is an old saw, but it is as true now as ever it was.

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To judge by one or two remarks elicited by the foregoing subject, some people appear to imagine that the filling of a gas bottle beyond the extent of its normal capacity is either an impossibility or that it never occurs. For the credit of the gas compressors and others, I am certain such a thing does not often happen, but it is neither impossible nor unknown. It is not so very long ago that, in the rooms of a well-known Photographic Society where an entertainment was to be given, a twelve-feet bottle of oxygen was found to contain seventeen feet.

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THE Central Photographic Club has, it seems, started at last. As I gather that the social element is to form a leading item in the Club's programme, I trust that during the winter an attempt will be made to organize a good lantern entertainment at least once a month. When I speak of a "lantern entertainment" I don't mean a mere "exhibition of slides," such as every tinpot little Society in the kingdom indulges in, but lectures on attractive and popular subjects, delivered by men of ability, and illustrated by sets of slides of the quality of those produced by such masters as George E. Thompson, Paul Lange, W. Lamond Howie, Cembrano, Wellington, Sinclair, and others. A little vocal and instrumental music could be interspersed, and if the thing were well done the Central lantern nights would become extremely popular among men engaged all day in town, who could drop in and smoke their pipes, listen to the lecture, and look at the pictures without, as is generally the case at Photographic Societies, having to sit through a preliminary purgatory of "minute-reading," "objects of interest," "questions from the box," and other cruelties to animals. Look to it, good Central Clubbers!

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I HAVE given the Central Photographic Club a bit of advice; I will now give it a bit of my mind. When the Club was first projected by two or three good friends of mine, it was no part of the scheme that to the three meeting nights of the important mid-London photographic Societies—the Photographic Society of Great Britain (Tuesdays), the Photographic Club (Wednesdays), the London and Provincial (Thursdays)—a fourth meeting night (Friday) should be added; but this is what the Central Club propose doing. On Friday

nights, I believe, papers will be read, discussions held, apparatus exhibited, pictures shown, questions asked—by whom, think you? Why, the very men who, on the previous night, or two or three nights, have been doing exactly the same sort of thing elsewhere. The Central Photographic Club is almost entirely composed of members of other Societies, and will have to look to them to support its meetings. Do you think they are in a fever of anxiety to acquire fresh opportunities for talkee—talkee? Not a bit of it. Do you think country members coming to town will be eager to listen to a discussion on demitol, hangitol, tiddyfolol, or any other ol? Nary! Do you think the Central Photographic Club will be able, after the tingling enthusiasm of youth has worn off, to sustain interest in technical discussions week by week when so many established societies, with the pick of the photographic talent of the country, can scarcely do so?

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The more prominence that is given to the "social element" the greater will be the chances of the Club's success; but, if so far as the evening is concerned it is to be conducted on "Society" lines, so much the worse for it. The fact that it *is* a "Club" and not a "Society" decides the principles on which it should be run. If there is one thing more than another which in my experience (and it is not a slight one) frightens most members of the trade and professional photographers away from "Society" meetings, it is discussions on photographic subjects. Here, if I rightly understand matters, it is desired to attract them. The more open, informal, and, within certain limits, the less "photographic" the Club, the better it will succeed in this object. As regards the meeting night, I think it is too late in the week for most London men; and, as it does not matter for the country members, it would have been wiser to have fixed it earlier. But personally, in this instance, except for social purposes, I regard meeting nights as needless, especially as the usual club privileges are to be available.

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What has become of the Charitable Lantern Entertainment Society that was started last winter? Its object was a most humane one, and the Society deserved to live. A night's innocent pleasure to the inmates of a hospital or a workhouse, such as the lantern is capable of affording, is worth any amount of medicine or sympathy.

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Are we in for a lantern "boom?" It would appear so if one may go by the vast amount of attention given to lantern work by manufacturers, dealers, amateurs, societies, religious bodies, entertainers, &c. Nothing is so certain as winter and short, dark nights; and herein, to my mind, lies an unfailing element in the assured perpetuity of lantern work. With stereoscopic effects on the screen rendered practicable, a new field is opened up which promises well for the future of this branch of photography. I congratulate Mr. Anderton on the results achieved, which are truly remarkable.

Radiant.

COLLODIO-CHLORIDE LANTERN SLIDES BY TRANSFER.

Although, during the past few years, the taste for black or neutral tones in lantern slides has considerably grown, there are still very many photographers who lean towards the warmer shades more closely associated with collodion; but, with gelatine plates, these are far more difficult to secure than was formerly the case, and even with collodion emulsion, either from the introduction of new development methods or other causes, the rich brown and purple tones of former days are seldom seen.

Such tones are, however, very easily obtained by contact printing on collodio-chloride, and, as so large a proportion of the slides now produced are from quarter-plates, that process seems almost universally applicable, but for a certain difficulty in securing perfect homogeneity of film when the emulsion is applied to glass. This arises from the fact that the emulsion must necessarily contain a very considerable proportion of soluble or crystalline as well as of hygroscopic matter, which, owing to the non-absorptive character of the support, and to the extreme thinness of the collodion film, is apt—or, indeed, almost certain—to cause irregular markings when dried.

The evil may be, to a certain extent, mitigated, but not altogether removed, by the use of a porous substratum of gelatine or albumen, into which the soluble matters are partially absorbed; but the very fact of this absorption introduces other difficulties which go far to counterbalance any advantage gained. Thus, a substratum—more especially one of gelatine—confined between the collodion film and the glass, is very liable to become stained by the spontaneous decomposition of the free silver contained in the emulsion; indeed, this result may be calculated on with the greatest certainty if the plates are kept for any length of time after coating, and it is liable to occur even after toning and fixing, although not at first apparent.

The difficulty may, however, be entirely obviated by adopting a method which, though it may appear at first sight a little "round about," is, perhaps, in the long run, rather easier to work. I refer to the method of transfer from paper to glass. The emulsion is coated upon paper, the printing, toning, and fixing being carried out on the paper support, and, when finished, the image is then transferred to glass. To many readers the process may sound a very formidable one, but none except those who have actually tried it can fully comprehend how extremely easy, as well as certain, the transfer process is when properly conducted. The paper support acts as a perfect absorbent of the soluble matter contained in the emulsion, which consequently gives a far more uniform and satisfactory film, and any stain not actually in the collodion itself disappears when the paper is removed. The convenience, too, of paper in permitting the free examination of the print during progress adds very materially in securing uniformity and quality of result.

As a matter of course, the paper requires some little preliminary preparation, but this is of the simplest kind, and consists merely in coating it with a layer of soluble gelatine. This serves the double purpose of isolating the emulsion from the paper and ensuring its easy removal afterwards. By filling up the pores of the paper a much smoother layer of emulsion is secured, and this is readily and quickly separable from the original support by simple immersion in warm water. The preparation of this gelatine transfer paper presents not the slightest difficulty, nor does it require any elaborate appliances. All that is necessary is to prepare a clear solution of gelatine of one of the softer kinds, strength about twenty grains to the ounce—Nelson's "Photographic" or their "No. 1 Flake" answer perfectly—on which or into which the paper is either floated or immersed, and then hung up to dry. The quality of the paper itself is of very little importance provided it is tolerably even in texture; a fairly good sample of "printing" paper, such as The Journal is printed upon, will satisfy all requirements. So long as the gelatine is not allowed to run in streaks, or to lie in irregular patches, perfect uniformity in thickness is immaterial, as this coating is entirely dissolved and removed in the process of transfer.

Such a paper was at one time, and, for all I know, may still be, an article of commerce, and was used by the late Mr. W. B. Woodbury for stripping and transferring collodion emulsion negative films when travelling. His method consisted in applying the moistened gelatine paper to the collodion surface after fixing and washing, and when dry the whole was peeled off the glass, and the latter recoated with emulsion. In this manner a few plates of glass sufficed for a tour of some duration, and the negatives were afterwards retransferred to glass on the return home.

For our present purpose the emulsion is coated directly on to the paper, and the manipulations carried out in precisely the same manner as for the production of paper prints, with the exception that the printing should be carried to a much greater depth in order to secure the vigour needful in the transparency. That being done and the print carefully washed, it is "squeegeed" with its collodion side in contact with a prepared glass and allowed to dry perfectly. The glass is prepared with a substratum of gelatine and chrome alum, ten grains of the former and a quarter of a grain of the latter to an ounce of water. A number of plates can be prepared at once by simply pouring the warm gelatine on to the surface and drawing off the surplus, then rearing them up to dry in a place free from dust. When dry the substratum becomes insoluble, and the plates may be stored away until wanted for use, the prepared side being, of course, carefully marked.

When the time arrives, the transfer glasses are immersed in water for a few minutes to swell the substratum, and the collodio-chloride print brought into contact by means of the squeegee in the usual manner, and the whole allowed to dry, which will firmly attach the collodion image to the glass. This is then again immersed for a few minutes in cold water and then in hot, when the paper will peel easily from the picture, and a short rinse to remove the soluble gelatine will complete the process.

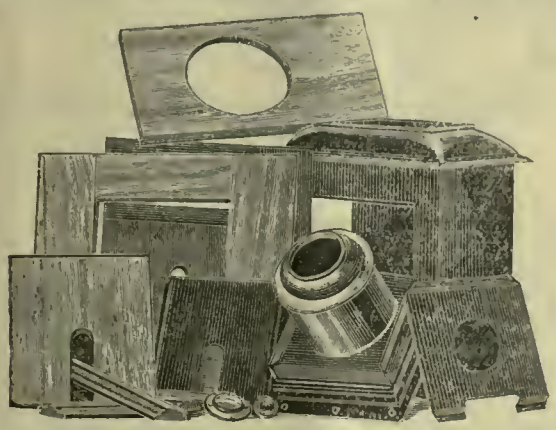
The character of the image obtained in this manner cannot be surpassed by any process, the tones obtainable being precisely similar to those produced upon gelatine or albumen paper of the finest quality while the trouble involved looks far more in the description than it is in the reality.

W. B. Bolton.

RECENT NOVELTIES IN LANTERN APPARATUS.

The "Star" Lantern.

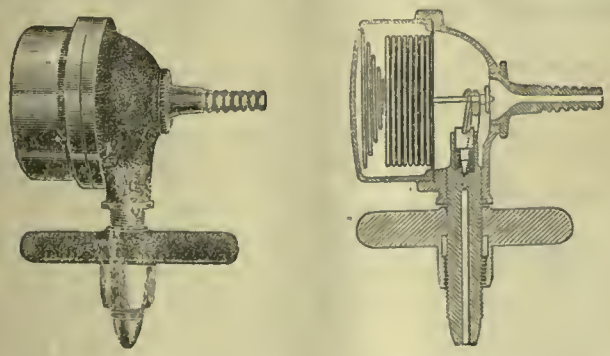
The Sun Camera Company, Limited, Leeds, of which Messrs. Londale Bros., of that town, are wholesale agents, make a speciality of the "Star" lantern, which is designed for the use of amateurs in more ways than one. In a word, all the parts necessary for the lantern itself (minus condenser, objective, lamp or jet, &c.) are supplied, so that an amateur



of average attainment in the handling of tools can occupy himself in fitting it together. The parts supplied are the metal lining, dome, stage, telescopic brass draw tube, knob, and screws for the completion of the instrument, as well as all the necessary woodwork, the sides and door being clamped and keyed, and the front and door turned for sight-hole and condenser, as well as the door mouldings. Two qualities of sets are supplied at moderate prices, and altogether the Star should be popular among amateur lanternists of a mechanical turn of mind.

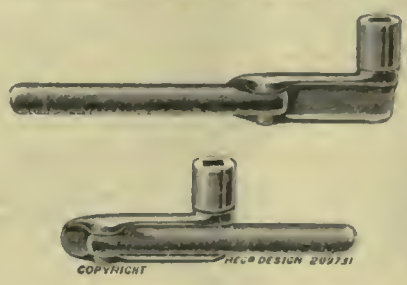
The Scotch and Irish Oxygen Co., Polmadie, Glasgow, N.B.

The metallic-bellows regulator of the Scotch and Irish Oxygen Company (Brier's patent), although not strictly a novelty, inasmuch as it has been before the lantern public for a considerable time, deserves notice in

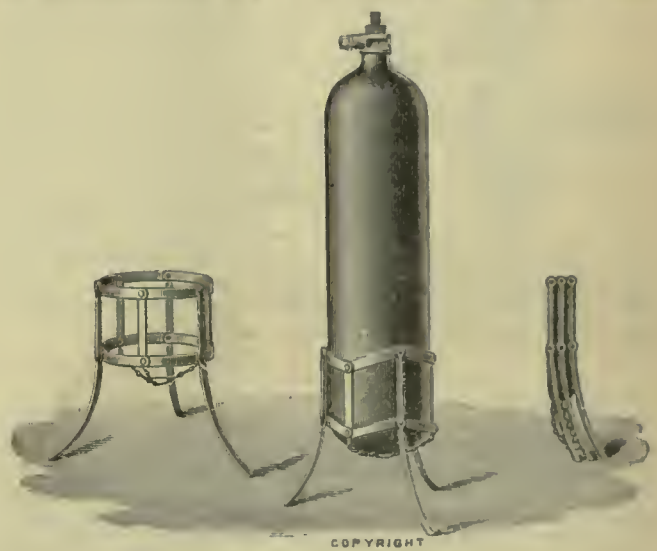


view of several improvements which have enabled the Company to reduce its price. The Company inform us that, so far as can be learned, this is the only regulator having a record of freedom from accidents. It is certainly in the favour of the regulator that none of its parts are of perishable material, the bellows being, as its name implies, of metal instead of rubber, durability and freedom from sudden collapse being not the least of the advantages thereby obtained. The cut in section shows the inside of the regulator, which is a beautifully made and finished instrument that should last a lifetime.

The Company are now the sole makers of the folding lever key, patented by Mr. K. S. Murray, and which we illustrated and described in The Lantern Record for March 3 last. This key shows which way the valve should be turned for opening, offers great leverage, and folds back within itself (as shown here) for closing, thus becoming less powerful, and preventing overstraining of the valve spindle. We can speak from practical trial of the convenience and utility of this form of key.

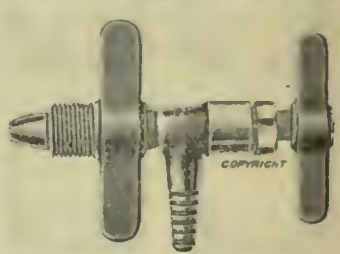


A convenient adjunct to lantern work is the folding cylinder stand which is illustrated below, closed and in use. It is very light and portable, and should be found specially useful for those who desire to hold cylinders in an upright position. It is made with steel legs, bronze connecting links, is very rigid, and may be quickly folded



up into a small space. In use, the weight of the cylinder upon the chains tightens the circles of links, and causes the stand to grip it firmly. By unbuttoning one link of each ring, which is provided with an oval hole, fitting on to an oval-headed stud, the stand may be folded up.

The Company's fine adjustment valve for regulating the flow of gases from high-pressure cylinders has lately been modified, and is considerably lighter than hitherto.



It is made with a stuffing box and screwed gland, so that, should a leak at any time appear at the spindle, it can at once be prevented by screwing down the gland or hexagon nut. This arrangement also enables a damaged spindle to be removed without necessitating the renewal of the whole valve. The productions of the Scotch and Irish Oxygen Company are of the highest type of efficiency, being well and carefully made and calculated to prove exceedingly serviceable to manipulators of compressed gases in connexion with the optical lantern.

Beard's Fine Adjustment Regulator and Pressure Gauge.

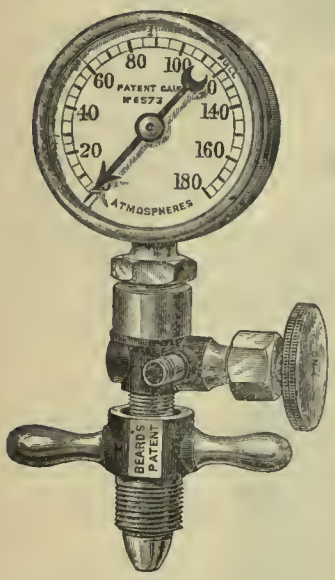
R. R. Beard, 62, Alscot-road, Bermondsey.

Beard's fine adjustment regulator is constructed upon the principle of the screw-down hydraulic valve; its use was proposed many years back,

but was very poorly adapted, an automatic governor then being the only recognised apparatus for the purpose.

Owing, however, to the cheap supply of oxygen, and consequently the great demand for cheap regulators, a large number of faulty instruments have been placed upon the market, which has only tended to bring discredit upon the use of regulators as a whole, many users preferring and resorting to regulating the gas by a long lever off the main valve of cylinder. This requires skill and practice to get good results.

With the fine adjustment valve as an anxiliary valve it places the gas entirely under control, and has the advantage, that when adjusted to get the best result at the burner, there is no need to upset it, for, should the light be required to be turned out, it can be done by the main valve, and in relighting one has no fear of blowing off the tubes, &c., which so often happens when one has only the main valve to work from. Of course, the valve is only useful with a single lantern, &c., or where a given supply of gas is required. It cannot be used for dissolving and triple lanterns.

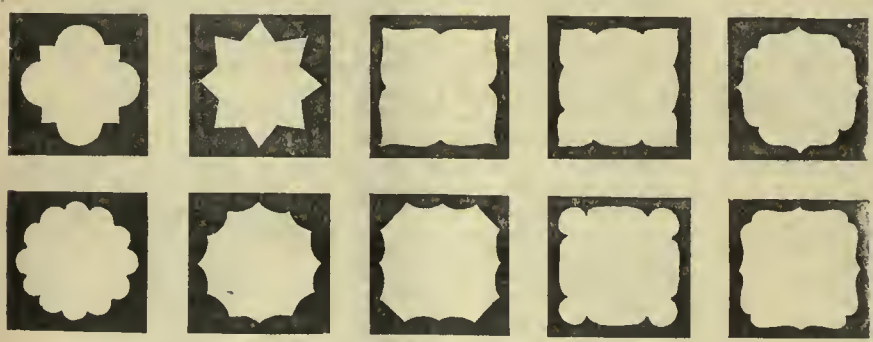


Mr. Beard has also constructed the valve so that a pressure gauge can be used to show the quantity of gas in the cylinder while using from it. This is a great advantage, as it gives the operator the comfort of knowing that his light is not going out in the middle of the lecture, to the confusion of both audience and lecturer.

The pressure gauge is constructed upon a patent principle, and has a check which allows only a small quantity of gas to pass into the tube of the gauge, so that, if it were possible for the tube to burst, it could not be followed by the loss of the whole of the gas in the cylinder, as hitherto.

William Tylar, High-street, Aston, Birmingham.

Mr. Tylar evolves novelties in the way of lantern and general photographic *minutiæ* with an ingenuity that can only be the outcome of a busy brain. Here below are ten illustrations representing the shapes of various fancily cut masks for lantern slides. These shapes, when selected with judgment, should impart pleasing variety to projected



pictures. For binding up and naming slides the pliable gummed binders, strips of thin paper ready gummed, and an index and spot label combined which Mr. Tylar supplies, are also very handy.

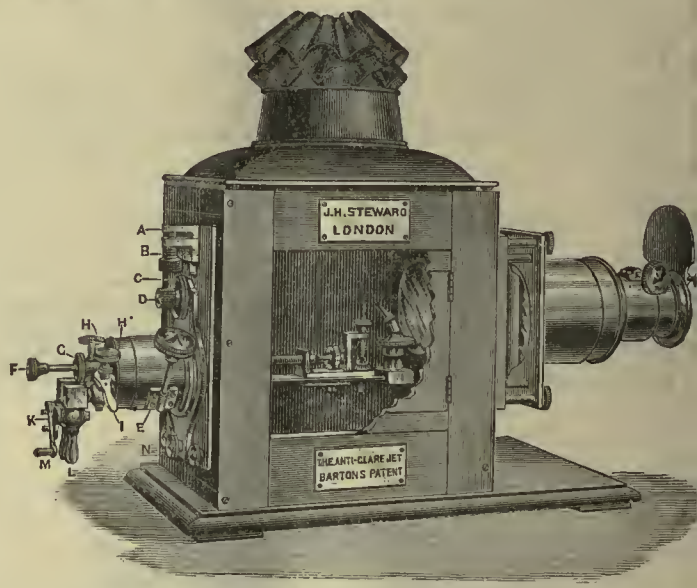
The wholesale agency of the Hill-Norris dry-collodion plate is now in the hands of Mr. Tylar, who forwards us a sample dozen of the lantern plates, which we shall take an early opportunity of trying.

A stand for oxygen cylinders, which folds flat by the side of the cylinder when not in use, and is perfectly rigid when set up, is also one of Mr. Tylar's novelties.

Barton's Patent Jet.

J. H. Steward, 416, Strand, W.C.

As announced last month, Mr. J. H. Steward has introduced Barton's "Anti-Glare Jet," one of the chief advantages of which is that no light can stream in to the eyes of the audience at the back of the lantern



All adjustments are made from the lantern outside in a simple manner, so as to prevent confusion. The working of the Jet may be understood by referring to the cut, in which B is the vertical adjustment, obtained by means of the screw working against the stop A. The side adjustment is controlled by the milled head C, and clamped by the nut D. The screw-down valves H, H, permit of the easy adjustment of the light; M is the cut off for checking the light down; E, the lime turning-rod working through G, which is screwed at the end into the lime support, and so moves the lime to and from the nipple. A spring click to the lime turner, F, is provided, so as to tell how much the lime has been turned. The Jet is fitted to one of Mr. J. H. Steward's lanterns, but can be adapted with little if any alteration to existing lanterns.

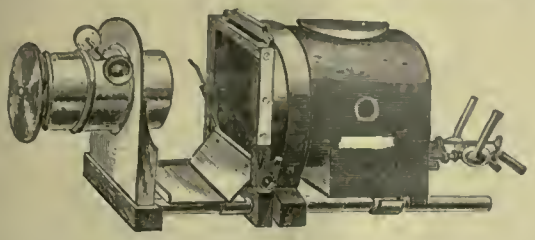
The Supplementary List of Optical Lantern Slides, issued by Mr. Alfred Underhill, of 32, Clarendon-road, West Croydon, Surrey, contains particulars of several series devoted to the Chicago Exhibition and Chicago City, day and moonlight effects at well-known spots of interest, effect slides of the Holy Land, a "Becket" series, bamboo screen effect series, &c. In the latter the first picture remains on the disc, and the subsequent views are exhibited in the blank centre of the bamboo screen. Mr. Underhill undertakes original drawings and designs for all purposes, but especially for reproduction as lantern slides.

Matthews's New Portable Optical Lantern.

Holmes & Watson, Danbury-street, Essex-road, N.

This Lantern is designed to combine efficiency with portability and extreme facility of manipulation. To attain these advantages telescopic tubes furnish a base, upon which run blocks to carry the condenser and objective, as well as the carrier stage and the jet stage; on these tubes perfect adjustment to suit the focal length of the objective, and the necessary distance of illuminant from the condenser, are readily obtained. The rear block is shaped as a crutch or cradle, in which the condenser is firmly held by a brass band furnished with slot and tightening screw, so that, in case of fracture, a condenser of somewhat larger or smaller diameter could be substituted. The front block carries a rigid brass standard, to which the objective is secured by means of a screwed flange. The carrier stage is of novel design, and, being provided with a rising platform, permits the use of various sizes of

slides at one uniform level, without the inconvenience of loose slips as usually supplied; the carrier is also attached to the stage by an entirely new method, bevelled-edge plates superseding springs, and forming a rigid and central attachment. Springs are, however, supplied in case of



need, and these are fixed to the stage and removed from it with great facility. The jet is designed for use with this lantern, and is furnished with all necessary movements for centering, and obtaining the proper distance from the condenser, a convenient lamp of Russian iron covering the light. The box in which the lantern is packed is provided with a rising lid, and forms a stand, with ready means of raising the picture to the desired position on the screen. Mr. Matthews has submitted the lantern to us for our inspection. It should be very popular.

THE LANTERN AND STEREOSCOPE AS AIDS TO EDUCATION.

[Abstract of World's Congress Paper by Professor C. F. Himes.]

After having obtained illustrative photographs, a pertinent question is how best to utilise them? what, if any, instrumental aids are there?

In this connexion, the magic lantern perhaps most promptly suggests itself. The lantern, it is true, has fallen somewhat into disrepute recently. This is also due to abuse of it and want of proper discrimination and thoughtfulness in its use. The improvements and modifications of recent years imparted to it such peculiar possibilities for illustration in the hands of the expert scientific teachers, that a tendency was created to suddenly expand its applications. Instead of calling upon it to do only that which could not be done so well without it, wonderful ingenuity was expended to bring within range of lantern illustration phenomena that are far more impressive to a class of students in their direct presentation. The popular lecturer, too, soon found it an excellent name to conjure with, and, by aid of modern photography, has created such a demand for pictures without much lecture, that he now finds his highest success in fixing them upon the screen with the rapidity of a mitrailleuse from his double or treble-decker lantern, leaving the impression upon his auditors similar to that of a view obtained from an express train. This species of lantern craze has tended to avert thoughtful persons from its use, and obscure to some extent its real merit.

The facility with which photography furnishes slides for the lantern constitutes, even with the educational lecturer, the temptation to overload a lecture with such illustrations, just as there is the temptation, on the part of the young lecturer, to overload a lecture with sensational experiments, that are apt to carry his audience beyond his control. The lantern in the hands of the teacher should be the servant, completely under control, never dictating to or directing the lecturer. Each slide should be as carefully selected for its pertinency and illustrative value, not simply facts, photographic excellence or its beauty, but as the experiment on the lecture table, or as a word in the discourse. They should be rigidly limited in numbers proportioned to the subject. To accomplish this, as I have before intimated, it is almost absolutely necessary that the lecturer should be the photographer. He should be able to cull his illustrations from a wider range than the catalogues of dealers. These, in the nature of the case, are often wanting in freshness. As an example, the slides of scientific apparatus are, for most part, reproductions from leading text-books, often of old models, even where they originate in scientific laboratories. As the lecturer draws from the freshest fields of current literature for his subject-matter, so he should have access to the most recent periodicals of all kinds, even to the advertisements, which often emphasise a point best for his illustrations, as well as perhaps to some little out-of-the-way discovered historic treatise. Apart from the expense involved in having single slides specially prepared by a photographer, no one can understand as fully as the teacher—in many cases—what is wanted, and no one will take the same pains to make the slide all it can be made, for much can be done, even in photography, in emphasising desired features. Besides, time might be a most important element in the case. In an emergency, a negative and slide from it might be made in less time than would be required to take the subject to and explain the wish to a photographer.

But there is a wide field for photography almost untouched, not restricted in its contributions to the lantern. Photographs of actual apparatus, not necessarily of detached pieces, but in groups illustrative of some phenomenon or some application, or, to go still further, arranged on the lecture-table, supporting each other in the progressive course of a lecture, are available to the teacher-photographer. These would afford permanent notes, full notes for the student, which might be supplied as blue prints to such as desired them. These photographs of line apparatus would not necessarily take the place of diagrammatic illustrations, or even text-book illustrations, but would supplement them, and make them real, and they might also have a peculiar value for lantern slides for future reference.

So, too, in the laboratory, apparatus of investigation, *in actual use* by the student, if photographed, would give a record often of general value, as well as of particular interest. Thus, supplementary to the evanescent pictures on the screen, often abnormal at best in many of their features, there might be formed permanent, accurate, highly valuable, as well as unique and peculiarly interesting collections for the student, the instructor, and the institution, and in many cases of general educational value.

But the educational methods of the day are more personal in their tendency. Even students in school do not receive their most effective instruction in crowds. The laboratory, the seminary, are supplementing the lecture each day more fully. The magic lantern thus recedes somewhat in importance. Even people are not as exclusively entertained in crowds. The photographs in the hands for close personal inspection, as long as may be desired, are much more satisfactory than even the best pictures upon the screen. In this connexion a second instrumental aid can be mentioned that far surpasses the magic lantern in all respects. It is a little instrument; it has been neglected, overlooked, displaced by popular fads, but which to-day seems to be experiencing a revival, not only of interest, but of intelligent interest, that will give it a permanent place on the library table and, it is to be hoped, in the schoolroom. I allude to the *stereoscope*. It was introduced into the scientific world just as successful photography was given it by Daguerre. Without photography it would have been little more than an exceedingly interesting piece of apparatus, illustrative of a theory of vision, and with limited educational applications. With photography of to-day it possesses an ever-widening field of usefulness for investigation as well as for education. It maps in space what the camera only gives in projection on a plane surface. It seemed at first limited in range to objects comparatively near until accidentally the pictures of Rutherford and De la Rue of the moon showed that even that body may be made to demonstrate its rotundity through its photographs in the stereoscope. On the other hand, it lays hold of the most minute object, and stereo photo-micrography is almost an untouched field of photography, in spite of the interesting specimens of micro-stereography produced, which demonstrate its usefulness.

It will readily be understood how much higher value the photographs of what I have called line apparatus—of lecture-table apparatus—will acquire if stereoscopic. What might appear a confused mass in any ordinary photograph of the lecture-table, in the stereoscope resolves itself into a wealth of interesting details, all in their proper relations to each other in space.

Without the stereoscope much care might be required in disposing the apparatus so that in many places the picture might not present patches of black or white pasted on a background without intelligible interpretation; with the stereoscope it can be felt that the representation will present itself as it appears to the eyes.

Recently Professor Stine, of the Armour Institute of this city, outlined to me an exceedingly ingenious method for mapping the magnetic field in space by means of stereoscopic photography, as effective in its way as the mapping of a section of it by the many methods in which iron filings are employed. When we consider that not only form is thus reproduced completely, but many other features, notably lustre, the little instrument acquires a new educational value. Thus the valuable unique mineral specimen meets its complete reproduction.

It may be asked, Why has so valuable an educational adjunct been overlooked so long?

In the first place, because, as a popular fad, the great public grew

weary of it. In the second place, because, as an instrument, it was, and has remained, crude and wanting in adjustments necessary to adapt it to personal comfort. At first there was no adjustment to focal length of eyes. Holmes's instrument remedied that. But the gravest defect which, in my own experience with many individuals, has caused its rejection is the want of an adjustment for varying distance between the eyes of different individuals, and for the varying distances of similar points in commercial stereography or varying width of pictures. Often when persons have been unable to see satisfactorily one stereograph, they could enjoy another, simply because the width was less. There are multitudes of simple mechanical movements that will accomplish this adjustment.

Professor Le Contre Stevens a few years ago put in the hands of a prominent photographic firm of world-wide reputation the design for an excellent and cheap one, and it was largely advertised; but, because there was not an immediate and large demand, they ceased to make it, and I was even unable to procure a specimen for exhibition at a lecture upon the subject before a prominent scientific body. The magnificent stereoscopic views of this exhibition, in spite of the revival of interest in the stereoscope, which will create a large demand, will be closed hooks to many, and scarcely satisfactory to others who might derive great enjoyment from them. The man or the firm that will bring upon the market a first-class stereoscope, with these almost necessary adjustments, at a reasonably advanced price, will prove a benefactor to these persons as well as to educators. To be sure, we are not dependent on the instrument; a very little exercise and patience will enable any one to combine, so to speak, the pictures of the ordinary stereograph without instrumental aid, and power to do this is a valuable acquisition which should be encouraged; but many will not take the time and trouble to acquire the power who would enjoy all that the stereoscope affords.

There is another point to which I would allude in this connexion, namely, the frauds practised in recent years, more especially with the revival of interest in the stereoscope. Twenty years ago, during a visit to Europe, I had less difficulty in getting stereographs of desired subjects than photographs of other sizes. In a recent visit, but few were to be had, and those for most part from old negatives. But in several reputable and large establishments where, perhaps, the call had recently been more frequent, I found the larger percentage of stereographs to be formed of duplicates from the same negative, a fact plainly evident without the stereoscope, and admitted by the dealer when his attention was called to it.

The time I have given to the stereoscope I justify to myself by the feeling that there is nothing that will so expand the applications of photography in personal instruction as the intelligent use of the stereoscope as an educational appliance.

LANTERN NIGHTS AT THE PHOTOGRAPHIC EXHIBITION.

The following are the nights set apart for optical lantern displays at the Exhibition Gallery of the Photographic Society of Great Britain, 5A, Pall Mall, East, S.W. On those evenings the Exhibition is open at seven o'clock.

Monday, October 9, *Variety in Hand Camera Work*, by Mr. W. D. Welford. Wednesday, 11, *A Visit to the Zoo*, by Mr. H. Sandland. Saturday, 14, Slides by Mr. J. Carpenter. Monday, 16, *A Photographic Trip to Spain*, by Mr. F. P. Cembrano, jun. Wednesday, 18, Slides by Members of the Birmingham Photographic Society. Saturday, 21, Slides by Messrs. West & Son. Monday, 23, Slides by Mr. J. B. B. Wellington and Mr. Birt Acres. Wednesday, 25, Slides by Mr. Richard Keene. Saturday, 28, Slides by Members of the Newcastle-on-Tyne and Northern Counties Photographic Association. Monday, 30, Slides by Mr. J. Dore.

Wednesday, November 1, *Pictures taken at the Photographic Conventions* by members thereof. Saturday, 4, Slides by Members of the Photographic Club. Monday, 6, Slides by Members of the London and Provincial Photographic Association. Wednesday, 8, Slides by Members of the Manchester Photographic Society. Friday, 10, *Special Lantern Night in Aid of the Photographers Benevolent' Association.* Saturday, 11, To be announced later. Monday, 13, Slides by Members of the Amateur Photographers' Field Club. Wednesday, 15, To be announced later.

The lantern is, as usual, in the competent hands of Mr. R. R. Beard. An improvement on previous entertainments is the provision of seats for the audience. A word of praise should also be given for the abolition of the ragged old lantern stand which formerly took up a needlessly great deal of room, and the substitution therefor of a new, smaller, and extremely artistic stand.

SUBMARINE PHOTOGRAPHY BY ARTIFICIAL LIGHT.

Mr. J. Humphrey writes to *Science*:—"Several of the difficulties experienced in endeavours to ascertain the natural relations of objects existing at considerable depths under water have been overcome by M. Louis Boutan in a remarkably ingenious manner, and the contrivances he adopted are described in a recent communication to the Paris Academy of Sciences:

"He prefers to use a small camera in which several plates can be exposed consecutively, and encloses this in a rectangular, water-tight metal box, into the sides of which plates of glass are inserted to serve as windows. The camera can be so disposed that the lens may face all the windows in turn, if desired, and exposures are regulated from outside the metal case. To avoid any ill effects that might be caused by differences in the internal and external pressure when the apparatus is sunk in deep water, a kind of balloon filled with air is connected with it. As the pressure increases, in descending, the balloon is compressed, extra air is thus forced into the box, and the pressure on its walls equalised. A stout foot to support the apparatus and weights to sink it complete it for practical purposes.

"In water near the shore, not greatly exceeding one metre in depth, the apparatus can be conveniently fixed, without the operator needing to enter the water, and, by direct sunlight, good negatives can be obtained in ten minutes. When the water is deeper, the operator must descend in diving costume to fix the case securely on its stand before commencing the actual work of photography. In calm, bright weather photographs can then be obtained by direct sunlight in from thirty to fifty minutes. Coloured glasses, preferably blue, must be interposed between the objective and the water, in order to obtain sharp images.

"By the use of artificial light to illuminate the surroundings, however, matters are still more simplified. To this end, M. Boutan has contrived a special magnesium lamp. A cask of two hundred litres capacity is filled with oxygen gas, and on its upper end is fixed a spirit lamp, which is covered by a bell glass. A vessel containing magnesium in powder is connected with this lamp in such a manner that the metal can be projected across the flame by the action of a rubber ball which serves as bellows. The oxygen gas, of course, is intended to assist combustion, and the lamp, having been lighted and covered by its protecting globe, the cask simply requires weighting to sink it.

"Good instantaneous negatives have thus been obtained by M. Boutan during a violent storm, when no daylight could penetrate the depths. They are lacking as regards background, but this he attributes to imperfections in the apparatus, particularly the objective. He also found it necessary to place before the lens a diaphragm of very small aperture to secure a sufficient degree of sharpness. If a formula were calculated for an objective, the front of which might be exposed to sea water, he thinks these drawbacks might be remedied.

"As it is, he has proved that photographs can be taken in a brief time under water, in calm weather, by direct sunlight, at depths up to six or seven metres; whilst, by the use of his special lamp, they can be taken, instantaneously, at any depth that can be conveniently reached by a diver, and the state of the weather is of no importance."

THE LANTERN SOCIETY.

Objects of the Society.

To acquire suitable apparatus for the purpose of giving exhibitions of general and scientific interest to both members and their friends.

To obtain the services of specialists in every branch of Art or Science suited to optical demonstration.

To impart instruction in the use of the Optical Lantern, and the apparatus connected therewith.

To form a large and comprehensive loan collection of Lantern Transparencies illustrative of Art, Science, and kindred subjects; such loan collection to be placed at the disposal of every member upon conditions to be laid down by the Council.

To provide a means of inter-communication between the members of the Society, whereby each member may be made acquainted with the private collections of his fellow-members, and may be able to negotiate a mutual loan if so desired.

(*A list of the slides belonging to the Loan Collection, and also of slides in the possession of members who are willing to lend them, is circulated at the commencement of each Session.*)

Meetings for 1893.

The Meetings of the Society are held at 20, Hanover-square, W., at 8 p.m., on the second and fourth Mondays in each month, from October to April inclusive.

October 9. The set of slides going to America will be shown.

October 23. Exhibitions of lantern slides for members and their friends.

November 13. Annual Meeting. The slides received from America will be shown.

November 27. Mr. S. Herbert Fry. Lecture, with demonstration on making lantern slides.

December 11. Mr. G. J. Symons, F.R.S., Hon. Secretary Royal Metcorological Society, on *The Lantern as a help to Meteorology.*

*** Several articles are unavoidably held over.

MONTHLY SUPPLEMENT

To the "British Journal of Photography."] [*November* 3, 1893.

THE LANTERN RECORD.

CONTENTS.

LANTERN NOTES AND NEWS.

We understand that the lantern nights of the Photographic Society of Great Britain have been very successful, the audiences being larger than hitherto. The quality of the slides shown has been, on the whole, high. Doubtless Mr. Anderton's system of stereoscopic projection has been instrumental in making the Pall Mall Lantern Nights popular, but independently of this there is ample cause for gratification at the continued interest taken by the general as well as the photographic public in lantern matters.

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It is said that a novel attraction in next year's proposed International Exhibition at Antwerp will be an aerial castle, formed of two balloons connected together by means of three cylindrical compartments, and made captive by four stout cables. It is to be lighted at night by thousands of electric lamps, the current to be supplied from the generating plant illuminating the Exhibition and grounds. Passengers will be conveyed by small balloons to the castle, which is to be capable of accommodating 150 people.

* * * * *

We read that a single electric lamp of 5000 candle power now illuminates the Bartholdi statue of Liberty in New York Harbour. The lamp is situated in the torch held aloft by the figure, and most of the light is reflected horizontally by mirrors, some of it, however, being directed upward through white, red, and yellow glasses to give the effect of a flame. In addition to this, the diadem on the brows of the figure is lit by fifty incandescent lamps of fifty candle power each, and of the national colours, red, white, and blue, thus resembling rubies, diamonds, and sapphires.

* * * * *

The Rev. Mr. Patten, who read a paper on *The Camera and the Pulpit* before the Chicago Congress of Photographers, referred with approval to the employment of the optical lantern in Church services, and since then several newspapers have commented upon the idea as if it were new or novel in suggestion. It is neither the one nor the other. Many years ago the late Rev. T. F. Hardwich, a name of the highest renown in photographic history, when he left King's College to devote his time to religious ministrations among the Durham miners, was wont to use the optical lantern as a means of illustrating his discourses, and as a ready way of appealing to the hearts of his hearers.

* * * * *

"With a series of good negatives secured in the bright summer weather," says Mr. W. Hume in his admirable "Cantilever" monograph, "the pleasures of the field work are revived on winter evenings, as the pictures take larger form through the agency of a good enlarging apparatus, available at any hour, when the ordinary work of the day is over. For it is a remarkable fact that the development of the latent image is watched by the experienced photographer with an interest as keen as that of one who sees it for the first time. This interest is increased rather than diminished in the production of enlargements, as the worker sees before him the first faint outlines begin to appear; his pleasure increases as the positive image acquires strength, half-tone, and vigour; and his satisfaction is complete when the picture is finished, mounted, and hung up."

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Messrs. Newton & Co., of Fleet-street, have recently issued a new supplementary catalogue of sets of slides, which include *The Tower of London, Switzerland and the Alps, Spain, Italy, Venice, India, Animal Studies at the Zoo, National Gallery Pictures, Corals and Fishes* from the *Great Barrier Reef of Australia* (recently reviewed in The British Journal of Photography), and other attractive subjects, scientific and general.

* * * * *

The London agents of the lantern stereoscope (Anderton's patent) are Messrs. Harvey & Park, of 56, Charing Cross-road, W.C. This answers several inquiries.

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In a communication to *Nature*, Mr. W. Churchill describes the following novel form of image-projection:—"I was on the top of a small mountain in the Dövrefjeld, near Hjerkin, in the late afternoon of August 23, the sun being 10–15° above the horizon, when I saw a remarkable phenomenon. On the opposite side to the sun was a bright disc, perhaps 5° in diameter, shown on some drifting clouds. The shadow of my head appeared in the centre of the disc, that of my body below, while outside the disc the shadow of my legs was faintly visible. The phenomenon continued on and off—that is to say, when the clouds were favourable—for nearly a quarter of an hour. The landlord of the hotel said he had never seen anything of the sort."

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We have received from Mr. T. T. Wing, lantern-slide maker and colourist, of Chatteris, Cambs, specimens of his productions in lantern slides, both plain and coloured. The former are of great softness, clearness, and brilliancy; the latter are effective.

* * * * *

A number of processes for the manufacture of pure oxygen from air have appeared recently, all following in a general way the suggestions of the well-known "Brin" process. Herr G. Kassner, in the *Chemiker Zeitung*, claims a superiority for a salt of calcium, the calcium plumbate, Ca_3PhO_4, his process being briefly as follows:—The plumbate, in spongy, porous pieces, is exposed to the action of moist furnace gases which have previously been well washed. Carbonic acid is absorbed by the calcium salt with decomposition, forming calcium carbonate and free peroxide of lead. This decomposition is unaccompanied by a change of form. The resulting mass is transferred to a strong retort heated to redness. Oxygen is disengaged, and the evolution facilitated by a stream of superheated steam. Finally, carbonic acid is given off, and in the last stages this is pure. In the intermediate stage the gases are passed over calcium plumbate, and the carbonic acid there absorbed, leaving the oxygen pure. An-

other similar process has been patented by Peitz, calling for the use of pure carbonic acid.

* * * * *

Le Chatelier proposes a direct method of heating to drive off the oxygen and a reabsorption of the oxygen from the air, but Kassner, who has already experimented with the direct method, considers the higher temperature, the larger expenditure for fuel necessary, and the consequent greater wear upon the retorts, serious obstacles, successfully overcome only by his later indirect method.

* * * * *

Mr. L. Chapman, London, has patented a process depending upon the alternate oxidation and reduction of a mixture of manganese dioxide ("or a similar substance") with caustic soda by means of air and steam respectively. Finely divided manganese dioxide and caustic soda, in the proportions necessary to the formation of the manganate, are mixed with a weight of sodium sulphate equal to the weight of caustic soda taken. Air is passed through small pipes leading nearly to the bottom of the vessel, thus assuring mixture and oxidation by the uprising current. When the oxidation is complete the air is shut off, and the air in the upper parts and in the supply and exit pipes removed by means of steam. Dry steam is then passed. Nitrogen is obtained, with a slight modification, by collecting the gas which escapes during the oxidation and again passing it through the mixture.

AN EASY COLLODION PROCESS.

As there seems to be a tendency in the direction of a revival of collodion and the silver bath, some of the newer readers of the Record may be glad of a simple process which, while it gives all the good qualities for transparency work that are derivable from collodion, is free from many of the difficulties that surround the ordinary "wet" method. It is equally available for the production of negatives for process work, and indeed for all the purposes to which wet collodion continues to be applied, giving in many instances better results than would be obtained by the latter, except under the most favourable conditions and after the acquirement of a considerable degree of skill.

The method I have to describe is a dry one, having collodion and the silver bath as a basis as distinguished from collodion emulsion, with which at the present time, owing to the difficulty in obtaining suitable pyroxyline, many beginners experience a good deal of trouble. This is not the case with the bath process, as any of the bromo-iodised collodions still on the market answer as well as when used wet, or, if preferred for certain purposes, suitable plain collodion can be specially bromised by the operator himself.

The preservative I have to recommend as being at once the easiest to work, and giving the most satisfactory results as regards colour and general good qualities, is the old honey preservative, which may be preferably slightly acidified with acetic acid. This was commonly written down a slow process even in the old collodion days, which I could never understand, as in my hands, nearly thirty years ago, it proved quick enough to take pictures in a fraction of a second, and to render moving figures with a fair degree of sharpness. At any rate, for such purposes as lantern slides, it will not be found much, if any, slower than an average wet plate, while the chances are that the results will be superior. It has the advantage over the wet plate that the film will keep at least for some days if kept from damp, for which the honey has a rather powerful attraction, and consequently it is well adapted to the requirements of the amateur, who can, in a single evening, and at one trouble and mess, prepare a stock of films for subsequent exposure.

The process of preparing and coating the glass is precisely similar to that followed in the wet-collodion process, and it will save unnecessary repetition if I refer readers to Mr. W. E. Debenham's description of the methods of cleaning and coating the plates reported in the Journal of October 20 last. Any of the commercial bromo-iodised collodions may be used, and the formula given in Mr. Debenham's article referred to may be taken as the basis, though, for dry-plate purposes, if a special collodion is being made, it will be as well to salt it a little more heavily, and to slightly increase the proportion of bromide to that of iodide. For instance, six grains of iodide of cadmium and one (or one and a half) grain of bromide of ammonium (or an equivalent of the cadmium salt) will work satisfactorily. It is, above all, important that the collodion should be well "ripened" before use, that is to say, that its salts shall have partly decomposed and given it a somewhat deep yellow colour. If this change has not taken place, the same result may be allowed, as in Mr. Debenham's formula, by the addition of a small quantity of iodine.

If sensitiveness is a matter of importance, the collodion may be salted with bromides alone, to the entire exclusion of iodide, though in inexperienced hands the process will then be slightly more difficult to work to the best advantage, and a much stronger silver bath will be required. The bromised collodion may contain in each ounce five grains of cadmium and three grains of ammonium salt, and the silver bath should not be weaker than fifty grains to the ounce, thirty grains sufficing with bromo-iodised collodion.

The glass is cleaned and coated in the manner described by Mr. Debenham a fortnight ago, but it is well to allow the collodion to "set" for a longer period, or to become drier than when it is intended for a wet plate; it must on no account, however, be allowed to get wholly dry, or anything approaching that state. The immersion in the sensitising bath must also be more prolonged, especially in the case of simply bromised collodion, which, even with the stronger bath, requires a much longer time to fully sensitise than the bromo-iodide. The best test is to watch the density of the layer of silver salts, and, when that appears sufficiently "creamy" or opaque, the process may be taken to be complete. In preparing a number of plates, as only one can be in the bath at once, it is important to curtail the period of sensitising as much as possible, and, in order to economise time, it will be found useful to remove the plates from the bath at the end of one-half or three-fourths the total period that experience shows is required to complete the sensitising, and then to rear them up to drain for some minutes in a place sheltered from dust and light. During the period of draining the surplus solution remaining on and in the collodion film will go on acting, and so finish the process, not yet complete, at the same time less silver will be wasted in the subsequent washing.

After the plate has been well drained, it is placed in a dish of perfectly clean water, which should be preferably rain water previously boiled and filtered, although this is not absolutely needful. After it has remained in this for a minute or two, it should be passed through three or four changes of ordinary water, remaining in each a few minutes, and, after a final rinse under the tap or from a jug, it is ready for the preservative. If the plates are to be kept for any length of time, it will be safer to ensure the complete removal of all traces of nitrate of silver by very thorough washing, or else by the use of a weak solution of salt; but, where keeping qualities extending over two or three weeks will suffice, this is not of such extreme importance.

The preservative, the function of which is to soak into the pores of the collodion film, and prevent its drying up into an impervious skin, consists of a teaspoonful of good honey, and two or three drops of acetic acid, dissolved in an ounce of water, and carefully filtered. This is poured on to the film three or four times from a measure glass, so as to get as even a coating as possible, or the plate may be immersed in the solution in a dish; it is then reared up on end on clean blotting-paper, in order that the surplus may be evenly drained away, and, when all the films have become surface-dry, they are to be transferred to a suitable drying box or cupboard. It is important, during drying, that no sudden change in the atmospheric conditions occurs, such as a great and rapid change of temperature, or a strong current of air, otherwise drying marks will occur. If the films are permitted to become quite surface-dry, they may be rapidly dried over a hot plate, if care be taken that there is no check in the process. When dry, the film will have a bright polished surface of great hardness.

These plates are very useful for contact printing, but much more care must be taken with them than with gelatine, on account of the comparative tenderness of the film. The exposures will vary from ten to thirty seconds or more to a good gas flame, and any of the ordinary dry-plate developers can be used, but pyro and carbonate of ammonia give the best tones.

W. B. Bolton.

THE SEARCH LIGHT.

Does the presence of tobacco smoke in a room where the optical lantern is being worked interfere with the clearness and brilliancy of the projected image? I have never myself been able to detect any degradation of result where, say, thirty or forty photographers have been puffing away at what an acquaintance of mine once termed the "*calomel* of peace," but I have heard it suggested that the smoke does make some appreciable difference. I am just as fond of smoking as I am of optical lantern shows, so I hope no ukase against the use of the soothing weed on these enjoyable occasions will ever go forth. By the way, my enemies ridicule my favourite brand of the weed, and endeavour to destroy my affection for it by foisting their own particular fancies in the way of tobacco upon me; but so far I have preserved my allegiance, and defied the arts of these would-be poisoners. In view of the near approach of the Christmas gift season, perhaps some of my readers would like to know what tobacco I *do* smoke; so I—— Dear, dear! where am I wandering to?

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Aided by some good fellows, I have lately perpetrated the harmless but seductive raffle upon one or two festive photographic assemblies on behalf of the Photographers' Benevolent Association, the result being the addition to its funds of a small, but useful, sum of money. I am induced to refer to this matter here, at the risk of being called names, for two reasons. In the first place, I want to thank all those gentlemen who parted so freely with their sixpences and shillings to me; and in the next place to remind them and others that, on Friday, November 10, there will be, at the Exhibition Gallery of the Photographic Society of Great Britain, 5A, Pall Mall East, a special lantern display in aid of the Photographers' Benevolent Association. Mr. Mackie, the chairman of the Benevolent Council, and Mr. Snowden Ward, hon. secretary, both of whom work hard and spend much time in the good cause, tell me that the Association is in need of funds, which, translated into other language, means that it is doing good work among the necessitous. I therefore hope the Special Lantern Night will be well supported. I trust to be present myself, and, if I can persuade my urbane friend, Mr. Child Bayley, to let me apply the magnet to the contents of everybody's purses there, I will engage to provide a work of art to be raffled for, which will generate so much covetousness in the room that the Photographers' Benevolent Association will wake up the next morning to find itself rich. All joking apart, however, the distress among photographers, assistants, and others is just now so keen, that the Benevolent will have to cope with a large and steady drain upon its resources during this winter. So, once more I cry, Give, give, give!

* * * * *

I looked in at the Central Photographic Club the other night, and found an exhibition of lantern slides in progress, by Messrs. Acres and Wellington, in connexion with a talk on the carbon process, and very good slides they were too. I am glad to find, from certain parental observations that I occasionally make as to the progress of the Club, that the powers that be take my last month's criticisms in the best part, and appear laudably anxious to give the Club a character other than that of merely another society for the conversational cultivation of photography, as it might, should, or ought to be, but isn't. Now, the next thing I should like to hear is, that the Photographic Convention of the United Kingdom and the Photographers' Benevolent Association will make the rooms of the Central Club their headquarters. I see that, by invitation of Mr. Thomas Fall (its President) the National Association of Professional Photographers are to meet at the Central and indulge in the "cup that cheers but not inebriates," and discuss matters of interest to the profession. A very good idea, and likely to benefit them and the Central Club as well.

* * * * *

I read in the pages of the *Journal of the Photographic Society of India* that, at the recent meeting of the Amateur Photographic Society of Madras, Dr. Van Geyzel, one of the members, showed a very ingenious device by which he turns his camera into a stereoscope. Such are all the details vouchsafed. Given a pair of lenses, there are, of course, no great difficulties in the way of putting the camera to such a use, but I am sorry that so few particulars of how Dr. Van Geyzel went about it were given. Although it is commonly said that there is not much left in photography for the inventor to turn his attention to, Dr. Van Geyzel's idea suggests to me that after all the common fancy is incorrect. For instance, there is clearly scope for the production of a camera which shall be either a microscope, telescope, lantern, hand bag, knife box, writing desk, money box, as occasion demands, and I hope that, in the interests of amateur photographers, who naturally want the best value for money, such an article will shortly be forthcoming. You see, my brethren, the manufacturers of cameras and photographic apparatus generally are just now making so much money out of that too confiding and trustful Crœsus, the modern amateur, that it behoves us all to use every possible means to prevent such rapacity, and thus to invent one piece of apparatus to do duty for twenty.

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The question whether as good results for lantern projection can be obtained on commercial gelatine plates as on wet collodion is one of the vexed variety which apparently is doomed to be always with us. Speaking from a considerable experience of lantern entertainments as a spectator, I do not hesitate to say that, in transparency, clearness, brilliancy, and agreeableness of tone, I have seen results on gelatine which it would be impossible to separate from the finest results on collodion, even in a competition. To my thinking, the process, and not the man, is responsible for any advantage which collodion may seem at times to possess. Gelatine plates, with all their apparent simplicity, require great study and education to get the best results from them.

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Chatting the other night with an old platemaker, and one of great experience in most processes, wet and dry, he stated it as his deliberate opinion that dry gelatine could be made to equal wet collodion in the quality of its results, and, when met by the contention that the few great makers of commercial lantern slides still employ the wet process, cogently pointed out that in all probability it did not pay these firms to change, inasmuch as their *employés* were thoroughly well used to wet collodion, whereas they, as yet, had not had the opportunity of becoming acquainted with gelatine. "There's something in that," as the old lady said on a peculiar occasion.

* * * * *

Talking about photographic societies, and those that foregather at them, I will let you into a pretty little secret, my dear reader. There is in existence in London a Secret, Black and Midnight Association, of persons of the highest eminence in photography, who hold in their few hands all the leading strings of photographic progress and enterprise, and who shape the policy of the photographic world at large with a despotic remorselessness only equal to that of the terrible Third Section. Admission to this charmed circle is a thousand times more difficult than to that eerie but Tooley-street-Tailorish body, the Linked Ring, or even to the jovial Solar Club. It is essentially a Lantern Society because it only meets by artificial light. When I hear mention of the Photographic Society of Great Britain, the Camera Club, the London and Provincial, the Photographic Club, the Central, and others of that ilk, I smile at their individual and collective unimportance. For this is *the* Photographic Society. To call it by its initials, it is known as the "A. M. S." Now, reader, what do these three initials stand for? No prizes and no blanks, and please prepay all replies.

RADIANT.

CARRIERS.

With the growth in popularity of the lantern, and the enormous increase in the facilities for slide-making due to photography, the old form of lantern slide mounted in a cumbrous wooden—I had almost said timber—frame has become nearly a thing of the past. Evolution has been at work in this detail of the lantern as well as in others, and the ingenuity of inventors has put upon the market a host of contrivances for facilitating (or otherwise) the change from slide to slide. Into the distinctive features of some of these carriers I propose to inquire; but, before doing so, it would be best to recapitulate a few of the more important *desiderata* which the lantern-slide carrier should possess, and in doing so it is best to state at the outset that the kind of display under consideration is more that required by a photographic or lantern society, or scientific or popular lecture illustrated by photographic slides, than the more or less infantile diversion obtained from what are styled "effects."

A writer, some week or two ago, in another periodical which devotes its attention to photography, after stating that the chief function of lantern slides was to illustrate, and not to decorate, and that they should take the place of diagrams rather than pictures, went on to say that one of the most important rules that lanternists should observe was "that the view on the screen should never be seen to move." Why, I must confess, I entirely fail to see. Assuming that a lantern slide is a *picture*, some of the hyper-sensitive artists, some of those individuals who cannot look at a photograph if there be a camera in the same room—it is so technical, you know—might have some possible complaint to make that the sliding of the picture destroys the illusion; in other words, that the function of a slide is to not-slide. It would be in keeping with other of their contentions. In reply to these gentry, it might be pointed out that even pictures can be taken down off a wall, that there is no case on record where an artist failed to appreciate a picture because it was removable, and that they would hardly decry all works of art with the exception of frescoes? But that a diagram or an illustration should never be seen to move—what can it matter? I have attended lectures where the Professor has had hanging, one upon the other, on the walls a series of "diagrams" or "illustrations" which he took down one after another to illustrate the various points in his lecture. Did he violate a most important rule? We may safely disregard a *dictum* of this sort in considering the most desirable features of a carrier, which are as follows:—

1. The absolute impossibility of sticking and jamming.
2. The prevention of one slide from overlapping another.
3. The absence of either a blank white disc or complete darkness while changing.
4. The possibility of the operator seeing the slide in the carrier before it passes into position in the lantern.

As regards the first two of these conditions, by "absolute impossibility" I mean, at least, as much certainty against accident of any kind, say, as the axle of a railway carriage possesses. There are carriers in existence, marvels of ingenuity, capital methods of changing slides in private, or where a non-critical and indulgent audience would pass over a hitch occurring perhaps once in the course of a display. They act beautifully 99 times in 100, or 999 times in 1000, but the 100th or 1000th time something happens—a slide is too big or too small, a catch or a spring has been wearing, and the carrier "won't work." I have known an excellent carrier in other respects jammed by so slight an accident as the binding paper of the slide becoming unstuck. For a public exhibition such a hitch should be impossible; the slides should follow one another in even and unbroken succession.

The alternation of a blank white disc with a slide is very trying to many persons' eyes, apart from which many of the best slides pictorially are not absolutely bare glass in the highest lights, or these portions bear so very small a proportion to the rest of the picture that, following immediately upon the exhibition of a white screen illuminated with the full glare of the lantern, they look gloomy and dull, and half their beauty is lost. This would seem to favour complete obscurity while changing; but to this there are equal, if not stronger, objections. To sit for an hour, and look at something which every minute or so alternates between a brightly lit picture and Egyptian darkness, is a strain upon the strongest eyesight, provocative of headache, and would put the best audience in anything but a good temper. The middle course between these two extremes consists either in the employment of a translucent screen to cut off part of the light while changing, such as has been constructed with celluloid, opal, &c., or in permitting the audience to see one picture pass off the screen and be succeeded by another, no such dreadful a process now that all the mystery which surrounded dissolving has been sent to the "limbo near the moon."

With reference to the fourth requisite—that the operator should see the slide in the carrier before it is passed into the lantern—this most important point is generally overlooked. It is perhaps hardly an essential of the *carrier*, since, with most carriers, it could be arranged by means of a distinct adjunct, such as a shaded candle with a piece of ground glass or opal in front about the size of a slide. This could be stood by the side of the tube of the lantern, with its back to the screen, the illuminated glass coming immediately in front of the slide awaiting exhibition. The best of operators are but mortals, and fallible; and, when set down at the lantern, with a pile of unspotted and variably spotted slides such as most "scratch" society and other sets generally are (regular lecturers' sets always excluded), can hardly help occasionally getting one in sideways or upside down. It is frequently necessary, when exhibiting such slides, to look through them at the screen to form an idea from the subject of the right way to put them into the carrier; and the screen, covered as it is with the details of another picture, is not at all a good surface to look at for the purpose. Such a little device as I recommend would entirely obviate all this, and would act as a certain preventive with all but the most careless operators of that unfortunate *contretemps* of a slide upside down or lying on its side. As at present managed, the first intimation the operator gets of his mishap is from the audience or from the screen itself.

Such, then, are the chief points which a lantern-slide carrier should possess, and there are several in the market which meet Nos. 2 and 3 absolutely, and No. 1 very nearly; No. 4, as I have already pointed out, can be met, in the case of most carriers, by the addition of a trifling and inexpensive "extra."

The simplest form of carrier consists of a slab of wood—which should, by the way, be well seasoned to stand the unequal heating that it is certain to get—$9\frac{3}{4}$ inches long, by about 5 inches high, by $\frac{5}{8}$ inch thick, down which runs a groove slightly deeper and wider than a slide when bound with its cover glass, and in the centre of which is an opening a trifle over 3 inches square. Into one end of the groove a slide is placed, and pushed on by the next until the edge of slide No. 2 is flush with the edge of the carrier itself, when the first, supposing both are $3\frac{1}{4}$ inches long, must be in the centre of the opening. The next is then put in and pushed home as before. Various modifications of this carrier have from time to time been introduced; the first, chronologically, was probably the extension of the groove at one side into a series of steps, so as to take and centre various sizes of slides. It might be considered advantageous to have the exit end of the carrier of some length, to avoid the necessity of taking a slide out every time one is put in at the other end, but this lengthening is likely to lead the operator to forget and let the slide drop out and fall. A drawback to this carrier is that if the groove is cut to take the thickest slides likely to be met with, it will have to be of such a size as, when very thin slides are being shown, to allow of their overlapping, a most disastrous result. Moreover, carriers of this pattern are often met with on the market which have no definite top or bottom, the groove being equally deep. Hence there is danger either that the groove will be too tight to admit a slide a little over the regulation size, or so deep as to allow one which was a little too small to fall forward or backward. This is easily got over by having the bottom groove of such a depth that the centre of a slide $3\frac{1}{4}$ inches high comes in the centre of the opening; the top groove can be any depth in reason greater than this; slides varying one-eighth of an inch or more can then be passed through without a hitch. One side of the channels carrying the slide, instead of being fixed, can consist of strips of wood or other material actuated by springs, which press them gently into contact with the slide, and prevent too thin ones from overlapping. Such a form of carrier, with the top groove deeper than the bottom, and with the wood cut away on the side at which the slides are inserted, so that the operator can see them *in situ* before they are thrown on the screen, meets every requirement a carrier should possess, while in point of view of reliability and freedom from mechanical details, with their proverbial disposition to go wrong just at the most awkward moment, it offers great advantages over many more complex forms.

By a simple process of evolution from this carrier a form greatly in vogue at the present day was reached; that in which the sliding portion is a frame holding two slides, which are inserted from the top, this frame, by being pushed backwards and forwards, brings one or other slide into position, the other being then outside the lantern, ready to be taken out of its carrier and another substituted. This has now been elaborated by the addition of a spring underneath the slide, which, when the frame is withdrawn from the lantern, causes the slide to project up above the top of the frame, and so facilitates its removal. Whether it is desirable, especially when the pictures are following one another in fairly rapid succession—as is bound to be sometimes the case—that they should see-saw or pass away, one in one direction and the next in the opposite, is doubtful. I must confess that it is unpleasant to me. Otherwise this form of carrier is very efficient.

A great elaboration of this carrier is to be found in another form. Here the motion of the frame bearing the two slides is caused by the partial revolution of a handle. This handle, however, before moving the frame, actuates two levers, which, in their turn, close two vulcanite shutters in front of the condensers; then the frame carrying the slides passes across, and immediately the second slide is in position the shutters open. Allied to this carrier in the method of changing—at least, as far as the audience can observe, although it is accomplished in a different way—is one in which the slides are inserted in a groove, as in the first-described form. In this carrier, however, there is a second similar groove, in which slides a shutter, on which is fixed a projecting stud. The shutter, which is a long one, is pushed

steadily in. It first obscures the slide which is in the lantern. The stud then catches the second slide, and carries it in with it, pushing the other out, until the motion of the shutter is arrested by a stop, which indicates that the second slide is in position, when the shutter is withdrawn. Both these carriers give a momentary darkness while the slides are changed.

Still another form of the sliding frame-carrier is one in which the changing is effected by a lever on the top of the lens tube. On moving this lever through an arc, the first effect is to partially obscure the screen by interposing a celluloid or other translucent disc between the lens and screen. Further motion of the lever causes the frame carrying the slides to pass along and bring the second slide into position, when the disc is withdrawn, and the new picture appears on the screen.

Two other remarkably ingenious carriers are both due to the same inventor. In one, the slides are put upon a metal runner, upon which is a spring catch, which holds the slide in position, and this runner is then pushed right home, when, by an arrangement of levers, into contact with which the slide is brought when it is pushed as far in as it will go, it is accurately centered. The other alluded to is, probably, the nearest approach to dissolving that will ever be obtaind with a single lantern. The methods of its working cannot be explained without diagrams, but its effect upon the screen is as follows: As soon as one slide has been sufficiently displayed, the other is pushed in behind it, being, while in that position, of course somewhat out of focus, until the two entirely over-lap; as soon as this is the case, the bar which has carried the second slide into position is withdrawn, drawing with it the first slide; a spring then brings the new picture into focus with a slight click. A very decided advantage possessed by this carrier is, that the slides are put in and taken out from the same side of the lantern, a *desideratum* when the operator is working without assistance.

All the foregoing carry the slides horizontally into and out of the lantern. This, of course, is much the commoner way, most lanterns being constructed in such a manner that any other method is not applicable to them. For the slides to pass through vertically, the lantern has to be specially constructed; there are, however, several clever devices for effecting this, but in nearly every case they are put upon the market as part and parcel of the lantern itself, not as an adjunct or extra. One of the latest of these possesses a distinct feature of novelty. The slide is inserted from above, and, when shown, does not exactly slide or drop, but, in a kind of combination of the two methods of motion, passes into a tray for the purpose, lying vertically under the lens tube of the lantern.

Another novel form of carrier, and the last space will permit me to mention, consists of a light metal frame, in each end of which, by means of springs, a slide is held. The frame is pivoted on its centre at a point exactly above the centre of the slide when in position. A lever first partially obscures the slide in the lantern by inserting a slip of celluloid, then swings the frame carrying the slides round on its pivot through a semicircle. This brings the new slide into position, while that already shown is at the top of the lantern ready to be changed, the lever finally raising the disc and displaying the fresh picture.

With the number of carriers at present in the market, one could go on for some time indicating their distinctive features, but to no very great advantage. Those above described have been selected more as being typical than as possessing any very marked superiority over any to which allusion has not been made. It only remains for me to reiterate, in conclusion, what I have endeavoured to indicate as my opinion throughout, that the simpler the carrier the more efficient it will be. The first requirement should be the avoidance of the unexpected, and any consideration as to the ideal method of replacing one picture on the screen by another should be relegated to the second, or, rather, the fourth place. For, to parody an old saying, a lanternist's three golden rules should be:—First. No hitch. Second. No hitch. Third. No hitch.

JAMES LEWIS.

LANTERN MEMS.

THAT the lantern season has fairly started one has evidence of on all sides. Men passing to and fro in the principal thoroughfares with gas cylinders on their shoulders, and at the railway stations one sees smaller vessels being carried in the hand by luggage straps; and as a balance in the other hand the well-known lantern box. Lectures are announced in the papers and on the walls and hoardings, in which the optical lantern is used for illustration, and we have recently had at the East End (Charington's Hall) Sir Robert Ball and Professor Fleming lecturing respectively on astronomy and electricity to an audience of something like 5000 persons.

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THE use of the optical lantern as an instructor for colossal assemblies has put a new power into the hands of scientific men, religious bodies, and entertainers, and besides it has recently again proved of great value in controlling the united action of a large audience. I refer to the memorial meeting of the Salvationists at the Agricultural Hall, where messages were given to the congregation by means of projections on the screen, the words standing out in huge white letters, capable of being seen by every one present, while the words of hymns, &c., enabled all those who were so disposed to join in the singing.

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WITH smoked glass and a pointer, any formula or other explanation, diagram, &c., it is desired to project, can be rapidly and conveyed by the lecturer to the audience, while photographic illustrations assist the explanation of ideas or facts. The National Sunday League are good friends to the Rational Sunday advocates and the working classes, and to their success I can personally testify, for not only do they make it possible for the masses to view the wonderful works of nature and of man during the summer and get needful fresh air by their excursions to the New Forest, Salisbury, and Stonehenge, and all accessible seaside places, but during the winter foster the love of science, art, and music at the various suitable halls in and around London.

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As an illustration, may be given the programme for Sunday, October 30, at The Horns, Kennington, when Mr. Eric Bruce gave a lecture on "The Human Eye, and its Wondrous Illusions," illustrating Persistence of Vision by the aerial graphoscope, which the photographic fraternity will remember having seen at one of the photographic societies' Exhibitions. The similarity between the photographic camera and the eye has often been made; and, in fact, is the usual simile, but it is certainly gratifying to a lecturer to know that a large audience (filling a good-size hall to completion) sat interested for one hour listening to a technical discourse, and following the illustrations with pleasure. For the musical part an excellent programme was provided in an overture, intermezzo, and march by a capital orchestral band, while soli and anthems formed the vocal items. That the result is so successful speaks well for the future of lantern entertainments, and opens up a large field of work. Without wishing to be hypercritical when an audience is so appreciative, we can always review a result afterwards, and there are many points that suggest themselves in an exhibition of this kind that deserve consideration and permit of improvement. It is admitted that a lecturer is handicapped the moment he essays the dual task of lecturer and operator as well, and consequently those who have *not* to do this work can more easily see little points of improvement. A candid critic is never liked, and, if the artist were to listen to all his "friends" who came to the private view of his Academy picture, the chances are it would never be "hung."

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As an unbiassed unit in the audience, I give my impressions, and, as they no doubt apply to scores of similar entertainments, I trust that they will be accepted in the same spirit as given. The result of an experiment is measured by the effect left on the mind of the audience. If an illusion is to be shown, there is no value in exposing the method of producing it—certainly not before it is an accomplished demonstration. In the case I have before me an aerial image is to be projected. The lantern is placed between the screen and the audience (with the back, by the bye, partially open, letting some light out, and the lath which is to revolve and form the disc on which the projection is to be made is in turn placed in front of a black velvet (or other suitable material) screen, to prevent the image of the slide to be shown going beyond the rotating lathe or destroying the illusion.

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WHAT can we think but that a miscalculation has been made in the distance of the black screen or the angle of the lantern when we find

not only the aerial projection but a portion of a fixed one on the wall or part of the stage above the black screen that should have shielded it? I say in reply the simple word, *rehearsal*. As a well-wisher of the lantern, there is, no doubt, absolute necessity for the special experiments of the lecture to be rehearsed in the building in which it is to be given, if perfection is to be achieved, and at any inconvenience this should, if possible, be done. Then, again, in changing the slide of an illusion, the audience should not see the change.

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I THINK the Royal Society make a point of having rehearsals; at any rate, in some instances the press view serves this end, and enables the lecturer to have the advantage of a "preliminary canter" and demonstration, before the critical eyes of *savants* have a chance of finding out the weak spots.

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WITH persistence of vision on my mind, I must allude once again to stereoscopic projection, for I remember, when I first had the privilege of a private inspection of Mr. Bruce's aerial graphoscope, of suggesting that it might serve as a means of getting a stereoscopic view; and, to prove it, I had a stereoscopic slide sent to Mr. Bruce with the two halves mounted separately, but no practical result came of it.

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IT was only the other day, in looking up some other scientific matters, I came across the following, which I cannot help thinking will be of interest just now:—"A. Stroh (without knowing H. Grubb had described the essentials of the apparatus in 1879) has recently (*vide Encyclopædia Britannica*, 1887) invented a new form of stereoscope based on the well-known effects of persistence of vision. Two stereoscopic pictures are simultaneously projected by two lanterns on a screen so as to overlap, and discs, having suitable slits, are rotated in front of the eyes of the observer in such a way that only one picture is thrown on the screen at a time, and also that the view of the picture is seen with the right and left eye alternately."

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THIS plan must have occasioned a considerable loss of light, similar to what one gets with the Wheel of Life, but it is interesting in comparison with the accomplished stereoscopic lantern projections as demonstrated this year by Mr. Anderton. G. R. BAKER.

PRINT-OUT LANTERN SLIDES.*

II.

WE have now arrived at the stage at which the emulsion may be prepared, and, as there is no "cooking," or long-continued heating of the sensitive preparation, as obtains in the case with gelatino-bromide emulsions, no heating apparatus is absolutely necessary. It is convenient, however, to have a gas stove, or a paraffin one, and an ordinary saucepan; but, if more convenient, the emulsion may be concocted at the kitchen range at night.

Weigh up accurately the following chemicals:—

Potassium citrate	80 grains.
Sodium chloride	80 ,,
Gelatine (Nelson's No. 1)	240 ,,

Measure ten ounces of distilled (or well-boiled) water, and place in a pint bottle. A clean pyrogallic acid or hydroquinone bottle serves the purpose admirably, and has the additional advantages of being of a non-actinic (yellow) colour, and of not breaking when placed in hot water. Add the gelatine, and, after allowing it to soak for ten minutes, place the bottle and contents in a saucepan of warm water, shaking at intervals to dissolve the gelatine. Whilst the dissolution is proceeding, the citrate and chloride may be added to the contents, and all well shaken up together until the whole is in a froth. Now place the bottle back into the saucepan (water at a temperature of about 150° Fahr.) and allow the froth to settle down. In the mean time have ready weighed upon a clean piece of paper 300 grains of nitrate of silver. This should be purchased of a dealer who has a clean fresh stock of photographic chemicals, as upon the quality of the nitrate of silver almost everything depends.

When the gelatinous solution is reasonably free from froth, and at a temperature of 120° Fahr., the silver may be added, all in one lot, and promptly the solution must be shaken up in the most energetic manner until the whole is once more in a state of froth. A fine creamy emulsion should be the result of this combination, and there should be no perceptible grain or coarseness of texture when the gelatinous solution is examined upon a piece of clean glass. I will go so far as to say that, if these simple directions have been carried out to the letter, and the instructions as to temperature observed, there will be a fine emulsion, but, if, as the lawyers say, the alternative obtain, then the temperature of the emulsion must be raised to about 140° for a few minutes, or until it is fine enough. This is an important point, for one of the leading characteristics of a print-out lantern slide should be the stainlike character of the image.

Of course this emulsification must have taken place in a suitable light—say, lamp or gaslight—but not in daylight, unless the bottle in which the solutions are is of stoneware or opaque.

The sensitiveness of the emulsion will depend, *cæteris paribus*, upon the temperature of mixing, but it is not possible, as with bromide or iodide emulsions, to resort to a prolonged emulsification, for the reason that a slight degradation of the purity of the whites quickly ensues.

So soon as the emulsion, therefore, is seen to be fine enough, the solution must be cooled by artificial means. Place the bottle in a pan of cold water, which will quickly reduce the temperature to the setting point. It is best, so soon as the temperature is reduced, to pour the emulsion into a jam jar or other open-topped, clean, stoneware vessel—into anything, in fact, from which it can be readily and, without waste, removed for washing.

Our chloro-citrate emulsion now requires washing to bring it to perfection. Some makers do not wash their print-out emulsions, but this, I venture to think, is a mistake. And here I shall give a wrinkle which I do not find in the text-books, viz., that, after the thorough elimination of the products of the double decomposition by washing, the emulsion receives great vigour and improved printing qualities by the addition of a little free silver and citric acid.

But, to proceed. The *thoroughly* set emulsion must now be squeegeed through canvas (about sixteen shreds to the inch) into a mixture of equal parts of methylated spirit and water. The shreds must be well stirred about and carefully separated, so as to be brought well into contact with the liquid. It is best to squeegee the emulsion through the canvas whilst underneath the surface of the liquor, as, by that means, the after-separation of the particles or shreds of emulsion is more readily brought about. After five minutes' stirring, drain off the water, and put the shreds of emulsion into another lot of spirit and water for a second five minutes. Now drain off the liquor again by making a bag or funnel of the canvas over the top of a jug, and remove as much of the moisture as possible. This may be much facilitated by placing the canvas upon some clean blotting-paper, and allowing it to soak up as much moisture as possible.

Let me here warn the beginner not to smear a print-out emulsion too much over his clothes or hands. It stains in an emphatic and decided way, and is difficult to remove unless promptly attacked by a solution of cyanide of potassium and iodine.

It may possibly be asked why use the mixture of spirit and water for washing. It is not absolutely necessary, but the citrate of silver being slightly soluble in water, I think, and certainly in practice I find it so, that the use of the spirit lessens waste in water. Moreover, when made in small quantities, and experimentally, the washing process is always a bugbear, and generally the result of inexperience is that the emulsion gets "sloppy." This is easily prevented by the use of a proportion of alcohol—the gelatine is kept firm—and, more important still, the resulting bulk of emulsion does not become too large, and the gelatine lose its setting powers.

The emulsion now washed is ready for the final stage of preparation, and the following must be weighed or measured out, exactly, of course:—

Gelatine (Coignet)	100 grains.
Alcohol	1 ounce.
Distilled water	a sufficiency.
Chrome alum sol. (5 grains per ounce)	30 minims.

Once again heat the washed emulsion to a temperature not exceeding 105° Fahr., and add to it the Coignet gelatine, which should previously have been soaked in cold water, or dissolution will be very slow at so low a temperature as 105° Fahr. This latter must not on any account be exceeded if bright slides *are to be counted upon*.

So soon as the extra gelatine is dissolved add, with plenty of shaking, the alcohol, and, continuing to agitate the emulsion, add the chrome alum solution and sufficient distilled water to make up to a

* Continued from page 93.

total bulk of fifteen ounces. There is no particular reason that I know of why the emulsion should not now be completed and used, but I always prefer to allow it to set, and to remain for twenty-four hours before use. A not unimportant reason for this course is that the emulsion gains considerably in density-yielding powers, and, therefore, in covering powers, and, therefore, is more economical if it be permitted to rest at this stage. The point, however, which I wish to accentuate is that, as I hinted earlier in this article, the additions of silver nitrate and citric acid having been made, the emulsion must be used, as it will not keep in bulk, whereas, before this addition has been made, the emulsion will keep as long as the gelatine remains good, which it will do for a very long time if a few grains of thymic acid be added to the alcohol already scheduled.

When about to use the emulsion, or, rather, just before using, it must be warmed to a temperature of 105° (and not more), and one ounce of the following solution added, and the whole briskly shaken into a froth :—

Nitrate of silver	100 grains.
Citric acid	100 ,,
Distilled water	10 ounces.

So soon as the froth has settled down, the emulsion may be filtered through a piece of clean swan's-down calico to remove air bells and general dirt, and is then ready for coating the plate for the preparation, of which I gave sufficient instructions in the concluding paragraphs of my previous article (The Lantern Record, page 92).

We have now arrived at the interesting period of our platemaking, viz., the actual coating of the plates. I fancy that more amateur platemakers—for I will include under that generic name all those who do not actually make money out of the sale of plates—and perhaps professional platemakers too—have failed over the actual coating of the plates and the subsequent drying of them than in the preparation of the emulsion itself. This is perhaps not difficult to realise, but rather difficult to overcome. The actual technicalties of coating the plates are not difficult to acquire. It is the environment of the plates between coating and the final stage of drying which is all-important.

The four points to bear in mind are:—

1. Set the plates quickly.
2. Dry in plenty of air.
3. Avoid dust.
4. Do not alter the rate of desiccation.

Let me review these briefly.

First. Set the plates quickly. This is a point cardinal. If the plates are sluggish in setting, the silver will settle to the bottom and will be difficult to get at through the gelatine. Frilling may also be expected.

Second. Dry in plenty of air. The best way for a small quantity is to dry in an ordinary room, with the windows blocked or made light-safe. If the coated and set plates be fixed up against the wall in such a way that the gelatine side is slightly downwards, no dust can fall upon the film, and the moisture therein contained rapidly falls away and the plate dries well. I cannot at the moment, and writing without the necessary books of reference beside me, remember who it was who, in the early days of gelatine dry plates, recommended the following plan of drying negatives: Two headed nails must be placed horizontally in the wall about half an inch apart, and driven in until the heads are about half an inch outstanding. A corner of the plate is placed between these two nails, and the glass is allowed to rest against the heads of the nails, whilst the point, or corner of the glass, presses against the wall. The plate will now be just in the position which I have described as a desirable one for drying, and, for reasonable numbers, no more satisfactory method can I suggest.

Third. Avoid dust. I am aware that this is simpler to advise than to carry out, but for small quantities the best way to avoid dust is to leave it alone. If dirt is matter in the wrong place, my suggestion is that it should be left undisturbed just before coating. If cleaning and dusting must be done—and it comes to that sometimes—let it be arranged so long ahead of plate-coating as to give the particles ample time to settle down again.

Fourth. Do not alter the rate of drying. In other words, when once set up to dry, leave the plates and the room alone until the desiccation is complete. Most of the drying marks which occur round the edges of plates arise from a sudden hastening (or the reverse) of the rate of drying.

With these four maxims, or axioms, before us, we can now proceed to coat the glass plates we have prepared with the emulsion we have made. With the plates in a pile upon the left hand, and the bottle of emulsion standing in a saucepan of hot water on the right, take a plate by the corner, between the thumb and first and second finger of the left hand, and hold it in as nearly horizontal a position as possible. Now pour on to the right-hand back corner of the plate a pool of emulsion sufficient to half cover the surface. Tilt the plate, ever so little, in the direction that the emulsion is desired to flow in, until the whole plate be covered, when the surplus emulsion can be poured back into a special (and separate) vessel ready to receive it. It is conventional to flow the emulsion round from the right-hand back corner of the plate, from east to west, or in the opposite direction to that taken by the hands of a clock, but this is perfectly immaterial. If the glass be clean, the emulsion of the right temperature, viscosity, and containing sufficient alcohol, it will flow easily and regularly in any direction the plate be tilted. This is always supposing that the person manipulating the things has a steady and true hand, and a supple wrist.

So soon as the emulsion is evenly spread all over the glass, and the surplus returned to its bottle, the plate is to be placed, without further tilting or disturbing the surface and regularity of the emulsion, upon the glass setting slab already described.

It is impossible to accurately suggest how much a little of the sensitive material should be left upon the plate. One or two plates with varying amounts will be the best guide to experience, but this may be noted, that a gelatine citro-chloride emulsion is rather colourless compared with a bromide one. Much less colour or light-obstructing quality will suffice, therefore, to give ample density, which is the point to be secured.

The plate, so soon as set, which can be ascertained by touching an edge of the emulsion, can then be reared up to dry in the manner described, and, when dry, should be packed and protected both from light and atmospheric action. In my concluding article I shall deal with the printing and toning of the slides.

S. Herbert Fry.

(*To be concluded.*)

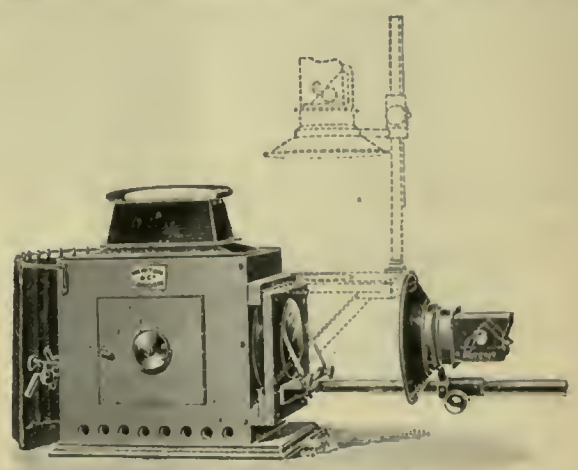
RECENT NOVELTIES IN LANTERN APPARATUS.

Newton's "Demonstrator's" Optical Lantern.

This lantern has been designed for scientific lecturers. A large prism is so arranged that, without being removed from its mount, it can be placed in either of the two bearings, so as to work as a reflecting or an erecting prism.

The space between the condenser and the front lens is left clear for projecting apparatus, &c.

The stage for holding slides, alum trough, &c., being keyholed to the



front plate, can be removed or replaced in an instant with one hand, all screws being dispensed with.

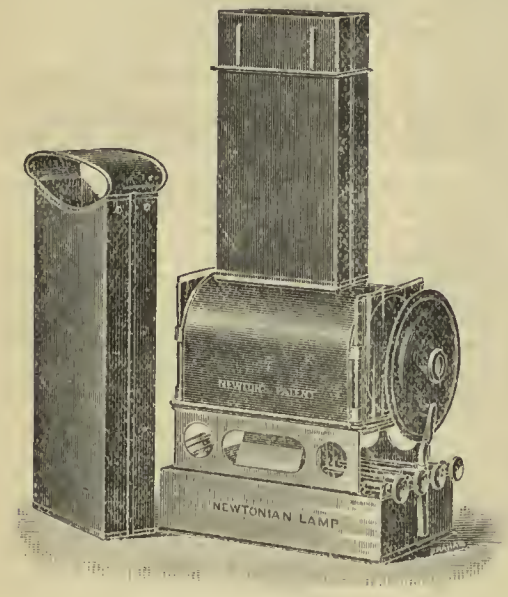
The rack bar, with front lens and prism, can also be similarly removed or replaced with equal ease, leaving the condenser entirely open.

When projecting thermometers, capillary tubes, gold-leaf electroscopes, &c., with an ordinary lantern, the effect is spoilt by the inversion of the image on the screen, and the cost of an erecting prism often prevents its employment. In this lantern the same prism may be employed to erect these objects, that is used as a reflector for vertical projection.

The Demonstrator's lantern should be useful to those for whom it is intended. It is evidently both effective and simple to manipulate.

The Newtonian Oil Lamp.

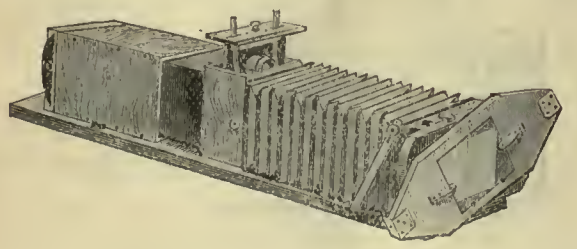
This is a four-wick lamp, for which Messrs. Newton claim great brilliancy and penetrating power. The reflector of each lamp is permanently adjusted to its most effective distance, and the chimney is also



placed to the exact height found by experiment to give the best results. The difficulty of making the flames draw up readily, owing to the sharp draught, is entirely obviated by the peculiar construction of the chimney. If the lamp is lit and burnt for two minutes, using only the lower part of the chimney (see figure), the upper portion may he then fitted into its place on the top, and the flames will at once be entirely under control.

The "N. & G." Lantern-slide Reducino Camera.

Messrs. Newman & Guardia, of 92, Shaftesbury-avenue, W.C., are introducing a new lantern-slide reducing camera, of which we here give an illustration. Speaking of the superiority of reduction slides over those made by contact, they have the following eminently sound remarks:—"The superiority of slides made by reduction in the camera over those produced by printing in contact is admitted on all sides. Quite apart from the constant risk of injuring the negative, ever present in the latter method, it is quite impossible to secure absolute contact all over two plates of glass, and the sharpness of a 'contact' is always inferior to that of an optically produced slide. Besides, when printing by contact, objects are often rendered far too large for the screen, and the more pictorial shape of the usual photographic view is invariably lost in the circle or square of the contact printed slide. Neither is it possible to correct distortion of lines in a printed slide."



As will be seen by the cut, the "N. & G." reducing camera consists of a baseboard, at one nd of which is the apparatus for holding and adjusting the negative; the dark side and focussing screen at the other; and the shutter and lens board in the centre. The shutter board draws right out, so that the lens, &c., may be seen without disturbing the adjustment of the apparatus. It carries a *rigid lens mount*, so that, by means of adapters, any lens can be fitted; also a shutter working close to the diaphragm. One diaphragm, *f*-8, is permanently fixed in the lens; the working diaphragm, *f*-16, is so arranged that it can easily be shifted in and out of position. The shutter and the diaphragm can be actuated, and their position seen, from the outside of the camera.

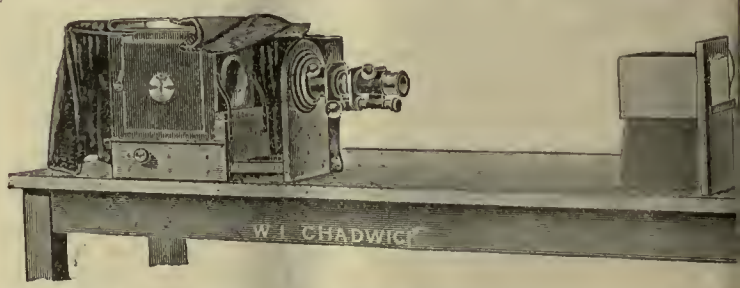
The negative holder is formed of three frames—one hinged to the baseboard, and admitting of being inclined backwards or forwards, and two which can be entirely detached from, and easily fixed on, the camera. Of these two frames, one carries the masks determining the shape of the picture, the other holds the negative to be reproduced. These frames allow the picture to be shifted in every direction, so that the whole or any part of a negative may be reproduced, and errors as to parallellsm of lines, &c., on the negative may be corrected. The dark slides used are single ones of special construction. They will take any lantern-slide plate.

The "N. & G." Lantern-slide Reducing Camera is constructed on simple principles likely to be successful in actual practice. As is the case with all the productions of Messrs. Newman & Guardia, it has been well thought out. That it is well and strongly made goes without saying.

MR. W. I. CHADWICK ON PHOTO-MICROGRAPHY SIMPLIFIED.

Before the members of the Photographic Society of Great Britain on Tuesday evening, October 24, Mr. W. I. Chadwick gave a brief discourse on photo-micrography, submitting for inspection a large number of bromide enlargements from negatives of microscopic objects, chiefly of a popular kind, and explaining the apparatus he employed, which was on view. He said there was no branch of photography which was deserving of more consideration than this, and, when one got on the right track,

there was nothing that was more fascinating. A lot had been said on the subject which he did not agree with, and which was not calculated to instruct or encourage beginners. Taking high-class subjects with high powers did not popularise photo-micrography; what was wanted were popular subjects which could be done with a quarter-inch objective as the



highest power. Referring to his examples, Mr. Chadwick said that not any of them had been done with higher powers than a quarter-inch, while the most expensive lens he used only cost 1*l*. Speaking upon the subject of colour-correct plates, he said, that in their use he failed to discover any difference between them and ordinary plates. Coming to the apparatus employed, he compared a photo-micrographic system to an ordinary optical lantern system, the movements of the various parts of the two systems corresponding in their relations to each other. He had two photo-micrographic cameras on view, the one consisting of the usual arrangement of the ordinary table microscope and camera, the mirror being employed to facilitate the adjustment of the image on the ground glass, while the operator is working from the objective end of the system.

In the second system employed a camera is dispensed with, the dark room itself acting as it were as the camera, an ordinary projection lantern being employed for the illuminant, a front stage supporting the microscope attachment. In the focus of the objective is a small box holding a ground glass upon which the object is focussed and arranged. Mr. Chadwick uses a simple mirror to reflect the image while partly giving his attention to the adjustment of the microscope.

Mr. Chadwick said he found that most people wanted to do popular work such as he was showing, and this was done by the method above outlined, using one-half, three-quarters, and inch powers. He mostly used an oil lamp. His exposures ranged from one to four minutes.

MONTHLY SUPPLEMENT

TO THE "BRITISH JOURNAL OF PHOTOGRAPHY."] [*December* 1, 1893.

THE LANTERN RECORD.

CONTENTS.

LANTERN NOTES AND NEWS.

AN evening contemporary says: "A new idea in the way of a magic-lantern show has been brought out at No. 230 Tottenham Court-road, where for sixpence the weary shopper can go in and sit down, while before his or her astonished view rotate in endless panoramic form views of all the wonders of the world, stopping one half-minute each. The machinery is run by an ingenious combination of heavy-weight clockwork and electricity."

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BY the way, with what tenacity does the ordinary newspaper man still cling to the term "magic" lantern. Apparently he is ignorant of the circumstance that the lantern has scope and potentialities outside the limited field of the toyshop and its youthful supporters. With many brethren of the pen it is also the fashion to refer to the uses of the "magic" lantern as being confined to Sunday-school entertainments and similar quasi-religious festivities. Probably within recent years no optical instrument has done more service in the cause of science than this so-called "magic" lantern.

* * * * *

SPEAKING of the uses of the lantern for religious purposes, there is no doubt that, to the fact that it is so largely employed by the clergy of all denominations, the lantern trade owes a great deal of its success and expansiveness. Not long ago, when in the establishment of Mr. Walter Tyler, of Waterloo-road, we were surprised at the large number of orders emanating from clergymen, &c., a number of which most of our purely photographic readers can have little conception. In this respect science is clearly the handmaid of religion.

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FOLLOWING an interesting discussion and demonstration on the carbon process by Mr. Birt Acres and Mr. Skelton (of Messrs. Elliott & Son) before the London and Provincial Photographic Association on Thursday, November 23, the first-named gentleman brought his lantern into requisition, and showed, among others, a series of carbon lantern slides of clouds, land and seascapes, animals, &c., which revealed the singular beauties and charms of the process to perfection. Looking at its comparative ease and the delightful results yielded by the carbon process, it is surprising that so few amateurs undertake it. Such demonstrations and exhibitions as those given by Mr. Acres should go far to lifting it into popularity.

* * * * *

THE lantern used by Mr. Acres was one of the open-front portable variety. A few months back we suggested that during the present season single lanterns would enjoy great favour, and the prediction has been verified. Moreover, several new forms, aiming at great portability, have been introduced. It looks as if for single lanterns the old-fashioned kind, with bulky bodies, heavy front attachments, and large brass objective-holders, are to be superseded by more compact devices. Certainly on the score of portability there was frequently great room for improvement.

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THE very able and interesting paper on *Photography in Coal Mines* which Mr. Herbert W. Hughes, an authority on coal mining, delivered before the Photographic Society of Great Britain on the 14th ult., was illustrated by a number of lantern slides made by himself, Mr. Burrow, and Mr. T. Sopwith, all experts in this difficult and out-of-the-way branch of photography. Mr. Burrow's slides represented views in metal mines; Mr. Hughes's and Mr. Sopwith's were taken in coal mines. They showed various phases of mine life—miners at work, &c.—and, according to the testimony of experts in mining engineering, who joined in the discussion that followed the reading of the paper, the slides shown were of great educational value in conveying to mining students an accurate idea of things as they exist underground.

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MR. F. W. HINDLEY returned from his annual vacation in Ireland with a large number of negatives, from which he has made slides illustrative of many phases of Irish life, character, and scenery on the west coast.

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ON the 15th ult. members of the Photographic Club had a treat. Captain Abney showed a collection of his slides depicting views in the Upper Alps. The slides were of singular beauty, their delicacy of detail, softness, and pearly-grey tones in the lights, with transparent shadows, apparently admirably suiting the subjects. Perhaps the most remarkable feature about them was their evenness and uniformity, although, as Captain Abney said, they were made on three or four different kinds of lantern plates. For developer he used amidol well restrained. A great many of them were snap-shots, but only in one or two instances could these be distinguished from those which had had time exposures. Captain Abney, in acknowledging a vote of thanks, referred to his slides as "the work of an amateur," at which there arose smiles on the countenances of the Photographic clubbers there assembled.

* * * * *

IN another part of THE LANTERN RECORD we print the first annual report of the charitable Lantern Entertainment Society. In a quiet, unostentatious way much good work of a humane nature has been done during the past twelve months, for which the secretaries deserve every one's thanks. We trust our readers will support the Society in its efforts to alleviate the pain and *ennui* of many poor sufferers in hospitals &c.

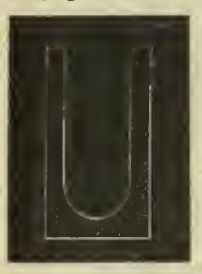
HOW GAS CYLINDERS ARE MADE.

MOST lanternists know that the modern cylinders for compressed gas are made of steel, solid drawn, but few perhaps know the process of production, and, as I recently had an opportunity of seeing some made at the Projectile Company's Works, a description of same may be of interest.

Blocks of rolled steel of the right proportionate diameter and thickness for the cylinder required are heated in a furnace to the

necessary heat, and then treated in hydraulic presses to pressure from a series of punches, each gradually elongating the material with a

hollow inside until the right length is reached, and then the top is closed to make the neck for the valve to be inserted in the metal walls, bulging inwards, as shown in sketch. The number of drawing operations vary with the size of the cylinder, from five to fifteen. To see the men take these pieces of hot metal in the long pincers and lift them into the furnaces or presses, one cannot but help admiring their dexterity.



The metal, between the cold drawing operations and when the cylinder is finally complete, is pickled and slowly heated, allowed to slowly cool, and so becomes annealed.

After the cylinder is drawn the exterior is trued and the superfluous square edge of base (in the large ones) turned off in a lathe.

To test the strength of the cylinders hydraulic pressure is used, and, although it has hitherto been (under some companies' tests) two tons to the square inch, it is considered that one and a half ton's pressure would be more satisfactory.

In Germany there are Government testing places in Brohl and Cologne, where cylinders to be used for high-pressure gas have to be sent to be certified, and where they are tested for pressure, annealing, and general safety, and a record of dates given with the certificate. Any one using an uncertified cylinder is liable to a penalty, and they must be periodically retested and reannealed. A great number of cylinders are used in Germany for the carbonic acid gas so largely employed in the manufacture of lager beer; but I believe the pressure to which they are filled is much less than oxygen and hydrogen gases in England, viz., 50 atmospheres instead of 120 atmospheres.

The works of the Projectile Company cover a large extent of ground to the south of the South-Western and Brighton Railways, between Battersea Park-road and Wandsworth-road, and every convenience seems at hand for the proper manufacture of cylinders, shell, and projectiles, that require varying thickness of tensile strength. The facilities for annealing are such that 500 can be annealed in a day, but two days should be allowed for reannealing. This is, of course, independent of any work connected with valving, filling, repainting, &c., which is done elsewhere. The many processes through which the steel has to go from the time it is a block or disc until it is a finished cylinder prevents a batch of new cylinders being turned out in less than nine or ten days, and, to allow for unforeseen stoppage, in some of the shops the average is taken at fourteen. The machines employed are of great strength, one of the most powerful of which has an hydraulic force of 500 tons to the square inch. The furnaces are supplied with air blast, and in the testing and proving shops the utmost accuracy is shown in ganging, &c., each item, whether it be shot, shell, or cylinder. I am indebted to the courteous Secretary of the Company (Mr. Hatton) for most of my information, and the opportunity of witnessing the process of manufacture.

G. R. Baker.

SILVER INTENSIFICATION FOR COLLODION TRANSPARENCIES.

Somewhat contradictory opinions have been expressed as to the ease or otherwise of intensification in the case of the new Hill Norris collodion lantern plates, but the truth probably is that these, like all other plates, vary more or less in different batches. Those who have had any considerable experience with ordinary collodion emulsion films will know that, whereas some plates will give, with the greatest readiness, literally any amount of density to complete opacity, others, though apparently prepared in precisely the same manner, fail altogether in giving anything more than a mere ghostly image.

This is especially the case with the more rapid kinds of emulsion, and, though the precise reasons for the difference cannot always be ascertained with any degree of certainty, it is usual to attribute the effect either to unsuitable pyroxyline or else to unskilfully washed emulsion. Where the fault originates with the pyroxyline the difficulty experienced may vary very greatly in degree, but where improper washing is the cause it almost invariably amounts to an absolute impossibility to secure any depth of deposit by any ordinary means of either development or intensification. There is, however, one method by means of which any image, no matter how thin, can be intensified, though, of course, it does not follow that the final effect is in all cases perfect. Where, however, a fairly respectable image exists as a basis upon which to work, the means exist of securing both vigour and tone.

With the great majority of modern dry-plate workers, silver intensification is either an utterly unknown or a lost art, and yet it is probably the most perfect in its action, and pleasing in its result, of any of the known methods. With gelatine plates it has fallen into disuse owing to the difficulty, or, rather, the care necessary, in sufficiently freeing the film from the last traces of hypo before resorting to intensification, and perhaps also to some imaginary idea that the action of the free silver renders the gelatine itself liable to subsequent change of colour. The necessity for care in washing does certainly exist, but that the liability to subsequent change is purely imaginary, due precaution, of course, having been taken, is proved by negatives I have in my own possession that were intensified with pyro and silver thirteen or fourteen years ago, and which, whatever their imperfections may be, have undergone not the slightest change.

With collodion plates, however, neither of these two difficulties exists, for, even if hypo be employed in fixing, it is got rid of with such comparative ease as compared with gelatine that a very few minutes' washing suffices to bring the plate into a fit state for intensification. The absence of any permanent action of the free silver upon the collodion film itself is sufficiently testified by the existence of collodion negatives considerably over thirty years old.

When the collodion film is in perfect condition, it is perfectly easy to obtain even more than the requisite vigour by alkaline development alone, that is to say, in one operation; and most photographers, no doubt, will agree with a speaker at the last meeting of the London and Provincial Association, in preferring to dispense with intensification. So far as negative work is concerned that may be all right, but personally, for transparencies, I cling to the old-fashioned style of finishing off with silver; not so much for the sake of intensification as for the sparkle and crispness it gives to the picture, and also for the rich tones that can be produced in this manner.

We are accustomed to speak of the tones obtained upon collodion emulsion plates with alkaline pyro as being the ideal of perfection, and so perhaps they may be when the emulsion is in perfect condition—so far, at least, as mere colour may be conceived. But there is an indescribable something in the look of a silver-finished image that distinguishes it clearly from one developed right out with alkali. Of course it is to be understood that the developed image must be of good colour, to start with, for the process of piling on silver will certainly not disguise a disagreeable tone, and, moreover, it must be performed in a proper manner.

First, with regard to those images which exhibit a total indifference to intensification. Such are frequently perfect in gradation and clearness, and, in fact, in every respect except vigour, and refuse to take any further deposit of silver except in the form of fog. In such cases there is nothing for it but to proceed by a somewhat round-about way, and convert the image into bromide of silver and redevelop it; in fact, to proceed upon much the same lines as in the old method of intensification with chloride of copper, only substituting bromide for chloride.

The plates, after careful washing on removal from the fixing bath, may be flooded with a solution containing equal parts of sulphate of copper and bromide of potassium, the exact strength being quite immaterial so long as it is strong enough to bleach or convert the image in a reasonable time, say, not more than a minute or two. In this solution the picture is converted into bromide of silver, and presents the appearance of a delicate positive by transmitted light, and an equally beautiful negative by reflection. At this stage it is to be very thoroughly washed before proceeding to the next operation.

Another solution, which I prefer for some reasons, consists of bichromate of potash and bromide of potassium, of each twenty grains to the ounce of water, rendered slightly acid by means of almost any acid, but preferably sulphuric or hydrochloric. This solution converts the image into pure bromide of silver, whereas the orher forms also a sub-bromide of copper, which is objectionable, because silver nitrate alone, without any reducing agent, will darken it, and so may interfere with the tone desired.

After bleaching and well washing, the film may be flooded with a solution containing a few drops of a twenty-grain solution of nitrate of silver in half an ounce of water, and exposed freely to light, and is then ready for intensification.

Where the image is of such a character as not to require this treatment it is ready for toning, as I prefer to call it in this case, as soon as development is complete, and this should be arrested shortly before full density is obtained. After well washing it is advisable to flood the plate with a very weak acid solution in order to ensure the total removal of the last traces of alkali, or, which answers the same purpose, to pour over it once or twice the acid pyro solution before adding the silver, or, if it be preferred—and this plan has the advantage of allowing a better judgment of the density and colour of the image to be formed—the plate may be fixed before intensification, in which case the washing must be very carefully carried out, or, if the least trace of hypo remain, the film will be irrevocably stained.

The intensifying solutions consist of pyrogallic acid restrained with either citric or acetic acid in one solution, and nitrate of silver with a little nitric acid in the other. A grain and a half of pyro to the ounce of water, with two grains of citric acid, or ten minims of glacial acetic acid, will form a suitable reducing solution; and the second consists of three grains of nitrate of silver and ten minims of nitric acid to each ounce.

Enough of the pyro solution is taken to well cover the plate, and, after pouring it on to the film two or three times to unite well with the water on the surface, a few drops of the silver solution are dropped into it.

The exact quantity must be regulated by the tone required and the ease with which the particular films take density, bearing in mind that the smaller the quantity of silver the warmer will be the tone, the finer the deposit but the slower the action. If too much silver is added at once, the deposit will be coarse and disagreeable in colour, and most likely too much density will be given. Acetic acid gives warmer tones than citric. The nitric acid prevents the intensifying solution from becoming thick and muddy.

Extremely rich tones and a fine translucent deposit are obtained by the addition of a minute trace of various organic matters to the pyro solution, such as sugar, albumen, or gelatine; but, for all practical purposes, I prefer to rely on plain acid pyro and silver.

When the film is in proper condition, the requisite effect is obtained very quickly, almost in a few seconds. It is only in the case of a defective emulsion that any difficulty will be experienced in getting either density or colour.

W. B. Bolton.

OIL LANTERNS—TRANSLUCENT SCREENS.

Oil Lanterns.

The introduction of compressed gases at prices which place them well within the reach of most amateurs has caused the old-fashioned oil lantern to retire very much into the background; and it is no uncommon thing now to hear of drawing-room displays to small audiences, say twenty or thirty all told, in which the oxy-hydrogen lantern has been employed, with very probably quite a small disc. It is obvious that the slides, which, by reason of their intensity, were quite suited to such an illumination upon such a scale, would be too thick and heavy in the shadows for a disc twelve or more feet in diameter, although, of course, the superior illuminating power of the mixed jet would, to some extent, counteract this. The ambition, otherwise very laudable, to have the maximum brilliancy of illumination over the biggest possible disc, seems, in gatherings of such small numbers, and in the circumscribed area of the modern villa or flat, a little out of place. It may be safely asserted that a result much more satisfactory might be obtained at a tithe of the cost, both in labour and money, by employing our old, discarded friend, the lamp. I say nothing of the relative amount of skill required to manage properly the jet and the oil lamp because I hold that the latter needs quite as much knowledge and attention as the former, although the want of common sense in its manipulation might not have such disastrous results as it might in the former case in spite of the assumed safety of drawn steel cylinders. It seems worthy of consideration whether the requirements of the generality of such exhibitions as those to which I have alluded would not be better met by the use of a lamp burning petroleum and a four-foot disc than they now are by the limelight with a disc of three or four times that area.

The mistake, as I have already mentioned, consists in trying to have the biggest possible disc, and it brings with it more inconveniences than the obvious one of needing powerful light. Screens of any size are very inconvenient, and take a good deal of putting up and taking down, &c. I do not mean for a moment to limit the use of the petroleum lamp to so small a disc as four feet. I have seen excellent results obtained with it of three times that area; but, with an audience of, say, twenty in a small room, a four-foot disc should be ample. Such a size does away with the screen nuisance at once, since good white card of this size can be obtained, and makes the finest possible screen; or, if preferred, very brilliant results can be obtained by using a translucent screen as mentioned below.

In the management of such an instrument as one of the many three or four-wick lamps on the market, there are many points to be considered if the best possible result be wished for. On the score of economy alone, the three-wick instrument is preferable to that which contains a larger number. The consumption of oil is not in strict proportion to the light emitted, and is greater in a four than in a three-wick lamp for the same amount of illumination. Another important matter is the selection of a suitable oil. There is a good deal of petroleum in the market which, while perfectly safe and suitable for lamps in which, by reason of the construction, or material of the reservoir, the latter does not get hot, it would not be advisable to employ in an optical lantern; for the latter, however well designed, can hardly fail to cause the temperature of the oil in the receptacle to rise, on account of the enclosed space in which the various parts are necessarily crowded together, and the metal of which the bodies of oil lanterns are almost invariably composed. Such oils should be carefully eschewed, both on account of their danger, and, if that is not sufficient reason, on account of the unpleasant smell they are certain to give off when the light is burning. The "best crystal" oil which is generally sold at a slight advance in price over the inferior qualities, should be purchased at a shop where sufficient reliance can be placed in the shopkeeper that he really does keep two qualities, and does not draw both brands out of the same barrel. The addition of camphor to the petroleum is said to whiten the light, but I have never been able to detect any difference visually; it certainly tends to cause smoke and smell, and there should be no difficulty in obtaining a white enough disc without it. I have even heard it suggested that "albo-carbon" should be dissolved in the oil—how, was not stated. In the ordinary petroleum it is hardly, if at all, soluble; certainly not enough to cause any perceptible difference in the colour of the light, was taken up by cold crystal oil, although the "albo-carbon" was crushed into a fine powder, and left in contact with the solvent for some weeks with frequent shaking.

The brilliancy of the light as well as the absence of smell depends far more upon the careful trimming and adjustment of the wicks. It will be found much easier to trim the edges smoothly when they have once been burnt for a short time, they can then be cut without difficulty with a pair of scissors so as to give a perfectly even flame. Care should also be exercised to see that all three wicks are doing an equal share of the work of illumination, and that none are turned up so high as to smoke, but that each is so adjusted that the slightest possible rise would cause smoking to commence. They should be turned up fully at first, watched for a few minutes, and lowered as the lantern warms and they begin to smoke, bearing in mind that a lamp partially turned down is sure to smell and to smell horribly. Smell is also avoided to a great extent by the use of a funnel for filling the reservoir and seeing that the slightest trace of oil does not contaminate the outside of that vessel. With this object, at the close of a display the oil should be poured out, the wicks taken out, squeezed in paper, and when nearly dry wrapped up and put away. The metal parts of the lamp can then be washed in water containing a little washing soda, dried and replaced. If a little trouble and attention are given to these points, it is surprising how odourless any petroleum lamp can become, and what a brilliant light can be got from it. It is a good plan to test the burning of the lamp both outside of as well as in the lantern, the proper height for the metal chimney of the lantern can then be adjusted and marked at the best height once for all. This will also indicate whether the air inlets and outlets are sufficiently free. More attention is generally given to the former than to the latter, although both are of equal importance, and it is no uncommon thing to find lanterns in which the air inlets are all that could be desired, but in which the outlet at the top of the chimney is so contracted or distorted as to neutralise the benefits derived from the care exercised at the other end.

Translucent Screens

are perhaps the most attractive method of displaying slides before small audiences. They are especially convenient when they can occupy a doorway between two rooms, the lantern and operator being in one, the audience in the other, and they should not be made too big if a brilliant

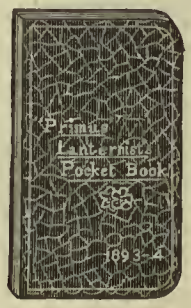
result be desired. Many house have two fair-sized rooms separated by folding doors; such places are admirably suited for a lantern display on a small scale. A light wooden frame should be constructed about four feet square, across which thin tissue or tracing paper must be stretched; it can be fastened by means of drawing pins. A vegetable parchment, which is admirably suited for the purpose, is supplied in rolls sixty inches wide. By reason of its toughness, it could probably be used many times before getting damaged. For very small screens of this kind finely ground glass answers perfectly. The spaces between such a screen and the door-posts and beam overhead can be draped with curtains, the frame itself being either hung or supported on legs, at such a height that its centre is about five feet from the ground. Employing an oil lantern with photographic slides of medium density in this way, a very satisfactory result can be obtained at less cost and with less trouble than with any form of limelight.

It must be borne in mind, however, that all kinds of tissue paper do not yield equally successful results, in some of the cheaper kinds the fibres are here and there gathered into almost opaque clusters, while others have a yellowish tinge by transmitted light. The best quality of white tissue should be employed, unless a thin light-blue coloured tracing paper (the "stag" brand is what I have used, but what mill or make that may be I cannot say) is accessible, which is by far the best material I have up to the present tried. JAMES LEWIS.

RECENT NOVELTIES IN LANTERN APPARATUS.

THE "PRIMUS" LANTERNISTS' POCKET-BOOK.

W. Butcher & Son, Blackheath.

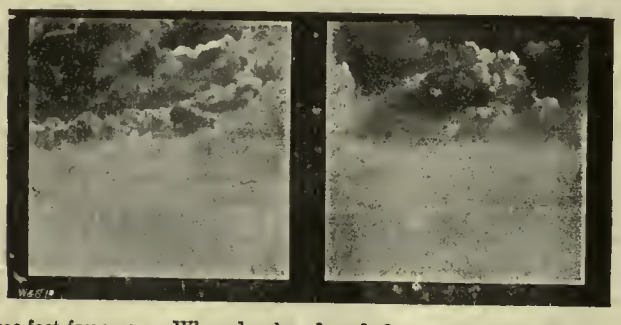


MESSRS. BUTCHER & SON are issuing the "Primus" Lanternists' Pocket-book, a neat and handy remembrancer for lanternists. It is prefaced by some useful tips on oil lamps, blow-through and mixed jets, cylinders, gases, reference tables as to size of discs in relation to lens focus, a diary for the winter months—November to March. Other spaces are also given for the entries of particulars of engagements, lists of slides, &c. Lanternists will find the "Primus" Pocket-book a decided convenience.

THE "PRIMUS" CLOUD NEGATIVES FOR LANTERN SLIDES.

MESSRS. BUTCHER are also issuing a series of cloud negatives on glass for lantern slides. A lantern slide of a land or seascape, however good, is imperfect without clouds judiciously chosen and introduced, and the excellent series of Messrs. Butcher should therefore be a boon to the slide-maker. They are cheap, and a variety is supplied. The following are the directions supplied for using them:—

"First make a trial exposure or two from cloud negatives only, at, say,



three feet from gas. When developed and dry, mark on these time of exposure, the developer used, and the time taken to develop. Put these aside, and keep for future reference.

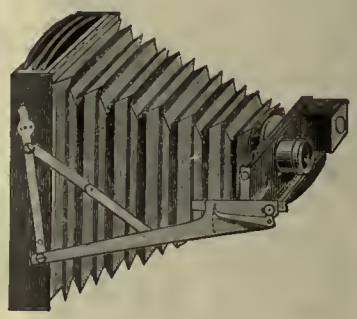
"Make the exposure for subject on to lantern plate first. Should the sky be thin and print through, it should be roughly shielded. Mark the outside of printing frame at each side with a pencil to show depth of sky portion, taking notice of any slight projection above the horizon. Replace the view negative by the cloud negative, taking care to keep the plate the right way up, and to place it so that the vignette of cloud negative comes across the horizon. (An ordinary quarter-plate printing frame is the best to use, which allows latitude for arranging the vignette.) Now expose for the clouds, the time, &c., being known from previous exposures. Any part of the lantern plate that is not covered up by the opaque part of cloud negative should be shielded by a piece of card or brown paper."

MR. ALFRED UNDERHILL, of 32, Clarendon-road, Croydon, has secured a valuable series of Botanical Negatives, by Mr. J. Packham, F.R.H.S., illustrating morphologically and histologically the minute structure of plant life. Slides from these negatives are in course of preparation, and a classified list will shortly be issued. In addition to the above series, Mr. Underhill intends to publish photo-micrographic, and other lantern slides, specially prepared for the advancement of technical education.

THE "NYDIA" CAMERA.

Newman & Guardia, Shaftesbury-avenue.

THIS is an extremely neat and portable camera of the pocket class, the chief points in which may be summarised as follows:—The lens is a Wray, 5½ inches focus, *f*-8, rapid rectilinear lens; two extra thin steel diaphragms, *f*-11 and *f*-16, are provided. The camera has full range of focus, from two yards to "infinity;" a lever, scale, and clamp enable the worker to alter or fix the focus in an instant. The shutter works between the lenses, immediately behind the diaphragm; it opens and closes from



the centre, by a vertical slit. It is provided with pneumatic regulation. "Time" exposures are easily given at will. The finder is fixed on a swivel joint, and can be used for both vertical and horizontal pictures. Solid double dark slides are used with the "Nydia" camera. They are of light but very strong construction, and the ebonite shutters draw right out. A light celluloid screen is always in the camera. It holds the dark slide in position, and when this is withdrawn the screen automatically springs into register. For its particular purpose, that of constituting a highly portable but efficient little camera, which can literally be carried in the pocket, the "Nydia" should be found extremely useful.

PROJECTED PORTRAITS.

I.—MR. GEORGE MASON.

MR. MASON is President of the Photographic Convention of the United Kingdom, President of the Photographers' Benevolent Association, and President of the Central Photographic Club, in spite of which he is not by any means proud, and one may actually speak to him without being charged an entrance fee, and be sure of a courteous response, which is not the case with some presidents. Mr. Mason combines the direction of the largest photographic-dealing business in Scotland with a taste for poetry, and he has achieved the rare feat of transmitting a love for the divine *afflatus* to one of his descendants. He is also an editor and author, and an enthusiastic devotee of optical lantern matters, his lantern lectures in the city of St. Mungo being highly popular. He is a shy orator, but a good story-teller, and a great smoker. Moreover, he is an artist in black and white, and has solved the problem of how to be genial without knowing it. Mr. Mason is making a collection of Dickens pictures for a lantern lecture on the great novelist. After his triple Presidency he will have no more (photographic) worlds to conquer. Happy man!

II.—MR. W. E. DEBENHAM.

Mr. Debenham is a concentrated encyclopædia of photographic information, but is, nevertheless, a good portrait photographer. Possibly he has fallen into a common misfortune and mistaken his vocation, his creative faculties being inferior to his critical acumen. He would have made a very capable reviewer. He has written (and spoken) on most, if not all, branches of applied photography, and is particularly happy in

discoursing of the properties of photographic objectives. His favourite themes are "flatness of field" and "photographic perspective the only true perspective," which cheerful topics he occasionally varies by denouncing the tricks and manners of the fuzzy school, and Mr. H. P. Robinson. He is the "hope of the stern and unbending Tories" of photographic definition, is a frequent Judge at photographic exhibitions, and is as fond of polemical writing as a bee is of honey. Mr. Debenham comes of a family prolific in photographers, but still, paradoxical as it may read, there is only *one* Debenham. There isn't room for two such in the photographic world. Mr. Debenham is a member of several societies, and his readiness to read papers to them and impart information on photography in general is highly creditable to his good nature.

III.— Mr. H. P. Robinson.

Mr. Robinson not long ago was unlucky enough to incur the title of "King of Photography," while his life and works formed the subject of a lantern lecture which was trotted round the country, presumably for the purpose of telling his Majesty's subjects what his claims to sovereignty were. The consequence was that, like the community of letters, the world of photography decided to remain a republic. Mr. Robinson has had a long, varied, successful and profitable career in photography and was evidently born under a lucky star. He was once a professional photographer, but now he can not only afford to despise the accumulation of filthy lucre out of the black art, but also to be finely scornful of medals at photographic Exhibitions. People are unkind enough to remind him that 'twas not always thus. Mr. Robinson has produced numerous good (and bad) photographs in his time. He has written several books on art principles applied to photography, but sometimes in his own work demonstrates the possession of an heroic courage in refusing to practise what he preaches. He is a keen and clever newspaper controversialist, but suffers under the disadvantage of always fighting on the wrong side, that is, his own. A year or two ago, he in a huff threw away a chance of becoming President of the Photographic Society of Great Britain; he may yet be President of the Camera Club. He likes his pictures well placed and hung, and they generally are. He is one of the founders of the Salon, and will be sorry for it. He boasts of his thick skin, and needs it. For all that, Mr. Robinson is personally a very pleasant gentleman, although few people would think so from his paper record. He resides at Tunbridge Wells and the Camera Club.

IV.—Mr. W. I. Chadwick.

Bleed Mr. Chadwick, and the resultant fluid would give off oxygen and *Bacilli lanterna et stereoscopisca*. He convulses the photographic world with comic advertisements, and is philanthropist enough to pay for the printing of them. In his salad days he wrote extensively about the optical lantern, and made it the subject of many inventions, which amused him in his leisure hours; and in revenge people have compelled him to convert his hobby into a profession. Hence it is not his fault if he is regarded as a high and practical authority on the optical lantern, and sells a very great quantity of what he calls the "tackle" in connexion therewith. It is a disagreeable fate—and he deserves it. He is fond of scientific projection and photo-micrography, and is laudably anxious to make those branches of photography popular by divesting them of unnecessary intricacies, difficulties, and superfluous brasswork. He will probably succeed. He took the egg of stereoscopic photography into his roost, and has hatched it into a vigorous chicken, which gives promise of developing into a hale and hearty fowl. He is of opinion that people who go in for monocular photography are "mostly f—ls." Mr. Chadwick was Hon. Secretary of the Manchester Society for fifteen years, and so little did the Society appreciate his services that it has condemned him to wear a handsome gold watch for the remainder of his life. His business and photographic energy are like gases in cylinders—kept under great pressure. He is extremely popular in the north. Him the poet probably had in his mind's eye when he wrote those immortal lines—

"He's all right when you know him;
But you've got to know him first."

But, then, who doesn't know Mr. Chadwick? Limelight.

(To be continued.)

LANTERN MEMS.

Compressed gas in cylinders has been the most important item for consideration during the past month, from the fact of the fatal explosion at Bradford necessitating a coroner's inquest, and experiments and statements by experts to show the strength of the cylinders and what risks are incurred in their use and conveyance.

* * * * *

Of their strength under ordinary conditions a great deal has been written at various times, and considerable pains taken by one, at least, of the Gas Compression Companies to find out really the strength of the various quality of solid-drawn and other steel tubes as against the old iron cylinders. Then, as to the tests employed before filling, everything seems to have been done that human forethought and ingenuity could suggest; but, when it comes to the distributing part, there the weakness of the whole system comes in.

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Cautions there have been in plenty, showing it is not fair to the carriers or users to send cylinders unprotected by rail; and, after what has now happened, no one ought to send cylinders about except in the care of adults who understand the nature of their charge, or, if to go by carrier or railway, without being properly packed in an extra strong case. While the Gas Compressing Companies still continued to send cylinders unprotected, very little good came of isolated examples among opticians to bring about a more cautious treatment. Readers of The British Journal of Photography will remember I have alluded to this risk more than once, and felt the danger of cylinders being treated simply as "hardware" or bales of goods, and pitched and thrown down with the "usual care" of the proverbial railway porter.

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Writing the above before the result of the coroner's inquest was known as my idea on the subject, I find the conclusions of the jury entirely endorse them, for, in their finding, "they strongly recommended that in future these cylinders, when sent out, should be protected, either by cases or otherwise." Users of compressed gas have only now to *insist* on their cylinders being sent them properly protected, and to make a point of putting a special mem. on their order for gas in new cylinders, that a strong box shall be supplied; and, if they already possess cylinders, have cases made three-quarters or one inch thick with extra strong ends, and fixing on for the nozzle of cylinders so as to prevent it knocking the end of case out.

* * * * *

The matter of the material (steel) suitable for gas cylinders will have to be settled by experts in metals and engineering, but the broad fact cannot be overlooked, that of the thousands of cylinders in use only one or two have failed, and these through rough treatment. Therefore, if lanternists and carriers are protected by cylinders being duly protected in transit, the use of compressed gas will be as popular as ever. A point of some importance, as a technical detail that has come to light since the accident, has been the necessity of reannealing each cylinder after testing.

* * * * *

I am indebted to Mr. Hatton, the Secretary of the Projectile Company for certain details connected with the manufacture of cylinders that are not only interesting but reassuring, for, from what I heard and saw at the works, everything seems to be done to make the best possible cylinder out of certified qualities of steel. The various processes of drawing, testing, pickling, tempering or annealing, and gauging for thickness and size being done with the utmost regularity and precision, and the various stages through which each cylinder passed ensuring a sequence of proper treatment that seemed to render any passing over of a needful item impossible.

* * * * *

Some question has been raised as to the proper strength of steel for these cylinders, and, while not venturing to give an opinion on such a special matter in any way opposite to that already published, it seems that a cylinder that will bear a strain of say thirty-five tons to the square inch with twenty to twenty-two per cent. of elasticity must be good material. This is practically the result of an expert's test of a cylinder of exactly similar make to the one that the accident occurred with—in fact, made in the same batch, under exactly the same conditions, from the same material of steel.

Owners of cylinders must be prepared for a little time to come to spare their cylinders, when sent to be filled, for a much longer time than usual, for each one will have to be reannealed periodically, and always after each time of testing, for it is now found to be necessary on account of the action on the steel when testing for strength (at, say, two tons' pressure) to somewhat soften the material again by slowly heating the cylinder and allowing to cool again, or annealing, as it is called.

* * * * *

At this season of the year many little points crop up in lantern working, especially with beginners or those taking up a new light, and the natural result is they write to the optician or supplier of the apparatus for explanation. In cases of this kind much valuable time would be saved if, instead of mixing up their queries with their letter, they would put them on a separate piece of paper, taking up half the sheet for the questions, and leaving the other half free for the answers, numbering each question in rotation. G. R. Baker.

GAS CYLINDERS AND EXPLOSIONS.

A good many lanternists know that a gas cylinder exploded a few days ago at Bradford, and that it killed the boy who was carrying it, and beyond the fact that it is said the metal of the cylinder was defective very little else is known. Of course, there is a slight scare at present, but the circumstances will soon blow over and be forgotten until another explosion occurs. In my opinion we may expect these explosions much more frequently from now.

I am not an alarmist, nor am I a timid man, but I do like to know something about the things I use, especially if those things are dangerous.

Some people say that gas cylinders are not dangerous, and it has been said, 'Fools rush in where angels fear to tread.' If we admit that a perfect cylinder, properly handled, is not dangerous, I would like to ask, How are the public to know that they are perfect, or that they have been properly handled even before coming into the user's possession?

The cylinder that exploded at Bradford was said to be defective. Then, why did the Oxygen Company fill a defective cylinder? The reply is easiest by saying that they did not know it was defective. Then, are there any other defective cylinders in use?

It is said that great improvements have of late been made in the manufacture and quality of material of gas cylinders. Then, what about those made before the improvements?

There are plenty of cylinders that have been in use for many years and are still in use to-day; but that is no guarantee for their safety to-day; on the contrary, perhaps.

Most lanternists know that cylinders expand (stretch) by pressure (when charged), and that they contract as the pressure is relieved (emptied); and so does a rubber band. Does this constant expansion under high pressure and contraction improve a cylinder? Does the metal always remain the same in quality? Certainly not.

I know of plenty of cases where cylinders that have been in use for years and not retested, and other cases where cylinders have been under the full pressure for three and four years; then, again, I know of plenty of cases where cylinders have been overcharged, one hundred and thirty to one hundred and thirty-five atmospheres is not uncommon. It will be remembered that some time ago I told the readers of the Journal that a friend of mine had had a cylinder charged in excess of these figures, and now I may tell the reader that "the friend" was my own self. I saw it done with my own eyes, when I wrote advocating a safety valve by which it would be impossible to overcharge a cylinder. The manager of one company replied that they already had such an appliance; of course I don't know what they have. I know that a branch of the same company had not, but what I have said is a mild experience compared with some things that could be told.

It will perhaps be remembered that up to a certain date both oxygen and coal-gas cylinders were provided with similar valves, and by which the various fittings or connexions could be used for either, and thus there was a possibility of charging a cylinder with the wrong gas or of mixing the gases; indeed, this has actually occurred more than once, with fatal results. Then an order was issued by certain firms that all cylinders for coal gas must be revalved, and uninterchangeable fittings provided, to prevent the possibility of filling a wrong cylinder, and this alteration was freely advertised, and considered a step in the right direction; but some few months after considerable expense had been incurred by revalving coal-gas cylinders and alterations to fittings my own carter brought me a nice little interchangeable adapter, by which we could connect an oxygen cylinder with a coal-gas cylinder, or use any fittings or connexion with either gas, and the adapter was sent to me as a present from the man who fills the cylinders, with the message that "I would find it very useful." Since that time these interchangeable adapters have become commercial articles.

Now, it would be interesting to know why we were obliged to have our coal-gas cylinders and fittings altered, for the security which was paid for is *gone*.

Surely what has actually occurred and has now been said ought to show that the public require protection. If a man goes to buy an eighteen-carat gold watchguard, he can have a guarantee by a Government test and stamped. If we want a sporting gun, we can have Government-tested and stamped barrels; but what is the bursting of a gun barrel to the bursting of a gas cylinder? If the gun barrel bursts, it might injure the user or it might kill him, but the explosion of a gas cylinder might just as easily kill 500 people as one. Take for instance, the last year's explosion at Ilkeston. That was a gas-bag explosion under very insignificant pressure compared with a gas cylinder, but the force of it was sufficient to bulge to many inches the narrow lead-tight windows of a very large newly built chapel, so that the pressure must have been enormous; and I remember, when inspecting the place, asking myself what would have been the result of a cylinder explosion? Why, the walls would have been blown out, and the roof would have come down amidst a room full of people.

It is all very well for some writers to try and smooth the matter over as best they can, to say the things are safe, or that by doing so-and-so there is no danger; that is all nonsense. As a rule, people who write such nonsense are either commercially interested or they don't know anything about it. A man may have used cylinders a dozen years, and yet know very little about the present subject.

In conclusion, I say again the public require protection, and the only way to get it that I can see is by a Government inspection and supervision. W. I. Chadwick.

CHARITABLE LANTERN ENTERTAINMENT SOCIETY.

The following are extracts from the first annual report of work and accounts, 1892–3:—"We beg to lay before you a brief report of the work done by the above Society during its first year—1892–3—which we are sure will be read with interest by the subscribers, and trust it may be the means of inducing others to also become subscribers.

"The Society was inaugurated in October, 1892, for the purpose of giving free lantern entertainments, accompanied with music, &c., to the inmates of our hospitals, infirmaries, workhouses, and similar institutions, during the winter months.

"The Society gave, last winter, twenty-five entertainments, among which were included the Temperance Hospital, two wards; St. Mary's, Paddington, two; Victoria Hospital for Children, two; North Eastern London Hospital for Children, two; the Children's Hospital, Great Ormond-street, W.C.; the Paddington Infirmary; St. Pancras Infirmary; Fox-court Ragged Schools, W.C.; St. Paul's, Herne Hill, Sunday Schools and Church of England Temperance Society; the British Home for Incurables, Clapham, S.W.; St. Stephen-the-Yeoman Mission, Jamaica-road, Bermondsey, two; St. Marylebone Workhouse; the Home for Incurable Children, Maida Vale; St. Jude's Mission, Brixton; Hanwell Asylum; the Y.M.C.A., Aldersgate-street; and others, which entertainments were highly appreciated, and gave great delight to the poor inmates.

"Our thanks are due to the Y.M.C.A., whose Secretaries—Mr. Burn and Mr. Puttrill—kindly placed a room, free of cost, at our disposal for meetings, &c., thus saving considerable expense.

"It will be seen by the balance-sheet that the receipts were 17*l.* 1*s.*, and the expenditure 22*l.* 13*s.* 9*d.*, which shows a deficit of 5*l.* 12*s.* 9*d.* The Society is indebted to one of its members for the use of the lantern and apparatus, sufficient funds not being forthcoming to enable one to be purchased for the Society.

"We therefore trust that kind friends will come forward to help us to fit the Society out with the necessary apparatus.

"In conclusion, we beg to thank our subscribers and members of the Society who have, by their kind help, enabled the work to be carried on with success, and trust that the ensuing season—1893–4—will bring new help, without which it will be impossible to carry on the Society, which, as before mentioned, needs funds by which a lantern and apparatus can be purchased.

"The Society is in urgent need of funds to enable it to carry on the work this winter, and subscriptions will be thankfully received and acknowledged by,

"Yours very faithfully,

"F. Simmons,

"158, *Frances-terrace, Herne Hill, S.E.;*

"B. Foulkes-Winks,

"2, *Pretoria-avenue, Walthamstow, Essex.*"

THE BURSTING OF AN OXYGEN CYLINDER AT BRADFORD.

On the 17th instant the Bradford Borough Coroner resumed his inquiry into the death of the lad, J. W. Fuller, who was killed by the bursting of an oxygen cylinder which he had dropped. After hearing expert and other evidence, the jury returned a verdict that the deceased met his death from the accidental bursting of a cylinder made of unsuitable metal, and they strongly recommended that in future these cylinders when sent out should be protected either by cases or otherwise.

The principal expert witness examined was Professor Goodman, of the Yorkshire College, who had inspected the fourteen pieces of metal in the possession of Superintendent Paul, and also the sound coal-gas cylinder. Every piece was carefully examined. The fractures in every part were crystalline—coarsely crystalline in the portions of the bottom and top of the cylinder, but of finer grain in the centre. There was a peculiar fracture near the top of the cylinder, which was different in shape from any other fracture. This might or might not have been due to a flaw in the material. The point was a doubtful one, and opinions might differ. The spot was carefully examined, but he could not come to any definite conclusion. The fractured pieces showed bulging, which might have been done in the accident. The thickness of the metal varied very much over the cylinder. It was impossible to avoid some little variation in making such cylinders, but he certainly thought the variation much greater than it ought to have been. In a well-made cylinder the variations would not be so great. He had only a limited knowledge of the manner of making such cylinders.

The Coroner: Would not the varying thickness of the metal be a source of weakness? Witness: Yes, and no. If the thinnest portion was sufficient to bear the pressure, the variation of the thickness would be no weakness, but, if the metal was so badly disposed that the thinnest portion was unable to bear the pressure, that would, of course, be a weakness. That risk of bulging, Mr. Goodman went on to say, would certainly be greatest where the metal was thinnest. He took away to Leeds two pieces of the broken cylinder which he first had photographed. The pieces were then cut up into test pieces, and subjected to a series of experiments. A sound cylinder supplied by Messrs. Riley as a duplicate was also handed to him, and this he caused to be cut into pieces, and found it as variable in thickness as the one which was broken. These pieces were also subjected to experiment, and the witness handed in a detailed report of the character of the tests inflicted and the results obtained. Steel ought not to be used of a greater tensile strength than 32 tons per square inch, and no boiler-maker would dare to use it of greater tensile strength for internal pressure. The steel of the cylinder in question was very high indeed in tensile strength. In some cases it was over fifty tons per square inch. This in itself was not harmful, but it was always considered that steel of very high tensile strength was very brittle, and therefore unsuitable for internal pressure, especially when, as in the case of an oxygen cylinder, it was likely to be subject to much knocking about. The remedy, of course, would be to use material of great ductility. The steel actually used was, in his opinion, unsuitable for the purpose. The maximum thickness of the body of the duplicate cylinder was found to be ·242 in., and the minimum was ·164 in. In the cylinder which burst he found that the pieces varied from ·172 in. to ·205 in. in thickness, though he might perhaps find a thicker piece on examination.

The Coroner: You have heard the evidence that this cylinder fell from the shoulder of the deceased on to the concrete floor. Does that explain its bursting?—Yes; after looking at the figures of my experiments, which show how very hard and brittle the material is. Although the tensile strength is very great, it has very little ductility. If the material used were good material, there ought not to be the slightest danger of an explosion from such a fall on to the floor. This morning, before coming here, I took one of the cylinders which we are constantly using at the Yorkshire College, and dropped it 22 ft. 6 in. on to a cast-iron block. There was no explosion, and the cylinder received only a small dent.

In reply to further questions, witness said that the cylinder of which he had just spoken was charged with oxygen at the time, and it was charged by the same firm—the Manchester Oxygen Company—which filled the cylinder that burst. But it was a cylinder of different make to that which burst. He then took a cylinder similar to the one he dropped that morning, and cut it up, and found that the thickness was—maximum ·232 in., and minimum ·178 in. A third cylinder was burst by hydraulic pressure, the bursting taking place at between 59 cwt. and 60 cwt. per square inch. These experiments confirmed his opinion that the material used in the cylinder which burst and killed the deceased was improper. The annealing of steel reduced the tensile strength somewhat, but increased its ductility and made it more capable of stretching without breaking. The annealing process was indispensable, and no cylinder ought to be sent out until it had been thoroughly annealed. With regard to tests, he believed that cylinders ought to be tested to a considerably greater extent than the working pressure, but he believed that it should not be as much as double the working pressure, as it was possible to permanently injure a cylinder in the testing.

The Coroner: Your opinion is that the cause of the bursting in this case was the defective material of which the cylinder was composed?—Witness: Yes; but I would hardly say "defective" material—it was unsuitable material, and if it had been annealed the chances of accident would have very much less. Witness went on to say that he did not think it could be said that there was any danger attending the use of a properly constructed and annealed cylinder. There were probably some hundreds of thousands of these cylinders in circulation in the country, and this was the very first accident which had ever occurred from the breaking of an oxygen cylinder or "bottle." Of course, if the cylinder or "bottle" were made of unsuitable material, there would be serious danger.

In reply to Mr. Morgan, witness said there would be no outward appearance to indicate that the cylinder in question was of unsuitable material and had not been annealed, for the cylinder had been painted. At the Yorkshire College the cylinders used were not subjected to any test whatever, the makers being trusted. He had himself never cut up and tested a cylinder before this accident. His predecessor, however, had on one occasion cut up a cylinder and made tests, of which witness had the result. There was a mark on the valve of the cylinder which burst and killed the deceased, indicating that it had been tested on a ton and a half per square inch. He declined to commit himself to any opinion as to whether this test was sufficient for a working pressure of 1800 lbs.

ENRICHMENT OF COAL GAS BY THE HYDRO-OXY PROCESS.

The lecture recently delivered by Professor Vivian B. Lewes, F.I.C., to the members of the Society of Engineers, entitled "Gas Substitutes," gives us, says *The Gas World*, the opportunity of referring in detail to the hydro-oxy process now in practical operation at Huddersfield, and by means of which results have been obtained of a more satisfactory character than were expected in the experimental stage.

Early in 1890 British gas managers became aware, by the publication of the English patent specifications, of the somewhat bold proposal of Mr. Edward Tatham, of New South Wales, to add considerable quantities of pure oxygen to warm, heavy oil gas, with the object of producing a stable gas of very high illuminating power. This oxy-oil gas was, later in the same year, brought more prominently before the gas world in a paper communicated to the Gas Institute by Dr. L. T. Thorne, giving the results of preliminary experiments with this gas, carried out on behalf of Brin's Oxygen Company. In this paper, whilst belief was expressed in the ultimate employment of rich oxy-oil gas as an illuminant *per se*, the more immediate prospect of its use for enriching gases of low or non-illuminating power was pointed out.

Owing to the illness of the representative in England of the Australian Syndicate, to the difficulties inherent in introducing a totally new and rather startling process, and to other causes, there has been considerable delay in the development of the oxy-oil gas process in England. At length, however, a fair start has been made. Whilst the Hydro-oxy Gas Patents Proprietary, Limited, have erected at 11, Salisbury-square, E.C., a complete experimental plant for showing the process, and for enabling gas managers to make their own tests, plant is being put up by the Corporation of Huddersfield for the purpose of enriching the coal gas supplied to that borough.

Though the Huddersfield installation is not yet completed, part of it is in practical work; and this new departure in enriching processes is of such great interest that we feel sure our readers will welcome the publication of results at the earliest possible moment, even though these results have been obtained under the necessarily adverse conditions of a new and hardly complete installation, and will therefore be subject to revision, and probable improvement, when the plant has been got into thorough working order.

The Huddersfield plant, when completed, will consist of an oxygen plant and four bays of oil-gas retorts, capable together of a daily make of 200,000 cubic feet of oxy-oil gas, with the necessary adjuncts of condensers, holders, &c.

The oxygen plant, which is completed and in full working order, has been erected by Brin's Oxygen Company, and is their newest type of producer. It is built in two sections, which may be worked either together or separately, according to the exigencies of the gas output. This producer will make 30,000 cubic feet of oxygen per day, and is the largest oxygen-producer ever yet erected.

Of the oil-gas plant one bay, capable of producing about 50,000 cubic feet per day, has been erected, and is now working. In this bay there are fifteen cast-iron retorts, 8 inches in diameter and 7 feet long, and having 5½ feet of heated length between the walls. These retorts are set with a very slight fall (about one inch) towards the back of the bay. The oil is fed into the retorts through 2-inch iron pipes passing through the front covers and terminating about half way along the retorts. These feed pipes are kept in duplicate and are fixed by clamp flanges. Thus, when one becomes stopped, it can be removed, and replaced by its duplicate in about two minutes. The oil is supplied to these feeds by means of specially constructed syphons carrying floats so arranged that any back pressure, caused by stoppage in the feed pips or pressure in the retort, at once raises the float, which in its turn shuts off the cock of the oil-supply pipe of that particular retort. Arrangements are also made for shutting off each row of retorts without interfering with the working of the other rows.

In the present setting the bottom (and hottest) retorts are arranged so as to be used for cracking the residuals from the upper retorts; but they may, at will, also be fed with clean oil. The oil is cracked at a low red heat, a canary-coloured oil gas giving the best results under this process. The oxygen is admitted to the oil gas soon after the latter leaves the retorts and whilst it is still warm, the two gases then passing together through the condenser. The admission of the oxygen is controlled by specially coupled meters, supplied by Messrs. W. Parkinson & Co. The meter registering the oxy-oil gas made is so coupled with a balanced oxygen meter that the oxygen is introduced into the oil gas in the proportion of 15 per cent. of the oxy-oil gas made. The admixture of oxygen is thus automatically adjusted to the quantity of oil gas being made; the working of the process is rendered very simple, the labour required being reduced to a minimum.

The intention is to run the oxy-oil gas into a special holder, from which it may be passed into the coal gas just before the station meter, the quantity being regulated, at the will of the manager, by a meter coupled with the station meter. At the time up to which our figures were taken the connexions with this storage holder had not been completed, and the oil gas made had been passed direct into the main carrying the coal-gas make from a portion of the works. Consequently no reliable tests of the illuminating power of the oil gas *per se* had been possible, but only of the enrichment produced on the coal gas.

In the twelve days during which the oxy-oil gas plant had been running, 244,600 cubic feet of oxy-oil gas had been made and run into the coal gas, the total quantity of enriched gas registered during this time being 4,103,000 cubic feet. Owing to the shortness of ordinary coal, on account of the strike, a large percentage of cannel coal had been used in the coal-gas make, with the result that the average candle power of the unenriched gas was 18 candles. This high candle power would, as far as present experience goes, be against the process, and the enrichment of a poor coal gas would probably give higher results. The oxy-oil gas added increased this to an average of 23·5 candles, or 5·5 candles increase for 5·96 per cent. addition of oxy-oil gas. This is equivalent to an enriching value of about 109 candles per 5 cubic feet of oxy-oil gas.

Taking the whole amount of oil used during this trial (a proceeding against the process, as in the early stages of the working some oil was undoubtedly wasted and more tar made than would be the case in regular work), the yield of oxy-oil gas per gallon of oil used works to about 90 cubic feet. On this basis the effective enriching power works out at more than 1900 candles per gallon of oil—a result which should secure for the gas the careful attention of gas managers.

With the experimental plant at Salisbury-square makes have been obtained of about 100 cubic feet of oxy-oil gas to the gallon of oil, showing 95 to 100 candles on the bar photometer against the Methven screen; and it is believed that the gas made at Huddersfield has not yet been brought up to this, its full standard.

The coke made averaged about 50 lbs. to the ton of oil cracked—a *very* low figure in gas-making. The residual tar was also very small; and the patentee believes that in continued practical working it will be reduced almost to nothing. In consequence of the small quantity of coke and tar produced, the retorts fed with clean oil required clearing only about every five days.

The question of the stability of oxy-oil gas, both *per se* and as an enricher, was some time ago carefully investigated by Dr. Thorne. It was also tested independently by Mr. W. R. Herring, the manager of the Huddersfield Corporation gasworks, when he was investigating oxy-oil gas before recommending to his Corporation its use as an enricher in place of cannel. Both of those gentlemen not only satisfied themselves on the practical permanence of the gas, but found that, when used for enriching purposes, it actually increases the stability of the enriched gas. The poor coal gas used in the experiments actually lost more illuminating power on keeping than the same gas enriched with oxy-oil gas did under identically similar conditions.

Turning to the question of cost, it is estimated that with oil ("solar distillate" of about 0·870 specific gravity) at 3*l.* 5*s.* per ton—the figure now being paid for the small quantities which can be stored on the works at Huddersfield—and with oxygen at 4*s.* per thousand cubic feet—including wear and tear, interest on plant, and special royalty payable under the hydro-oxy agreements, at which price it should certainly be made with a Brin plant of the size of that at Huddersfield—the cost of oxy-oil gas into the holder, including interest, wear and tear of plant, and royalty, should not exceed 3*s.* 9*d.* per 1000 cubic feet. As soon as arrangements for storage are completed the oil will certainly be obtainable at 2*l.* 15*s.*, if not lower; and this will reduce the cost of oxy-oil gas to about 3*s.* 3*d.* Calculating on the higher basis, the enrichment obtained at Huddersfield works out at less than 0·3*d.* per candle per 1000 cubic feet; and on the lower basis at ¼*d.*

This process is now also being introduced in foreign countries; and in America it has an especially favourable field. With the very low-priced oil obtainable in the United States, the Hydro-oxy Company is confident that it could manufacture a gas of, say, 80 candle power, free from smoke and sulphur, at a price even below the average cost of gas in that country, which would prove a very formidable rival to the electric light.

Lantern Queries.

Those correspondents who write regarding the cylinder accident at Bradford are referred to an extract from the evidence at the inquest, as well as to some remarks by Mr. G. R. Baker and Mr. W. I. Chadwick, which are given in this issue of The Lantern Record.

Cloud.—Your query arrives opportunely. You will see from "Recent Novelties in Lantern Apparatus" that cloud negatives for lantern slides are commercially obtainable.

C. Farrow.—Some years ago a series of articles on Colouring Lantern Slides, by the late Mr. A. W. Scott, appeared in The British Journal of Photography, to which we refer you.

Several articles are unavoidably held over.

Lime.—Possibly the limes were kept in an unsuitable receptacle. Keep them in a clean wide-mouthed bottle, and lute the stopper.

RECENT LANTERN PATENT.

PATENT COMPLETED.

Improvements in Carriers for Holding Magic-lantern Slides.

No. 16,177. Lewis Myer Isaacs, 40, Furnival-street, Holborn, Middlesex. *September* 9, 1893.

The object of this invention is to enable magic-lantern slides to be placed in front of the lens from either side and properly centered by any person, the displayed slide being pushed out into a position for easy withdrawal by the act of centering the new slide.

Now, according to this invention, I provide a frame carrying two lantern slides sliding within a skeleton frame, which fits the "lens aperture" in the lantern.

The upper rail of the sliding frame has attached thereto two or more rollers, over which runs a band of tape or other suitable material, the ends of which are attached to the inside of the upper rail of the skeleton frame.

To the centre of the band I attach a projection or carrier of metal, or other suitable material, for the purpose of pushing out the slides on either side consecutively to enable the same to be grasped and withdrawn by the operator. I attach also to the said band two suitable clips to carry the slides before the lens of the lantern.

I provide further a piece of wood or other suitable material sliding easily in the sliding frame, which serves to form a stop for the slide when in position, and also to close the opening left by the receding slide, thus shutting off the light from the lantern screen until the next slide is properly centered.

On Thursday, November 30, before the members of the Liverpool Amateur Photographic Association, a lantern lecture by Mr. W. P. Christian was delivered on *Quiet Corners in France and Italy*. The following is a synopsis of the lecture: Quiet nooks in the Riviera—St. Raphael; picturesque coast scenery; Nice; Monte Carlo. The Italian Riviera—Ventimiglia; the cattle market; Bordighera and its adjacent valleys; San Remo; Porto Maurizio; Oneglia; Alassio; fisher folk; studies of Italian character; quaint and sleepy towns; Genoa, its Campo Santo; Pisa, its wonders in marble; the Carrara marble quarries; Pavia; the Certosa; Padua; Milan. Venice—The Ducal Palace; St. Mark's; the Lagoons; Chiogga. The Italian lakes—Como; a beautiful retreat; Maggiore; Pallanza; Locarno; a pilgrimage shrine; valley of the Ticino; Faido; quaint châlets; a mountain valley; early market.

The Newtonian Lime Cylinder.—Messrs. Newton & Co., of Fleet-street, are placing on the market a new lime cylinder, which is made of an intensely luminous stone lime, and by the aid of special tools can be supplied accurately turned. The cylinders are treated chemically to enable them to resist damp, and are packed in tin tubes, without any loose lime dust. They should be very convenient to the lanternist, the central hole of the cylinder not being blocked up, and the limes therefore being much pleasanter to handle than the usual variety. They are of a hard kind. We shall take an early opportunity of trying the limes and reporting on their light-giving properties.